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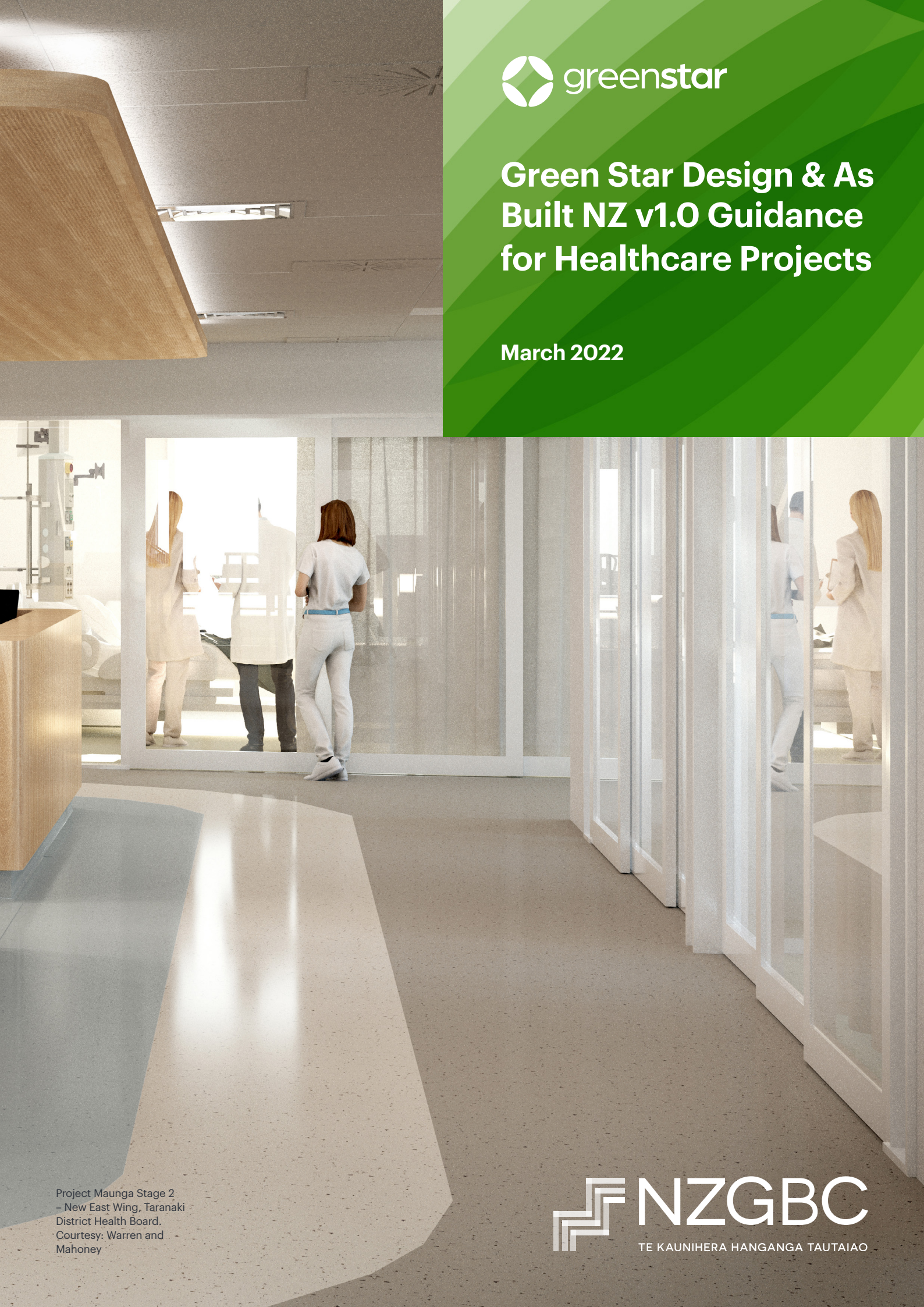
Green Star Design & As Built NZ v1.0 Guidance for Healthcare Projects

March 2022



Project Maunga Stage 2 – New East Wing, Taranaki District Health Board. Courtesy: Warren and Mahoney

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TE KAUNIHERA HANGANGA TAUTAIAO

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Project Maunga Stage 2 – New East Wing, Taranaki District Health Board. Courtesy: Warren and Mahoney

Introduction: Green Star – Design & As Built NZv1.0 guidance for healthcare projects

"*Sustainability and the Health Sector- A guide to getting started*" issued by the Ministry of Health in 2019 stated the following: "All new builds, fit-outs and renovations should use a certified sustainability rating system such as Green Star, which 'designs in' efficiencies and healthy buildings." As a result, Green Star is seeing an increased uptake in the New Zealand healthcare sector.

The New Zealand Green Building Council (NZGBC) has been working with asset owners and consultants to find new ways to create sustainable outcomes in these buildings. The purpose of this document is to provide additional information to help buildings such as public and private hospitals, and aged care facilities where substantial care is delivered (however not retirement villages) target a *Green Star – Design & As Built NZ v1.0* rating. It aims to address key barriers found in specialist healthcare facilities, the application for large healthcare projects such as hospitals, and re-alignment of selected benchmarks within Green Star the *Design & As Built NZ v1.0* tool with healthcare specific requirements. It also seeks to provide clarity in areas of Green Star guidance that have been ambiguous for the sector.

This guide has been developed for all those involved in healthcare projects that aim to achieve a Green Star *Design & As Built NZ v1.0* rating, including building owners, Green Star Accredited Professionals, and contractors etc. If that is you, then this is intended to make your work more straightforward.

How was this guide developed?

We worked with the Ministry of Health, the Green Building Council of Australia, consultants and contractors involved with Green Star healthcare projects to determine the additional guidance and pathways for the healthcare sector. By better understanding the drivers and the barriers to certification, we aimed to reduce time and cost barriers for healthcare assets to achieve Green Star *Design & As Built NZ v1.0* ratings.

What happens next?

NZGBC is committed to an update to *Design and As Built* and subsequently a review for the next iteration of Green Star. We will continue to work with those involved in delivering healthcare facilities as Green Star evolves.

If you have any other suggestions or feedback related to this guide or on how Green Star can continue to improve the healthcare sector, please contact us at greenstarnz@nzgbc.org.nz.

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List of credits involved in this guidance

CATEGORY	CREDIT	CRITERIA
General	Large Healthcare Buildings Definition Nominated spaces for Typical Healthcare Spaces	
Management	5 Commitment to Performance	5.2 End of Life Waste Performance
	6 Metering and Monitoring	6.1 Metering
	8 Operational Waste	8A Performance Pathway – Specialist Plan
Indoor Environment Quality	9 Indoor Air Quality	9.2 Provision of Outdoor Air
	10 Acoustic Comfort	10.2 Reverberation
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Credit Criteria Guidance

Using this document

Guidance provided in this document is intended for buildings where the primary building purpose is to provide healthcare. This could include New Zealand Building Code building classifications such as public and private hospitals, and aged care facilities where substantial care is delivered (but not including retirement villages). The guidance in this document is in addition to the Green Star – *Design & As Built NZ v1.0* Submission Guidelines unless expressly stated otherwise.

Use of this document isn't mandatory for healthcare projects. However, project teams wanting to adopt amended criteria must use the document guidance in full. Project teams must also clearly reference this guidance document in the relevant credit's submission template and include a copy of this document in the General Section.

Healthcare projects that are already halfway through the certification process before this document is released can still use the guidance in this document. Further inquiries regarding the application of this document can be discussed via a Technical Question to NZGBC.

The Green Star – *Design & As Built NZ v1.0* Potable Water calculators and selected submission templates have been updated with the healthcare-specific pathways and credits to facilitate project teams with using this guidance document. They can be downloaded from the Green Star resources webpage here.

Definitions of building size

This guidance document recognises that large healthcare buildings (such as main centre and regional hospitals) often have unique design requirements which do not always align with general Green Star design criteria. For instance, in credit 6.0 Metering, the existing Submission Guidelines direction to meter different sub-floor uses (such as seminar rooms and office spaces) would be of limited benefit to implement where multiple departments and room use-types are present on the same floor. In other examples, due to healthcare planning requirements, the design of an emergency department may preclude the admission of daylight into the central areas of the department.

Throughout this guide, a large healthcare building is defined as being both:

- ≥10,000m^2 GFA, and
- three or more floors

The following credits have been amended and have a required pathway for large healthcare buildings:

6.0 Metering and Monitoring

8.0 Operational Waste

12.2 Daylight

12.3 Views

Small healthcare buildings, defined as having a GFA of <1,000m^2, are still able to meet the small buildings exception for all credits. Healthcare buildings with a GFA >1,000m^2, but <10,000m^2, are not subject to either small or large building credit exceptions.

While the above definitions have been provided, they are not strict thresholds. Project teams may request that their building be assessed using the large buildings exceptions even if the building does not meet the thresholds listed above. In this instance, it should be demonstrated that the building has, at a minimum, large, and deep plan floor plates.

For example, a major extension to an existing hospital, which is necessarily restricted to deep floor plates due to healthcare planning or site restrictions, may still be eligible for the large buildings exception even if it is below 10,000m^2.

The only definitions for building size are for small buildings (as already noted within the Submission Guidelines) and large healthcare buildings as defined above. If a building is either not a small or a large building, it must use the Submission Guidelines credit criteria.

Clinical healthcare requirements

Where a space has a clinical functional requirement, which contradicts the requirements listed in either the Submission Guidelines or the *Healthcare Guidance* documents, the clinical requirement shall **always** take precedence. Clinical spaces are considered Not Applicable within most of the Indoor Environment Quality category. Examples of spaces which have clinical requirements that can supersede Green Star requirements are:

- Operating theatres
- Birthing & Caesarean delivery
- Trauma/triage, infection control, decontamination rooms and burns units
- ICUs & high dependency units
- Isolation rooms
- Patient imaging for surgery e.g. critical care (diagnostic patient imaging is excluded)

All spaces shall still be included for other credits which use the 'Whole Building' assessable area definition.

Common healthcare space types

As described in the Green Star – *Design & As Built NZ v1.0* Submission Guidelines, the nominated area refers to the areas of a building which are nominated as relevant to particular credit criteria. Select credits refer to 'nominated area' which can include combinations of primary, secondary, and tertiary area types. The predominant use of the space determines the space type classification.

Below is a list of **Indicative** non-clinical space types which may be found within a healthcare setting. More space types may be found within various healthcare buildings; however, the list below has been developed to capture most space types. These spaces have been assigned an indicative Primary, Secondary, or Tertiary designation. These designations are to be used as guidance only – it is expected that healthcare planners categorise the space types. Awareness of clinical healthcare requirements should be considered when categorising space types.

MAIN SPACE	SUB-SPACE	SPECIFIC SPACES (EXAMPLES GIVEN)	POSSIBLE PRIMARY, SECONDARY OR TERTIARY DESIGNATION
Patient Areas	Wards		P
	Maternity	Wards - infants	P
		Nurseries & wards	P
Primary Treatment Areas	General treatment bay		P
	Recovery		P
	Accident and emergency	Triage reception	P
		Treatment/examination room	P
Consult, Examination and Treatment	Consult/examination		P
	Audiometry		S
	Physiotherapy		P
	Endoscopic		S
	Ophthalmic		S
	Long stay patient imaging 2+ hour stay e.g. MRI		P
	Short stay patient imaging sub-2 hour stay e.g. X-Ray, Ultrasound etc.		S
	MRI anaesthetic		S
	Oncology (including chemotherapy, radiation treatment)		P
	Dental		P
	Dermatological		P
	Dialysis		P
	Therapy rooms (mental and physical health)		P
	Activity room		S
	Pathology labs		P
	Mortuary/post-mortem		S
Primary Staff Areas	Nurse & orderly stations		P
	Primary pharmacy (extended occupation for pharmacists)		P
	Medical staff overnight stay rooms		P
	Staff rooms and respite spaces		P
	Doctors / nurses duty rooms		P

MAIN SPACE	SUB-SPACE	SPECIFIC SPACES (EXAMPLES GIVEN)	POSSIBLE PRIMARY, SECONDARY OR TERTIARY DESIGNATION
Secondary Support Areas	Laboratory and dispensary support		S
	Central sterile services Department		S
	Maternity support	Babies wash	S
		Formula preparation	S
		Feeding rooms	S
	Patient imaging support	Control & prep rooms	S
	Orderly and nurse Support	Medication & prescriptions	S
		Kitchen and meal prep	S
Administration	Office		P
	Reception areas (all)		P
	Conference rooms		P
	Meeting rooms		S
Food Prep	Kitchens		S
	Dining rooms		S
Other Spaces	Retail		P
	Laboratories		P
	Classrooms & seminar spaces		P
	Day-care & childcare		P
	Shell spaces		P
Visitor Spaces & Lounges	All visitor waiting areas		S
	Whānau rooms		P
	Children's playroom		P
	Prayer/meditation/chapel		P
	Patient lounges		P
Tertiary Areas	Changing rooms, WCs & showers – patient ensuites included		T
	Circulation including atria, ante rooms, and patient transit		T
	Waste rooms, cleaning stations, laundry, and dirty rooms		T
	Preparation and scrub spaces		T
	Comms rooms		T
	Plant rooms		T

As healthcare spaces tend to be very cellular, the above areas are generally defined on a per room basis rather than an entire department. As such, each space should be considered separately where a physical boundary exists (e.g. an internal partition wall). Where no physical partition exists, project teams are expected to make reasonable estimations for where one space starts, and another begins. For example, a reception area and adjacent corridor should be separated between primary and tertiary spaces respectively. Project space types should be shown on a set of floor plans at project submission stage including locations and sum of each primary, secondary, tertiary area per floor.

Area definition

Project teams should use the above categorisations wherever possible, however where space types exist in the project which are not listed above, the project team may align the space to its nearest equivalent, or define a new space type should they deem it necessary.

While whānau spaces may only be used for small periods of time, they have been categorised as primary spaces as they will benefit from daylight and access to views.

Where project teams seek to exclude areas from credits due to different functional requirements, the project team must submit an Area Definition Request to the NZGBC for approval. Project teams are encouraged to contact the NZGBC Technical Coordinator where they have specific questions regarding their project.

Project Maunga Stage 2 – New East Wing, Taranaki District Health Board. Courtesy: Warren and Mahoney

5.2 End of life waste performance

Fitout lifespans of healthcare facilities tend to be significantly longer than the expected lifespan of non-healthcare developments. Given that the building owner and tenant of a healthcare facility are often the same entity and the original requirement of End of Life Waste performance offers limited environment benefits to such healthcare facilities, this criterion for healthcare facilities has been reframed to focus on designing for robustness.

1 point is awarded for projects that can demonstrate compliance with either of the following pathways:

A. Adequate protection is provided to exposed elements of the building and landscape to minimise the frequency of replacement and maximise materials optimisation, in accordance with 5.2A.

B. A formal commitment is in place to achieve a certified operational performance rating for the building, addressing waste from refurbishments, in accordance with 5.2B

5.2A Designing for robustness

This pathway is provided with reference to a credit from BREEAM New Construction (NC) of Designing for Robustness.[1]

For this option, 1 point can be awarded where:

- Areas of the building have been identified (both internal and external) where vehicular, trolley and pedestrian movement occur; and
- The design incorporates suitable durability and protection measures or design features/solutions to prevent damage to the vulnerable parts of the building. This must include, but is not necessarily limited to:
    a. Protection from the effects of high pedestrian traffic in main entrances, public areas, and thoroughfares (corridors, lifts, stairs, doors, etc.)
    b. Where relevant, protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor, and kitchen areas.
    c. Protection against, or prevention from, any potential vehicular collision where vehicular parking and manoeuvring occurs within 1m of the external building façade for all car parking areas and 2m for all delivery areas.

Suitable durability and protection measures to vulnerable parts of the building can include:

- Bollards/barriers/raised kerbs to delivery and vehicle drop-off areas.
- Robust external wall construction, up to 2m high.
- Protection to walls of corridors and partitions with high traffic volumes.
- Kick plates/impact protection (from trolleys etc.) on doors.
- Hard-wearing and easily washable floor finishes in heavily used circulation areas (i.e., main entrance, corridors, Public areas, etc.).
- Designing out the risk without the need for additional materials specification to protect vulnerable areas.

Any vehicle impact protection measures specified must be positioned at an adequate distance from the building to protect the fabric from impact from any vehicle with a measurable overhang of the body from the wheel track, particularly for any goods delivery areas.

In vehicle movement areas only, where the specification of external robust wall construction is specified to comply with the credit, additional protection must be provided to ensure against potential damage to the robust façade from vehicle movement, i.e. specifying bollards or protection rails.

The specification or design measures chosen should reflect the need to balance the additional specification of materials with the need to protect building elements to minimise their replacement, ensuring against excessive material use and promoting materials optimisation.

Consideration should be given to materials specification in public/common areas (especially public waiting areas and toilet areas) to provide protection against potential malicious or physical abuse as far as it is possible.

Material optimisation means adopting a resource-efficient design approach, which results in less material being used in the design (i.e. lean design) and/or less waste produced in the construction process without compromising the design concept. While this assessment issue is focused on specifying suitable durability measures, the design team should consider solutions that optimise the use of materials and therefore minimise construction waste.

Public areas are herein defined as areas of the building designed for public use (e.g., reception, retail unit, waiting areas).

Recommended supporting evidence

- Design drawings and/or photographic illustrating vulnerable areas/parts of the building.
- Design drawings, specification and/or photographic confirming the durability measures specified.

1. BREEAM New Construction (NC) Mat-05 Designing for robustness, https://www.breeam.com/BREEAMInt2013SchemeDocument/content/09_materials/mat_05_designing_for_robustness.htm#Materials_optimisation

5.2B Certified operational performance rating

For this option, the project must commit to achieving the 'Waste from Refurbishments' credit (23) from the Green Star – *Performance* rating tool. This credit must be used to report the measured results of the end-of-life waste commitments set by the parties involved.

Please refer to the recommended supporting evidence in the Submission Guidelines for demonstrating compliance of this pathway.

6.1 Metering

The aim of the Metering and Monitoring credit is to recognise the implementation of effective energy and water metering and monitoring systems. The following guidance is provided to clarify Metering and Monitoring requirements for healthcare buildings under Green Star.

Energy metering

Large healthcare buildings

The following requirements are applicable for large healthcare buildings only (see the definition above).

The Submission Guidelines metering methodology has been simplified to avoid excessive sub-metering of the building beyond a useful level.

Project teams are strongly advised to justify the project metering strategy with the project client or building owner and, where applicable, the facilities management team as the facility operators may have specific requirements which align with their own environmental performance reporting requirements. Projects are encouraged to provide confirmation that the metering strategy has been accepted by the project owner.

Each distribution board (DB) is to be metered individually. However, there is no requirement to separately meter lighting, small power, or on-floor mechanical systems. On-floor mechanical, lighting, and small power loads may still be separable from each other which is encouraged but not mandatory.

- Each motor control centre (MCC) board shall be metered individually.
- Individual loads over 50kW (including plant, equipment, and specialist medical equipment), or expected to exceed 5% of the total energy use of the building, must still be independently metered.
- Uninterrupted Power Supplies do not need to be separately metered.
- Any and all energy, steam, and water imports and exports to/from the building shall be metered separately. For example, heating hot water generated within the project building but distributed to an adjacent building shall have its exported thermal energy metered separately.

Small healthcare buildings (<1000m² GFA)

As per the Submission Guidelines, a minimum of one energy meter per energy source and one water meter is to be provided and commissioned for buildings smaller than 1,000m² GFA. The installation of additional energy or water sub-meters is not required except where specialist medical equipment, such as CT, MRI and X-ray scanners, Reverse Osmosis plant etc, is cumulatively expected to exceed 10% of the total annual energy consumption. All specialist equipment may be combined on to a single meter.

Any on-site renewable, non-renewable, and separate fuel source energy generation shall also be sub-metered.

Localised potable hot water heating systems clarification (all buildings)

Localised hot-water heating (such as hot-water cylinders) shall be metered separately where the sum of the localised hot water heating capacity exceeds 50kW.

Where multiple hot water cylinders are distributed throughout a building, project teams should determine the metering requirement based on the heating capacity of the system rather than cylinder storage capacity. This is to ensure that instantaneous heaters with low storage volume are captured. Electric boost type systems within calorifiers should also be considered in the heating capacity (though may be grouped under the same meter).

Water meters for all healthcare buildings

In addition to the Submission Guidelines guidance with respect to water meters, potable cold water supply is to be metered in line with CIBSE TM39 principles. Further sub-division of spaces where additional monitoring would benefit the project owner is encouraged but not mandatory, such as provision of metering to each riser or floor as appropriate to the building.

Further metering of the cold-water supply may apply to the following example end-use types:

- Hydrotherapy
- Main kitchen supply
- Laundry supply
- Central Sterile Services Department
- Tenancies
- High water demand specialist equipment

Hot water (potable and process) consumption can be difficult to measure

when large re-circulation systems are used. Each hot water generation system is to have separate water meters to establish the volume of hot water consumption. Where hot water generation is centralised; a singular water meter may need to be used for the whole building. Hot water supplies to tenanted spaces and kitchens (excluding kitchenettes) shall have individual water meters.

Water imports and exports from the project building to other non-rated buildings must be metered – for instance, where collected rainwater is exported to a neighbouring building.

Future shell spaces

The metering arrangement must demonstrate sufficient spare capacity to accept sub-meters for HVAC, lighting, power, water, gas and any future process loads. The remaining building area may not rely on uninstalled meters for calculations, error or leak detection.

8 Operational waste

The aim of the Operational Waste credit is to recognise projects that implement a waste management plan that facilitates the re-use, upcycling, recycling or conversion of waste into energy, and stewardship of items to reduce the quantity of outgoing waste. Operational waste streams for healthcare facilities differ from other building classes and are dependent on the types of care provided and healthcare facility type. Controlled and hazardous waste streams such as sharps, disposable medical waste, specimen containers, etc. cannot be included as a separable waste stream.

8A Performance Pathway – Specialist Plan

Large healthcare buildings

All large healthcare buildings targeting the Operational Waste credit must undertake an Operational Waste Management Plan (OWMP) which is to be implemented during the operational phase of the building. It shall be used to demonstrate compliance with the Performance Pathway – Specialist Plan requirements.

Where sorting and/or storage facilities exist within a campus setting, these may be used to meet the compliance requirements of the OWMP. However the project team are required to demonstrate the building's waste profile has been accounted for in sizing these facilities. Where new waste sorting and/or storage facilities are required, these must align with the requirements set out in the OWMP and shall follow the same access requirements as listed in the Submission Guidelines.

All other healthcare buildings

Where a building does not meet the large buildings definition, it shall follow the standard credit criteria as outlined in the Submission Guidelines.

8B Prescriptive Pathway – Facilities

Small healthcare buildings

Small buildings (below 1,000m^2) are not expected to have a diverse range of waste streams, do not need to undertake an OWMP and can still comply with 8B Prescriptive Pathway – Facilities if desired. Where third-party best-practice guidance does not align with the expected waste streams of the project (e.g. commercial office), it is suggested that project teams establish an expected waste profile to justify the sizing of their waste facilities storage area.

The project must still demonstrate compliance with 8B.2 Dedicated Waste Storage Area and 8B.3 Access to Waste Storage Area.

All other healthcare buildings

Where a building does not meet the small buildings definition, it shall follow the standard credit criteria as outlined in the Submission Guidelines.

Indoor Environment Quality

9.2 Provision of outdoor air

Credit 9.2 aims to provide sufficient outdoor air to ensure levels of indoor pollutants are maintained at acceptable levels.

Some healthcare spaces inherently have specific functional requirements that result in comparatively higher levels of Outdoor Air (OA) ventilation rates compared to other building types often for the following functional reasons:

- infection control
- mitigating potential cross-contamination between different spaces
- flushing contaminants and medical gases from a particular space (e.g. an operating theatre).

As such, these spaces can be considered Not Applicable, and no additional outdoor air above recognised standards as per 9.2.3 needs to be provided:

- Operating theatres
- Birthing & Caesarean delivery
- Trauma/triage, infection control, decontamination rooms, burns units, and bone marrow transplant units
- Sterile stores
- ICUs & high dependency units
- Isolation rooms with negative pressure requirements
- Laboratory spaces
- Kitchens (excluding pantries / beverage areas)
- Patient imaging for surgery e.g. critical care (diagnostic patient imaging is excluded)

Clarifications

- The requirements apply to the OA portion of a supply-air stream only. Air recirculated or transferred into the space from an adjacent space is not considered OA for the purposes of this credit.
- The OA requirement only exists when the space is occupied. Pressurisation and setback requirements are not included in this assessment.
- Intermittent Occupancy Factors (IOF) as defined in NZS 4303: 1990 or AS 1668.2-2002 may be applied.

Recommended supporting evidence

Where any of the above spaces are present, they may be excluded from the credit assessable area. All other Primary and secondary spaces not listed above should meet the credit criteria as standard. Project teams may submit Technical Questions if spaces not listed above meet the same criteria.

Evidence of outdoor air rates should still be provided for the excluded spaces. Project teams should show the minimum OA requirement and any pressurisation requirements (if necessary).

10.2 Reverberation

Space types which may be considered Not Applicable for the Reverberation requirement, as per the recommendations of NZS 2107:2016, are as follows:

- Inpatient wards including maternity suites
- Operating theatres
- Post-operation and pre-operation areas
- Recovery rooms
- All kitchens with food preparation and sterilisation requirements (not including kitchenettes, beverage bays, or ward pantries)

Other areas which may also be nominated as being 'Not Applicable' due to other functional requirements not listed in NZS 2107:2016, are as follows:

- Emergency departments
- Patient imaging and support areas
- Pathology labs
- Laboratories
- Treatment bays
- ICUs & high dependency units
- Central sterile services department

Other spaces not specifically listed have functional requirements that preclude the use of acoustic absorption can be considered Not Applicable. For such a case, a Technical Question must be submitted to justify clearly in submissions.

Note that this does not, however, preclude the spaces from meeting good design practices. The presence of a hygiene or infection control requirement does not always preclude the use of acoustic absorption. One innovation point can be awarded for introducing acoustic absorption into clinical areas. For further details of this innovation point, please check the guidance for 29.3 Improving on Green Star Benchmarks – Acoustic Absorption for Clinical Spaces.

10.3 Acoustic separation

Spaces with inter-linked uses, such as control rooms serving a patient imaging suite, do not need to be acoustically separated from each other. Inter-linked spaces are defined as being within the same department or have a similar use-case (e.g. a washroom to an operating theatre)

This does not, however, preclude the spaces from meeting good design practices. It merely acknowledges that the respective functional requirements make credit compliance either prohibitively onerous, costly, or impractical.

11 Lighting comfort

Standardised assessment process

Where a repeated primary or secondary space is used throughout the building, a typical indicative space may be assessed in lieu of all spaces. A typical space is defined as one which has no significant difference in:

- space size, shape, and layout
- interior surface reflectances
- light fitting selection
- luminaire placement

11.3 Surface illuminance and 11.4 Localised lighting control

The requirements of credit 11.3 apply largely to spaces which have extended periods of static occupancy (i.e.for office and administration related tasks). The aim of the credit is to improve uniformity of lighting to give visual interest. There are a range of healthcare spaces which do not appreciably benefit from this as they do not have extended periods of occupation, and are used intermittently, or are supplied with specialist task lighting – for instance dental examination suites. In addition, some spaces, such as operating theatres, have cleanliness and hygiene requirements which limit the types of luminaires which can be installed.

Credit 11.4 aims to provide occupants with individual control of the electric lighting within their immediate environment. This again has varied benefit in a healthcare setting, where spaces are often more cellular than in office buildings and so the immediate environment is already controllable to an adequate degree.

The below table is based on the main nominated space types. It breaks down the applicable and non-applicable space types for credits 11.3 and 11.4 and defines the 'immediate environment' for each setting.

Note that the localised lighting control credit allows for carers, medical staff, and other non-patients to be the primary lighting controller on behalf of patients who cannot reasonably access and control the light levels in the space. For example, the lighting levels in long-stay patient imaging spaces may be best controlled by the staff who will adjust lighting levels on the patient's behalf.

Note that AS/NZS 1680.2.5 has specific space definitions. Project teams should use the nearest approximation where these definitions differ from those in the table.

MAIN SPACE	SUBSPACE	SPECIFIC SPACES (EXAMPLES GIVEN)	11.3 SURFACE ILLUMINANCE (APPLICABILITY)	11.4 LOCAL CONTROL (APPLICABILITY)	IMMEDIATE AREA
Patient Areas	Wards		Y	Y	Patient bed
	Wards - infants		Y	Y	Patient bed
	Maternity suites	Nurseries & wards	Y	Y	Patient bed
Treatment Areas	General treatment bay		N	N	Room. No additional sub-separation where privacy screens are used. Considered a quick turnaround treatment bay expected in emergency departments.
	Recovery		Y	Y	Patient bed
	Accident and emergency (casualty or accident)	Triage reception	Y	Y	Workstation (as a whole, not per desk)
		Patient temporary hold (trauma bay)	Y	N	Room
		Treatment/ examination room	N	Y	Room

MAIN SPACE	SUBSPACE	SPECIFIC SPACES (EXAMPLES GIVEN)	11.3 SURFACE ILLUMINANCE (APPLICABILITY)	11.4 LOCAL CONTROL (APPLICABILITY)	IMMEDIATE AREA
Consult, Examination and Treatment	Consult/examination		Y	Y	Room. E.g. General Practitioner and specialist consulting rooms
	Audiometry		N	N	Room
	Physiotherapy		N	N	Room
	Endoscopic		N	Y	Room ambient lighting
	Ophthalmic		Y	Y	Room
	Long stay patient imaging		Y	Y	Room
	Short stay patient imaging		N	Y	Room
	MRI anaesthetic		N	Y	Control room
	Oncology (including chemotherapy, radiation treatment)		N	N	Room
	Dental		N	N	Room
	Dermatological		N	N	Room
	Dialysis		Y	Y	Individual patient area
	Therapy rooms (mental and physical health)		N	N	Room
Primary Support Areas	Activity room		Y	Y	Room
	Pathology labs		N	N	Room
	Mortuary/post-mortem		N	N	Room
	Nurse & orderly stations		Y	Y	Workstation
	Primary pharmacy (extended occupation for pharmacists)		Y	Y	Workstation
	Medical staff overnight stay rooms		Y	Y	Bed area + room
	Staff rooms and respite spaces		Y	Y	Room
	Doctors / nurses duty rooms		Y	Y	Workstation

MAIN SPACE	SUBSPACE	SPECIFIC SPACES (EXAMPLES GIVEN)	11.3 SURFACE ILLUMINANCE (APPLICABILITY)	11.4 LOCAL CONTROL (APPLICABILITY)	IMMEDIATE AREA
Secondary Support Areas	Laboratory and dispensary support		N	N	Room
	Maternity support	Babies wash	N	N	Patient area
		Formula preparation	N	N	Workstation
		Feeding rooms	Y	Y	Feeding area
	Imaging support	Control & prep rooms	N	N	Room
	Orderly and nurse support	Medication & prescriptions	N	Y	Workstation
		Kitchen and meal prep	N	N	Room
Administration	Office		Y	Y	Workstation
	Reception areas (All)		Y	Y	Workstation (as a whole, not per desk)
	Conference rooms		Y	N	Room
	Meeting rooms		Y	Y	Room
Food Prep	Primary kitchens		N	N	Room
	Dining rooms		Y	N	Room
Other spaces	Retail		N	N	Room
	Laboratories		Y	N	Workstation
	Classrooms & seminar spaces		Y	N	Room
	Day-care & childcare		Y	N	Room
	Shell spaces		Y	N/A	N/A
Lounges and waiting areas	All visitor waiting areas		Y	Y	Room
	Whānau rooms		Y	Y	Room
	Children's playroom		Y	N	Room
	Prayer/meditation/chapel		N	Y	Room
	Patient lounges		Y	Y	Room

12.1 Glare reduction

Not Applicable space types

Clinical spaces have functional requirements which supersede any Green Star Indoor Environment Quality (IEQ) requirement. This does not, however, preclude good design practices. It merely acknowledges that the respective functional requirements make credit compliance either prohibitively onerous, costly, or impractical.

Vision glazing which is installed to provide sightlines for clinical staff to observe patients may be excluded from the minimum requirements of the credit. This exclusion applies to healthcare facilities where there is a clinical health & safety requirement to observe patients e.g. mental health facilities which have a requirement for staff to observe patients across courtyards, atria, or from a different space within the building.

12.2 Daylight and 12.3 Views

The aim of the daylighting credit is to provide adequate levels of daylight for a certain proportion of the primary assessable area, with 1 point awarded for 40% of primary spaces achieving adequate daylight, and 2 points awarded for 60%. All primary spaces are included within the scope of the credits.

Primary spaces where the functional requirements prohibit daylight or views maybe excluded from the scope of the credit. If unsure, project teams are encouraged to justify during the area definition check, when excluding such spaces.

Standardised assessment process for all building types

Where a repeated primary space is used throughout the building, a typical indicative space may be assessed in lieu of all spaces. A typical space is defined as one which has no significant difference in:

- size and shape
- material and vision glazing selection, size, and configuration
- orientation and window placement
- effect of any local or site overshadowing

14.0 Thermal comfort

Not Applicable space types

Clinical spaces have functional requirements which supersede any Green Star Indoor Environment Quality requirement. This does not, however, preclude the spaces from meeting good design practices. It merely acknowledges that the respective functional requirements make credit compliance either prohibitively onerous, costly, or impractical.

Thermal comfort

The aim of the Thermal Comfort credit is to recognise projects which provide high levels of thermal comfort. ASHRAE 55:2013 and ISO 7730:2005 are the recognised standard for a Predicted Mean Vote (PMV) thermal comfort assessment under pathway 14.1.2 *mechanically ventilated spaces*. Under standard Design and As-Built PMV assessments, project teams must justify the inputs for Clothing (CLO) and Metabolic Rate (MET) values. The below guidance has been developed for healthcare projects as the range of space types can be quite broad for healthcare projects. These values should be used unless the project wishes to provide its own values via a Technical Question.

Secondary support spaces should use the same values as the primary space. Neonatal, neonatal ICU, special baby care units, and paediatric intensive care units are considered clinical areas for the purposes of his credit, and are therefore excluded from the credit criteria as they tend to have higher temperature requirements.

Table 1 - Thermal comfort PMV assessment inputs values are sourced from CIBSE Guide A:2015

*1 met = 58.1 W/m^2. Average body surface area = 1.8m^2

SPACE TYPE	SPACE DESCRIPTION	MET RATE*	CLO VALUE	
			SUMMER	WINTER
Administration	Office, meeting, administrative and consultation spaces, shell spaces	1.2	0.6	0.95
Patient and Primary Treatment Areas	All overnight stay wards including maternity, AAU	0.9	1.2	1.4
Examination & Treatment Spaces	Triage and emergency. Outpatients examination, treatment, and imaging	1.4	0.4	0.6
Laboratories	Includes primary pharmacy	1.4	0.6	1.0
Nurses & Orderly Stations		1.4	0.6	0.9
Lounges, Waiting Areas		1.4	0.6	1.0
Primary Staff Areas		1.4	0.6	1.0
Food Prep	Primary kitchens	1.8	0.6	1.0

Transport

It is recommended that healthcare projects consider adopting the Performance pathway (17A) option (refer to Technical Clarification issued March 2021).

When the prescriptive pathway is adopted, the following guidance apply.

17B.3 Low emissions vehicle infrastructure

Disabled parking, pick-up and drop-off vehicle parking bays are not included in the low emissions vehicle infrastructure requirements and are excluded from the requirements. Ambulance bays, either temporary or permanent, and loading bays are also excluded from the credit requirements. The above parking space types should be easily identifiable e.g. via signage.

17B.4 Active transport facilities

Projects located on a campus, where multiple buildings are owned and operated by the same organisation, may provide bicycle parking and end of trip (EOT) facilities for regular occupants elsewhere on the campus. This enables projects to centralise facilities if desired and make more effective use of space in a campus setting.

Campus facility requirements

The below guidance applies where bike parking and EOT facilities are located outside of the project boundary.

- The entrance of centralised facilities must be within 250m walking distance of a major or staff entrance of the rated project.
- The associated campus population located within a 250m radius of the centralised parking (buildings that overlap the radius boundary to be included) and EOT facilities must be included in the regular occupant population calculation, with the level of amenity sized accordingly. The facilities are therefore pro-rated evenly between buildings.
- The 250m distance shall be measured to the nearest main or regular occupant entrance to each building.
- Users must be rain protected between the EOT facilities and the rated building.
- The facilities are not exempt from other credit requirements targeted (e.g. materials credits), by the project unless more than 50% of the campus occupancy is served by the EOT facilities.

17B.5 Walkable neighbourhoods

One point is awarded where a minimum of six amenities are located within 400m of the project boundary when the project building is located outside a designated central business district, commercial or retail zone, as defined by local planning guidelines.

Where projects are located within the above zones, one point is awarded where eight amenities are located within 400m of the project boundary.

Where a healthcare building is located within a dedicated hospital zone as per local planning guidelines, and a central business district, commercial or retail zone is adjacent to the hospital zone, one point is awarded where eight amenities are within 400m of the project boundary.

In all healthcare settings, amenities listed within the Submission Guidelines may be provided on-site.

PROJECT LOCATION	6 (SIX) AMENITIES REQUIRED WITHIN 400M	8 (EIGHT) AMENITIES REQUIRED WITHIN 400M
Project is located within a "hospital zone" **OR** located outside of either a: central business district, OR commercial or retail zone	✓	
Project is located within a: central business district, OR commercial or retail zone		✓

Water

18A Potable water – Performance pathway

Healthcare buildings have inherently higher potable water requirements and more onerous health and safety requirements that make the use of potable water reduction strategies such as greywater and blackwater harvesting significantly more difficult to implement in practice. Consequently, it is expected that healthcare projects will necessarily use more potable water than other building typologies.

As such, the performance requirement for 12 points using the Performance pathway is reduced from 95% reduction, to 60% of the reference case building. All intermediate points are then scaled accordingly. Healthcare buildings which reduce potable water consumption beyond the 60% reference case level are awarded the full 12 points.

The *18A Potable Water – Performance Pathway calculator-NZv1.0 – Healthcare.xlsx* shall be used for all healthcare buildings.

Innovation

29.3 Improving on Green Star benchmarks – Acoustic absorption for clinical spaces

Aim of the innovation

To encourage and recognise efforts to balance the need to improve acoustic absorption and the requirement for infection control in clinical spaces.

Why is this innovation important?

The inclusion of sound absorbers has often been challenged due to current uncertainty about infection control risks and historical bias. Because of the real risks that infections pose to patients and healthcare staff, decision makers are rightly cautious about techniques and designs perceived as untried. Reluctance to adopt appropriate acoustic absorption may arise across a range of key decision makers both in design teams and wider project teams.

In contrast to office spaces where users typically occupy the space for less than 8 hours a day and retain the ability to relocate to other spaces if desired, patient spaces of healthcare buildings are generally inhabited 24 hours a day by people with reduced or no ability to move around or leave the building. Where patients have acute conditions, their stays are generally 5-7 days or more. An extended lack of sleep induced by excessive noise for people recovering from illness or surgery attributable to noise is undesirable.

Noise is one of the most frequently complained about issues in patient surveys. There is clear objective evidence as to how a lack of absorptive finishes contributes to this and the poor medical outcomes linked to it. The presence of a hygiene or infection control requirement does not always preclude the use of acoustic absorption. Risks of infectious growth in the absorber can be adequately managed through a comprehensive engagement and collaboration process.

Compliance requirements

In addition to the achievement of 10.2 Reverberation, one innovation point can be awarded for balancing the need to improve acoustic absorption and the requirement for infection control in clinical spaces.

A comprehensive engagement needs to be conducted, led by the acoustic consultant during the design stage, to facilitate input from the design team, building owners, operations/cleaning team, and any relevant suppliers and subcontractors (if engaged). The engagement process needs to address the following aspects:

1) Acknowledging the basic principles of infection control and cleaning requirements to identify appropriate products.
2) Gaining a greater understanding of where these products will be appropriate to install.
3) Making decision makers aware of the significant number of studies that show genuine healthcare benefits for improved absorption.
4) Understanding who the key decision makers are, what their concerns are and what the healthcare provider's approved cleaning regime for wall and ceiling finishes are.
5) Answering the concerns of key decision makers in a way that clearly states the benefits and manages concerns.

The engagement process and its outcomes must be summarised in an acoustic comfort strategy or report. This report should be agreed upon and signed off by the involved parties.

For the designer advisor who is considering recommending an acoustic absorber, it is recommended they:

- Actively seek out any potential concerns during the preliminary design stage. This should firstly be sought from the healthcare planner and then secondly from the operations/cleaning team.
- Appreciate that hospitals need rigid cleaning procedures to ensure all necessary cleaning occurs. Therefore, new products proposed for walls or ceilings requiring different cleaning methods are likely to be harder to obtain approval if a new procedure is required.
- Ensure wall panels are out of typical hand reach in the first instance to not become a surface that can pass a pathogen on.

- Enquire with the project's Health Planner first and foremost, who can advise on the cleaning procedures used for the walls. Some hospitals may stipulate the cleaning methods to be used, and the infection control team will advise whether products can be accepted by comparing proposals to the cleaning methods. Conversely, other health care providers will take a less prescriptive approach and may want to know from the project team what the cleaning requirements will be. Cleaning methods for walls and ceilings will generally never involve hard scrubbing due to the risk of introducing small scratches or grooves into the surface, which become a problematic crevice for pathogens.
- Be aware that many general design documents will suggest hard ceilings across a wide range of spaces, but this is not because of any particular evidence that a more absorptive finish represents an unmanageable infection risk. Indeed key infection control literature such as the CDC (Rutala and Weber, 2008) notes similar conclusions to others (Ayliffe, Babb, Taylor. 1999) being "The potential for transmission from contaminated hard-surface floors and walls is small unless there is existing moisture or residual stickiness present." A more specific summary of infection control recommendations can be found in Finley (2017).
- Discuss functionality needs with suppliers to ascertain what proven solutions may be viable. Where suspended tile ceilings are concerned and wipeable finishes readily available, cleaning and infection control advisors may remain concerned about any gaps the tile system could create if not properly seated. Such concerns about tile gaps appear to be manageable through proprietary clips if necessary.

Recommended supporting evidence

- An acoustic report/ strategy from a suitably qualified acoustic consultant summarising the engagement process and its outcomes.
- Measurement results showing improved acoustic absorption performance for clinical spaces with infection control risks.

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29.4 Innovation challenge – Respite spaces

Aim of the innovation

To encourage and recognise the provision of places of respite that enhance health and wellbeing and also provide a physical connection to the natural environment.

Compliance requirement

One innovation point is awarded where it is demonstrated that at least two places of respite are provided for regular occupants. Respite spaces must meet all General criteria and either External or Internal criteria (depending on location):

General criteria

- Total area of all respite spaces must be a minimum of 2% of the total building Primary and Secondary spaces
- Patient respite spaces must be universally accessible (i.e. allow access for wheelchair and other less able people) by providing a minimum of one space for ambulatory and wheelchair users per for every 5 seating spaces
- All staff have access to at least one dedicated place of respite which is solely for the use of staff

External respite spaces

External respite spaces must be universally accessible, well illuminated, non-smoking, and located to avoid noise, odour, and air pollution. Specific requirements for external spaces are as follows:

- Must provide fixed or adjustable shading
- Is screened from prevailing winds
- Must be located at least 6m away from any road, loading dock, parking area, or waste facility
- Should consider external acoustic protection when located near external noise sources
- Should have appropriate levels of soft landscaping and should use native plant species wherever possible.

Internal respite spaces

Regardless of credit criteria alignment for other spaces, internal respite spaces must achieve the below Indoor Environment Quality credit criteria:

- Acoustic comfort per credit 10.1 and 10.3
- Electric lighting comfort per credit 11.1 and 11.2
- Visual comfort per credit 12.1 and 12.3
- Thermal comfort per credit 14.1

Clarifications

The following space types may be included as possible places of respite, but should still adhere to the credit criteria:

- Whānau spaces
- Patient lounges
- Staff rooms
- Prayer/meditation/chapel

Note that waiting rooms are specifically excluded.

Recommended supporting evidence

Credit compliance may be demonstrated as per the recommended supporting evidence for the above referenced credits per the Submission Guidelines. Projects should refer to the Submissions Guidelines where appropriate.

An acoustic report from a suitably qualified acoustic consultant may be provided for exterior area acoustic performance.

Materials, Land use & Ecology, Energy and Emissions

No additional guidance is made for the above categories. Projects may seek additional guidance via a Technical Clarification.

Questions? Feedback?

Contact us at greenstarnz@nzgbc.org.nz
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