

# 1-12 Bills Street, Hawthorn

## Sustainability Specification

For Green Star Design & As Built

Prepared for: Hayball

Attention: Harry Nicholas

Date: 30 March 2021

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Ref: 47332

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 **BOROONDARA**  
City of Harmony

**Received**

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# Revision

Revision	Date	Comment	Prepared By	Approved By
0	30-03-21	90% DD Issue	MVS	CBK

Every effort has been made to ensure that this document is accurate and takes account of all potential Green Star credits which may be targeted for the proposed project, however Stantec take no responsibility for shortfalls in tender submissions (scope, financial or otherwise) based on this revision.

It is the responsibility of the design team (Architect, Services consultants, etc.) to include any initiatives required for Green Star within their respective disciplines. This includes providing the relevant documentation required to demonstrate compliance. It is essential the brief to the design team includes the Green Star objectives and an allowance is made by them for any additional scope of works necessary.

Checked and approved by Project Engineer

**Name:** Cormac Kelly  
**Signature:** \_\_\_\_\_

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## PART A. Preliminaries

Refer to Head Contract for Preliminaries.



## PART B. Project Specific Information

### B.1 Description of the Installation

#### B.1.1 Project Description

This specification document has been provided to present the building design sustainability overview of the 1-12 Bills Street, Hawthorn residential development. This document outlines the requirements for the design and construction teams to achieve the targeted Green Star Design and As Built Formal Certified Rating under the Green Building Council of Australia's (GBCA's) Green Star - Design & As Built V1.3 Tool.

#### B.1.2 Overview of Target

In accordance with the Client brief, the development must achieve the following:

- 5 Star Green Star Design and As Built Formal Certified Rating
- The GBCA Green Star Rating Tool Version is Design and As Built Green Star Version 1.3

#### B.1.3 General Requirements

All Contractors engaged on this project shall commit to meeting all of the requirements to achieve the targeted Green Star initiatives and shall carry out work as detailed and in accordance with this specification and any other written addendums as issued, the whole of which shall be deemed to constitute one document.

This specification shall be read in conjunction with all other design and GBCA documentation and such other written instructions as may be issued during the course of the contract.

All of the below noted Green Star credits and points form part of the total targeted credits and points to achieve the required star rating. It is the Contractors responsibility to ensure that their tender submission allows sufficient capacity to achieve all Green Star credits targeted. The Contractor shall ensure that the targeted credits are achieved.

The following requirements outline the scope of works that shall be required to be carried out on site and coordinated by the Contractor throughout the construction, commissioning and defects liability program of works for the project.

### B.2 Green Star Overview

Green Star is an environmental rating tool developed by the Green Building Council of Australia (GBCA) with the specific purpose of assisting industry in enabling a consistent and measured approach to the environmental rating of buildings. Buildings are ranked between 1 and 6 Stars with only those rating 4 or above can be submitted for a formal certification by the GBCA.

#### B.2.1 Categories

The Green Star rating tool is made up of 8 categories which represent a holistic review of the development of a building. A 9th category is available for sustainable strategies which are either innovative or cannot be currently measured by the tool.

- |                                |                        |
|--------------------------------|------------------------|
| • Management                   | • Materials            |
| • Indoor Environmental Quality | • Land Use and Ecology |
| • Energy                       | • Emissions            |
| • Transport                    | • Innovation           |
| • Water                        |                        |

#### B.2.2 Credits

Each category is made up of a number of Credits with varying levels of points available to each Credit. These Credits focus on specific aspects of a development within the Category they are assigned too. The following is a list of all the Credits associated with each Green Star Category.



Due to the nature of the tool and the actual development being assessed, not all Credits are necessarily applicable to an individual project. The table below provides a consolidated list of all the Credits and their associated points available within the Green Star tool. This project will not be targeting credits with a "0" or "N/A" against them, as they are either not applicable or have been deemed unsuitable for this development.

A minimum of 60 points are required for a 5 Star Green Star Rating. A project seeking formal certification requires a 10% buffer as some points are likely to change during the design and construction phase of the building due to unforeseen circumstances.

### B.2.3 Scorecard

Refer below credit summary of all targeted points for the Green Star rating.

It is the responsibility of the Contractor to achieve all defined outcomes. Any credit that is deemed at risk due to non-compliance at any stage during construction must be brought to the attention of the principal, and an alternative means for achieving the credit proposed. Where a non-compliance is proposed, an alternative credit may be required to maintain the total number of points targeted.

Green Star - Design & As Built Scorecard		
Evermore	<b>Core Points Available</b>	<b>Total Score Targeted</b>
5 Star - Best Practice	99	65

Category	Code	Credit Criteria	Points Available	Points Targeted
Man	1.0	Accredited Professional	1	1
Man	2.0	Environmental Performance Targets	-	Complies
Man	2.1	Services and Maintainability Review	1	1
Man	2.2	Building Commissioning	1	1
Man	2.3	Building Systems Tuning	1	1
Man	2.4	Independent Commissioning Agent	1	1
Man	3.1	Implementation of a Climate Adaptation Plan	2	2
Man	4.1	Building Information	1	1
Man	5.1	Environmental Building Performance	1	1
Man	5.2	End of Life Waste Performance	1	1
Man	6.0	Metering	-	Complies
Man	6.1	Monitoring Systems	1	1
Man	7.0	Environmental Management Plan	-	Complies
Man	7.1	Environmental Management System	1	1
Man	7.2	High Quality Staff Support	1	1



Man	8A	Operational Waste - Performance Pathway: Specialist Plan	1	1
IEQ	9.1	Ventilation System Attributes	1	1
IEQ	9.2	Provision of Outdoor Air	2	2
IEQ	9.3	Exhaust or Elimination of Pollutants	1	1
IEQ	10.1	Internal Noise Levels	1	0
IEQ	10.2	Reverberation	1	0
IEQ	10.3	Acoustic Separation	1	1
IEQ	11.0	Minimum Lighting Comfort	-	Complies
IEQ	11.1	General Illuminance and Glare Reduction	1	1
IEQ	11.2	Surface Illuminance	1	1
IEQ	11.3	Localised Lighting Control	1	1
IEQ	12	Glare Reduction	-	Complies
IEQ	12.1	Daylight	2	1
IEQ	12.2	Views	1	1
IEQ	13.1	Paints, Adhesives, Sealants and Carpets	1	1
IEQ	13.2	Engineered Wood Products	1	1
IEQ	14.1	Thermal Comfort	1	1
IEQ	14.2	Advanced Thermal Comfort	1	0
Ene	15B.0	Conditional Requirement: NatHERS Pathway	-	Complies
Ene	15B.1	Thermal and Energy Performance	6	2.1
Ene	15B.2.1	Lighting	1	1
Ene	15B.2.2	Ventilation and Air Conditioning	2	2
Ene	15B.2.3	Domestic Hot Water	2	0.5
Ene	15B.2.4	Appliances & Equipment	1	1
Ene	15B.2.5	Fuel Switching	1	0
Ene	15B.2.6	On-Site Storage	1	0
Ene	15B.2.7	Vertical Transportation	1	1
Ene	15B.2.8	Passive Laundry Facilities	1	0
Ene	15B.2.9	Unoccupied Areas	1	0
Ene	15B.2.10	Off-Site Renewables	5	0
Ene	16A	Prescriptive Pathway - On-Site Energy Generation	1	
Tra	17B	Prescriptive Pathway	7	3.5
Wat	18B.1	Sanitary Fixture Efficiency	1	1





Wat	18B.2	Rainwater Reuse	1	1
Wat	18B.3	Heat Rejection	2	2
Wat	18B.4	Landscape Irrigation	1	1
Wat	18B.5	Fire Protection System Test Water	1	1
Mat	19A.1	Comparative Life Cycle Assessment	6	3
Mat	19A.2	Additional Life Cycle Impact Reporting	4	1
Mat	20.1	Structural and Reinforcing Steel	1	1
Mat	20.2	Timber	1	1
Mat	20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1
Mat	21.1	Product Transparency and Sustainability	3	1
Mat	22B	Construction and Demolition Waste - Percentage Benchmark	1	0
Eco	23.0	Endangered, Threatened or Vulnerable Species	-	Complies
Eco	23.1	Ecological Value	3	1
Eco	24.0	Sustainable Sites - Conditional Requirement	-	Complies
Eco	24.1	Reuse of Land	1	0
Eco	24.2	Contamination and Hazardous Materials	1	0
Eco	25.1	Heat Island Effect Reduction	1	1
Emi	26.1	Stormwater Peak Discharge	1	1
Emi	26.2	Stormwater Pollution Targets	1	1
Emi	27.0	Light Pollution to Neighbouring Bodies	-	Complies
Emi	27.1	Light Pollution to Night Sky	1	1
Emi	28.0	Legionella Impacts from Cooling Systems	1	1
Emi	29.1	Refrigerants Impacts	1	0
Inn	30A	Innovative Technology or Process	10 *	0
Inn	30B	Market Transformation	10 *	0
Inn	30C	Improving on Green Star Benchmarks	10 *	1
Inn	30D	Innovation Challenge	10 *	4
Inn	30E	Global Sustainability - Safe Places	10 *	1

## B.3 Contractor Responsibilities

The table below depicts the Contractors responsible for each credit at a minimum. However, all Contractors shall ensure they do not perform any actions to put any of the Green Star credits at risk.

GREEN STAR CREDIT	Head Contractor	Mechanical	Electrical	Hydraulic	Structural	Fire	BMS	Landscape
Man 1.0 accredited professional								



Man-2.0 Commissioning and tuning - environmental performance targets	X	X	X	X			X	
Man-2.1 Commissioning and tuning - services and maintainability review	X	X	X	X			X	
Man-2.2 Commissioning and tuning - building commissioning	X	X					X	
Man-2.3 Commissioning and tuning - building systems tuning	X	X	X				X	
Man-2.4 Independent Commissioning Agent	X							
Man-3.1 Climate Adaptation Plan	X							
Man-4.1 Building Information	X	X	X	X			X	
Man-5.1 Environmental Building Performance	X	X	X	X				
Man-5.2 End of Life Waste Performance								
Man-6.0 Metering	X	X	X	X			X	
Man-6.1 Monitoring Systems	X	X	X	X			X	
Man-7.0 Environmental Management Plan	X	X	X	X				
Man-7.1 Environmental Management System	X	X	X	X	X	X	X	X
Man-7.2 High Quality Staff Support	X							
Man-8A Performance Pathway: Specialist Plan	X							
IEQ-9.1 Ventilation System Attributes	X	X						
IEQ-9.2 Provision of Outdoor Air	X	X						
IEQ-9.3 Exhaust or Elimination of Pollutants	X	X						
IEQ-10.3 Acoustic Separation	X							
IEQ-11.0 Lighting comfort – minimum lighting comfort	X		X					
IEQ-11.1 Lighting comfort – general illuminance and glare reduction	X		X					
IEQ-11.2 Surface Illuminance	X		X					



IEQ-11.3 Localised Lighting Control	X		X					
IEQ-12.0 Glare Reduction	X							
IEQ-12.1 Daylight	X							
IEQ-12.2 Views	X							
IEQ-13.1 Indoor pollutants – paints, adhesives, sealants and carpets	X	X	X	X		X		
IEQ-13.2 Indoor pollutants – engineered wood products	X							
IEQ-14.1 Thermal Comfort	X	X						
Ene-15.0 Greenhouse gas emissions – conditional requirement	X	X	X	X				
Ene-15B Greenhouse gas emissions – NatHERS pathway	X	X	X	X			X	
Tra-17B Sustainability transport – Prescriptive Pathway	X							
Wat-18B Potable Water - Prescriptive Pathway	X	X		X		X	X	X
Mat-19A. Performance Pathway - Life Cycle Assessment	X	X	X	X	X			X
Mat-19A.1 Comparative Life Cycle Assessment	X							
Mat-19A.2 Additional Reporting	X							
Mat-20.1 Responsible building materials – Structural and Reinforcing Steel	X				X			
Mat-20.2 Responsible building materials – Timber	X				X			
Mat-20.3 Responsible building materials – Permanent Formwork, Pipes, Flooring, Blinds and Cables	X	X	X	X				
Mat-21.1 Sustainable products -product transparency and sustainability	X				X			
Eco-23.0 Endangered, Threatened or Vulnerable Species								
Eco-23.1 Ecological Value	X							X
Eco-25.1 Heat Island Effect Reduction	X							X



Emi-26.1 Stormwater Peak Discharge	X			X				
Emi-26.2 Stormwater Pollution Targets	X			X				
Emi-27.0 Light Pollution to Neighbouring Bodies	X		X					
Emi-27.1 Light Pollution to Night Sky	X		X					
Emi-28.0 Legionella Impacts from cooling towers	X	X						
Inn-30C Stormwater Pollution Targets	X							
Inn-30D Financial Transparency	X							
Inn-30D Occupant Engagement	X							
Inn-30D Local Procurement	X							
Inn-30D Community Benefits								
Inn-30.E Safe Places	X							

Note: Each discipline refers to Sub Contractors engaged by the Head Contractor.

## B.4 Definitions

The following definitions shall apply throughout this specification.

Green Star Accredited Professional is the sustainability consultant responsible for the delivery of the Green Star rating for this project. Contact Stantec to communicate with the Green Star Accredited Professional where a direct contact has not been provided.

### B.4.1 Nominated Areas

Different credits within the Green Star system apply to different spaces within the building. The definitions of the nominated areas are described in the following table. Examples of the nominated areas for this development are also provided, however, where a space does not clearly fit into one of the Space Types, the Contractor shall raise this with the Green Star Accredited Professional as soon as possible.

Space Types	Definition	Example
Primary	All areas where a person is expected to work, or remain for an extended period of time.	Residential lounge rooms



Secondary	All areas used to support the principal activity of the primary space. These spaces will be regularly occupied, however a single person is unlikely to remain within for more than 2 hours.	Residential kitchens and bathrooms.
Tertiary	All areas which are either transient spaces, or accessed intermittently.	Back of house areas, corridors, hallways, storage facilities and storerooms.

## B.4.2 Nominated Building Systems

This credit requires nominated building systems to be defined by the project team. Examples of nominated building systems could include, but are not limited to:

- Mechanical systems (such as HVAC and refrigeration systems; mechanically operable systems such as blinds and actuated shading devices)
- Building Management and Control System (BMCS)
- Lighting and associated controls
- Electrical systems (such as electrical generation, electrical supply, distribution systems, security and access systems, and alarm systems)
- Hydraulic systems (such as gas and water supply distribution systems, sewage collection and distribution systems, stormwater collection and distribution systems; pumps)
- Fire detection systems, smoke alarm systems and emergency warning systems
- Fire protection systems, including pumps and other equipment
- Lifts and any other vertical transport devices
- Any other system that have an impact on the energy or water consumption of the building as identified by building owner or building operator
- Building envelope, such as facades, roofs and glazing systems



## PART C. Technical

### C.1 Standards

This Sustainability Specification shall be read in conjunction with the Green Building Council of Australia's (GBCA) Green Star Design & As Built Rating Tool Submission Guidelines, along with any Technical Questions (TQs) or advice issued by the GBCA.

It is the responsibility of all parties involved in the project to obtain a copy of said documentation from the GBCA. All GBCA documentation shall be the edition valid for the Green Star version described in Section B.1.2, unless otherwise advised in writing.

Where any discrepancies exist between the Sustainability Specification Clauses and the GBCA documentation, the GBCA documentation shall take precedence.

### C.2 Design Documentation

The Sustainability Specification shall be read in conjunction with all other design documentation issued by any member of the design team.

Where any discrepancies exist between the Sustainability Specification and the relevant design documentation, the Sustainability Specification shall take precedence. However, clarification shall still be sought from the Principal on all discrepancies.

Any project specific Technical Questions issued by the GBCA take precedence over this Sustainability Specification and any other specification.

The Contractor shall only accept instructions relating to these discrepancies as issued by the Principal. Any instructions given by the Principal shall only be given to the Contractor or his nominated representative.

It is the Contractor's responsibility to check and refer any discrepancies to the Principal before the Works progress to a stage where any adjustment to such will cause additional cost or substantial variation to the intent of the Contract.

Any discrepancies between the relevant documentation which may affect the Green Star rating shall be reported to the Principal before the work proceeds.

The design documentation as scheduled are issued to indicate the installation intent as coordinated by the design team. This documentation is intended to be self-explanatory and complete, but all work called for by one, even if not by the other, shall be fully executed. Should the documents be in conflict, the Contractor will be deemed to have included in their tender price for the larger quantity and the more expensive components, as applicable.

The Contractor shall obtain written approval of the Principal prior to substituting any of the product selections or locations listed in the design documentation for alternatives. Any items proposed to be substituted by the Contractor shall meet the credit requirements.

### C.3 Role of Sustainability Consultant

- The Sustainability Consultant has worked with the design team to ensure that the Green Star credits are achievable for the project. The role of the Sustainability consultant following the appointment of a Contractor will be:
  - Work with the Contractor to provide guidance on the credit criteria required to achieve a compliant Green Star Pathway;
  - Liaise with the Contractor to update and integrate the Green Star initiatives into the finalised design package;
  - Respond to requests for information;



- Attendance at site meetings, as required, and
- Collate Green Star Submission.

## C.4 Role of Contractor

In accordance with the Client brief, the development must achieve a certified Green Star rating. See Section A.1.2 for further details of the targeted rating. All Contractors engaged on this project shall commit to meeting all the requirements to achieve the targeted Green Star rating.

The Contractor shall provide all relevant documentation, material and incidentals necessary to ensure the targeted Green Star rating is achieved in accordance with the design documentation and programme. **The Head Contractor shall maintain primary responsibility for ensuring the performance requirements outlined within the specification has been met, including verification of evidentiary documentation from all Contractors.**

In addition, the Contractor shall comply with the following requirements:

- To raise in a timely manner, queries which require clarification from the Consulting Engineer, such as:
  - Interpretation of the Specification or any documentation
  - Non-compliance with the Specification
  - Discrepancies in the design documentation
  - To comply with all aspects of the Contract
- The Contractor shall be aware that the GBCA assessors may request design modifications or additional documentation to achieve the targeted rating
- All relevant Contractors must have access to a copy of the appropriate Green Star Design & As Built Submission Guideline and be suitably familiar with the Green Building Council of Australia's (GBCA) standard documentation and formatting requirements
- The Contractor shall ensure all subcontractors are made aware of all of the Green Star requirements and trained to the appropriate standards
- The Head Contractor shall coordinate and manage all sub-contractors to ensure required deliverables are met in a timely and GBCA complaint standard
- All of the below noted Green Star credits and points form part of the total targeted credits and points to achieve the required star rating. It is the Contractor's responsibility to ensure that their tender submission allows sufficient capacity to achieve all Green Star credits targeted. The Contractor shall ensure that the targeted credits are achieved
- The following requirements outline the scope of works that shall be required to be carried out on site and coordinated by the Contractor throughout the construction, commissioning and defects liability program of works for the project
- Contractor shall be responsible for updating to all works completed as a result of any changes or alternatives to the current design provisions
- The Head Contractor Shall allow for the provision of all documentation required for the Green Star submission inclusive of all components necessary, whether depicted or otherwise

## C.5 Application of this Specification

Each Specification Clause within this document is broken down into the following sections:

- Credit Requirements



- Documentation Requirements

The Credit Requirements section of each clause provides (where relevant) a description of the design intention of the project and how the design intent shall be achieved by the Contractor. The Contractor shall be aware that the design intention is the means by which the Green Star credit is met, and all aims within this section are to be met by the Contractor.

The Documentation Requirements section of each Clause provides a list of evidence that is to be produced, collated and maintained by the Contractor to be used as evidence of compliance to the credit requirements. Where requested, this documentation shall be provided to the Principal and the Sustainability Consultant.





## PART D. Green Star Specification Clauses

### D.1 MAN-1 Green Star Accredited Professional

#### D.1.1 MAN-1.0 Accredited Professional

##### D.1.1.1 Credit Requirements:

The Contractor shall be aware that Stantec Australia have been appointed as the Green Star Accredited Professional (GSAP) for this project. This project has been formally registered with the Green Building Council and will be submitting documentation for a formal rating. The GSAP must be contacted prior to making any changes to the project which may impact any of the targeted points for the Green Star rating.

The GSAP will act as the main point of contact between the project team and the Green Building Council. If the Contractor needs any clarification on any Green Star related issues, these should be directed to the GSAP.

##### D.1.1.2 Documentation Requirements:

The Contractor shall provide:

- No Contractor documentation required for this credit

### D.2 MAN-2 Commissioning and Tuning

#### D.2.1 MAN-2.0 Environmental Performance Targets

##### D.2.1.1 Credit Requirements:

The Contractor shall be aware that a draft Design Intent Report (DIR) or Owner's Project Requirements (OPR) report describing the Nominated Systems' functions, operations, and maintenance for all components of the building has been produced. The Contractor shall liaise with the client to complete this documentation and to ensure that any equipment substitutions or design modifications comply with all requirements included in this document.

The DIR / OPR shall include:

- A description of the basic functions, operations, and maintenance of the nominated systems including: A description of its intended operation and maintenance requirements; and a list of what the main components are (including controls), their operation and the importance of their efficient use
- The targets for the project energy and water consumption and energy and water budgets for all nominated systems
- Description of how energy, water, and aspects of indoor environment quality are metered and monitored. This includes a meter diagram that illustrates how energy and water budgets are confirmed in operation

Nominated Systems refers to all major systems including but not limited to those listed in Section A.4.3. A draft design intent report by the design team is available.

##### D.2.1.2 Documentation Requirements:

The Contractor shall provide:

- A finalised Design Intent Report (DIR) / Owner's Project Requirements (OPR) report as per the Credit Requirements

#### D.2.2 MAN-2.1 Services and Maintainability Review



#### D.2.2.1 Credit Requirements:

The Contractor shall ensure that a comprehensive services and maintainability review has been undertaken during the design stage, prior to construction. The services and maintainability review must facilitate input from the design team, the facilities manager and operations staff (if known), and any relevant suppliers and subcontractors (if engaged at the time). The report addresses the following aspects for all nominated building systems:

- Commissionability
- Controllability
- Maintainability
- Operability, including 'Fit for Purpose'
- Safety
- Outcomes of the review are to be summarised into a 'Service and Maintainability Report'. All parties involved in the review, including sub-contractors, are to sign off the final report

The review must be completed prior to construction starting on site.

#### D.2.2.2 Documentation Requirements:

The Contractor shall provide: Services and Maintainability review report

- Confirmation the services and maintainability report has been reviewed and received by the client

### D.2.3 MAN-2.2 Building Commissioning

#### D.2.3.1 Credit Requirements:

The Contractor shall coordinate, develop and implement a commissioning plan for all Nominated Systems in accordance with one or more of the following approved standards. The commissioning plan must allow for all pre-commissioning and commissioning activities outlined in these standards.

The approved commissioning standards include:

- AIRAH DA27 Building Commissioning 2011
- AIRAH DA28 Building Management and Control Systems (BMCS) 2011
- ASHRAE Commissioning Guideline 1.1-2007 (for mechanical services)
- BSRIA The Soft Landings Framework, Australasia
- CIBSE Commissioning Code M (and the ancillary codes for relevant services)
  - Commissioning Code A: Air Distributions Systems
  - Commissioning Code B: Boilers 2002
  - Commissioning Code C: Automatic Controls 2001
  - Commissioning Code L: Lighting 2003
  - Commissioning Code R: Refrigerating Systems 2002
  - Commissioning Code W: Water Distribution Systems 2003

The Commissioning Plan must cover all Nominated Systems and must include at least the following:

- the objectives, or basis, of the design



- the scope of the commissioning plan
- the commissioning team list, the individual responsibilities and interface matrix
- the general sequence of commissioning
- the proposed commissioning procedures
- the witnessing requirements
- the commissioning program
- the requirements for subcontractor commissioning manuals

Nominated Systems refers to all major systems including but not limited to those listed in Section B.4.2.

The person responsible for the commissioning of the Nominated Systems must have specific and demonstrable knowledge of the types of systems to be commissioned.

The Contractor shall be responsible for providing all materials, cartage, labour, plant, instruments, appliances, tools, measurement devices, load banks, fixings, and accessories necessary for the execution of all commissioning works, together with all minor and incidental works.

The Contractor shall allow for and perform all additional tests as required to bring plant into satisfactory running order.

#### **Air Permeability Performance Testing:**

An air permeability test must be carried out by a suitably qualified practitioner, in accordance with an approved standard, over a minimum area of the building. The test results must not exceed a maximum air permeability rate in order for this credit element to be awarded. This credit element applies to all building types irrespective of the conditioning strategy. Testing is equally relevant to mechanically ventilated (e.g. more efficient HVAC systems) and mixed-mode / naturally-ventilated buildings (e.g. control of airflow).

#### **Suitably Qualified Practitioner**

For the purposes of this credit element, a suitably qualified practitioner is defined as a member of the Air Tightness Testing and Measurement Association (ATTMA) or a testing member of the Air Infiltration and Ventilation Association of Australia (AIVAA). Please see the 'Guidance' section for additional information. The test results are required to be signed-off by the testing practitioner and main contractor. This step in the process ensures that the air permeability rate modelled at the design stage (for which the main contractor is responsible for delivering) is verified by the test.

#### **Testing Standard**

The air permeability test must be carried out in accordance with AS/NZS ISO 9972:2015 Thermal performance of buildings - Determination of air permeability of buildings - Fan pressurization method. This standard has recently been adopted in Australia and is identical with, and has been reproduced from, ISO 9972:2015.

Alternative standards may be applied where these are better suited to the project. The project team is required to justify why AS/NZS ISO 9972:2015 is not suitable via a Technical Query in order for this to be approved. The following list of alternative standards may be considered:

- ASTM E779-10
- ATTMA TSL1 Residential Dwellings – September 2016
- ATTMA TSL2 Non-Dwellings – October 2010
- ASHRAE Guideline 0-2005
- NIBS Guideline 3-2012 (for new construction or structural renovation)

#### **Testing Area Requirements**



The air permeability test may be carried out across a sample area, if not the whole building. For sample area testing, the test must be carried out on either 2,000m<sup>2</sup> or 10% of the building's total envelope area, whichever is greater.

Please see section 2.2 of ATTMA TSL (for dwellings) or section 3.2 of ATTMA TSL2 (for non-dwellings) for definition on how to calculate the building envelope area.

The sample areas tested must include the upper most occupied floor of the building, and be representative of the external envelope construction, including different façade types and building geometries, for the building as a whole. The methodology used to select the sample area and the extrapolation of results for the whole building must be outlined in the submission.

Levels can be tested separately as compartments. For commercial buildings, compartment testing is acceptable where the individual compartments are greater than 1,000m<sup>2</sup>. For multi-unit residential buildings, compartment testing of individual apartments is also acceptable and testing 10% of apartments is an acceptable sample.

### **Air Permeability Rate**

The test results must not exceed the 'maximum' air permeability rates outlined in the table below. At the introduction of this credit element, the 'maximum' rates outlined in the table below are conservative to ensure projects can satisfy this requirement without excessive difficulty; yet project teams should aim to achieve the air permeability rate as specified by the building's design team. The intent of the air permeability test is to verify whether this is achieved.

In future iterations of the rating tool, the 'maximum' rates will become more stringent, to recognise air tight buildings as being best practice. This is in line with the GBCA's strategic priorities, including high-performing, energy-efficient buildings.

Testing should be to a pressure difference of 50 Pascals (Pa) or greater; however where practical concerns limit test pressures to between 25 and 50 Pa the reasons must be clearly described and justified in the test report. A test is not valid unless a pressure difference of at least 25 Pa is achieved.

Building Type	Maximum - Air Permeability m <sup>3</sup> /(h.m <sup>2</sup> ) at 25 PA
<b>At least 25Pa pressurisation must be achieved, results are reported at 50Pa Conditional Requirement Testing area must be either 2000m<sup>2</sup> or 10% of the total building envelope area</b>	
Offices – Naturally ventilated	20
Offices – Mixed mode	20
Offices – Air conditioned / low energy	20
Factories / warehouses	20
Superstores	20
Schools	20
Hospitals	20
Museums and archival stores	20
Cold stores	20
Residential <sup>2</sup> – Trickle ventilators and / or intermittent extractors	15
Residential <sup>2</sup> – Passive stack	15
Residential <sup>2</sup> – Continuous mechanical ventilation	15



<sup>1</sup> The 'normal' and 'best practice' air permeability rates are taken from ATTMA TSL2.

<sup>2</sup> All 'residential' air permeability rates have been adapted from ATTMA TSL1.

#### D.2.3.2 Documentation Requirements:

The Contractor shall provide:

- A detailed commissioning plan
- Commissioning Report(s) demonstrating that comprehensive pre-commissioning activities and commissioning activities have been performed to all nominated systems in accordance with the noted standards as relevant to each nominated system. The commissioning report must be certified and signed by the designer, the Contractor, the commissioning manager, the Independent Commissioning Agent (where appointed) and the project manager
- Whole building air tightness testing report detailing of test methodology, air flow rates and statement of the building air permeability achieved.
- Signed confirmation from the testing practitioner and main contractor that the results have been sighted.

#### D.2.4 MAN-2.3 Building Tuning

##### D.2.4.1 Credit Requirements:

The Contractor shall carryout a building tuning process for a period of 12 months after practical completion to ensure that all Nominated Systems operate efficiently and in accordance with the design. At a minimum, this must include 12 months' measurement and reporting and quarterly adjustment of systems.

This process shall include the building tuning team consists of the facility managers, the building owner's representative and the ICA (if applicable).

The 12 month building tuning process must consist of analysis of all data from the monitoring system and assessment of feedback from occupants on building performance. Specific requirements include:

- Verification that nominated systems are performing to their design potential at full and part load conditions
- Reviews of environmental performance against the environmental targets
- Collection of user feedback to match the system performance with the occupant's needs
- Adjustment of all the systems to account for all deficiencies discovered
- Management, communication, and assignment of responsibilities for the tuning process within the team

The Contractor shall be available to assist in performing any rectification works as required during this period.

##### D.2.4.2 Documentation Requirements:

The Contractor shall provide:

- The Contractor shall provide a Building Tuning Plan (may be integrated with the Commission Plan) in accordance with GBCA approved standards and guidelines
- Evidence of any modifications that were implemented as a part of the Building Tuning Process

#### D.2.5 MAN-2.4 Independent Commissioning Agent



#### D.2.5.1 Credit Requirements:

An Independent Commissioning Agent (ICA) has been engaged to advise, monitor, and verify the commissioning and tuning of the nominated systems throughout the design, tender, construction, commissioning and tuning phases. The Contractor shall follow all direction from the ICA during design and construction phases to develop and implement a commissioning plan.

#### D.2.5.2 Documentation Requirements:

The Contractor shall provide:

The commissioning and tuning results in accordance with D.2.1, D.2.2 and D.2.3

### D.3 MAN-3 Adaptation and Resilience

#### D.3.1 MAN-3.1 Implementation of a Climate Adaptation Plan

##### D.3.1.1 Credit Requirements:

The Contractor shall be aware that a Climate Adaptation Plan has been developed. The plan includes a list of actions and responsibilities for all high and extreme risks that have been identified. The Contractor shall ensure that all design responses have been implemented in the construction phase.

##### D.3.1.2 Documentation Requirements:

The Contractor shall provide:

- As Built Drawings demonstrating design responses to the Climate Adaptation Plan
- Commissioning report demonstrating the successful implementation of any design responses highlighted in the Climate Adaptation Plan

### D.4 MAN-4 Building Information

#### D.4.1.1 MAN-4.1 Building Information

##### D.4.1.2 Credit Requirements:

#### **Building Operation and Maintenance Information**

The Contractor shall provide a comprehensive O&M manual for all building systems; refer to **Section A.4.3** for nominated building systems. The O&M manual is to include the following:

- Appropriate content for all nominated systems is readily available
- Confirmation the appropriate user group has access to the information they require to deliver best practice environmental outcomes
- Guidance on keeping information up to date is provided to facilities management
- A summary sheet of relevant building service contacts
- System-level information for nominated systems
- Introduction and scope, including physical and functional descriptions
- Operating parameters and procedures
- Preventive maintenance requirements, including procedures and schedules
- Corrective maintenance requirements, including repair requirements



- Service contacts, and any warranties and certificates
- Up-to-date drawings incorporating at least:
- Mechanical, electrical and hydraulic drawings and schematics covering all associated nominated building systems:
  - Architectural, facade/building envelope drawings
  - Details on targets for, energy use, greenhouse gas emissions, potable water, and indoor environment quality including air quality and thermal comfort indices. These must assist the operation team to optimise performance of the space
  - Details on the metering and sub-metering strategy employed by the space, including any instructions for data collection and analysis
  - Triggers for updating O&M information e.g. refurbishment of a fitout space, recommissioning, building owner targets or benchmarks change, or a new operational process or an existing one is changed
  - Confirmation this has been delivered to the building owner

The Contractor shall provide a Building Log Book developed in line with “CIBSE TM31: Building Log Book Toolkit”; covering all nominated building systems. It should be a reference point and provide links to all other key information and documentation such as drawings, O&M manuals, BMCS functional information, and warranty documents. The Log Book must include the following:

- Descriptions of building systems including their use and performance;
- Activities for ongoing compliance, operations and maintenance
- Recommissioning procedures
- Tuning protocols
- Recommendations to improve the system where appropriate

Nominated Systems refers to all but is not limited to those listed in **Section A.4.3**:

### **Building User Information**

The Contractor shall develop a Building User Information Document for use by all relevant stakeholders.

The relevant stakeholders, for the purposes of this credit, is to be tenants (a tenant representative or office manager of tenanted space) and residents (day-to-day users of space). The amount and details of 'building user information' is appropriate to the particular relevant audience.

The following typical information can be provided to building users. The detail required for each of these issues shall be agreed with the Principal:

- Description of initiatives designed to enhance energy efficiency and minimise greenhouse gas emissions, and measures that must be taken by users during day-to-day operation to maximise their effectiveness
- Description of initiatives intended to enhance and minimise water use and the measures that must be taken by users during day-to-day operation to maximise their effectiveness
- Description of basic function and operation of any nominated building systems that building users may come in direct contact with including any occupant activated controls
- List of relevant contacts for maintenance information, operational issues, complaints or other feedback
- Description of the operational waste requirements for the building users, including what waste streams can or cannot be collected for recycling at the premises



- Information on how to maximise the efficiency potential offered by base building services and nominated building systems
- Information on how to best maximise day lighting, sights and views
- Information on 'green' make-good requirements for tenants at end-of-life (if available)

Nominated Systems refers to all systems including but not limited to those listed in **Section B.4.2**:

#### D.4.1.3 Documentation Requirements:

The Contractor shall provide:

- Operations and Maintenance Manual
- Building Log Book
- Confirmation the Log Book and Operations and Maintenance Manual have been delivered to the building owner
- An electronic Building User Information document in compliance with above stated requirements
- Confirmation from the owner that the Building User Information has been created and made available to the building owner

## D.5 MAN-5 Commitment to Performance

### D.5.1 MAN-5.1 Environmental Building Performance

#### D.5.1.1 Credit Requirements:

Contractor shall provide a system capable of measuring, targeting and reporting on the two metrics below. For each metric committed, performance measurement procedures must be provided and include quarterly reporting to all relevant stakeholder groups.

##### D.5.1.1.1 Building Performance Metrics

Committed Metrics	Required Statement
Greenhouse gas emission / energy targets	Greenhouse gas in kg/CO <sub>2</sub> -e/m <sup>2</sup> and / or energy target kWh/m <sup>2</sup>
Potable Water Targets	Potable water consumption target in kL/m <sup>2</sup>

##### D.5.1.1.2 Application of Performance Targets

- For Strata Management for Multi-unit Residential  
Environmental Management Plan (EMP) document must address the following:
  - Environmental targets that have been set
  - Performance measurement procedures

At least 80% of the project's gross floor area (GFA), excluding car parking areas, is committed to achieve a set environmental performance. If less than 80% of the project's GFA is covered, then the achievable credit point will be pro-rated to one decimal point on a sliding-scale.

#### D.5.1.2 Documentation Requirements:

The Contractor shall provide:





- Confirmation that the installed metering and monitoring systems provide the building owner with the ability to measure required metrics

## D.5.2 MAN-5.2 End of Life Waste Performance

### D.5.2.1 Credit Requirements:

The strata management must have a formal commitment to environmental performance targets for common areas and services through an internal requirement (policy, guideline, or environmental management plan) that targets are set and measured. This formal commitment must address:

- The environmental targets that have been set; and
- Performance measurement procedures

### D.5.2.2 Documentation Requirements:

No documentation required.

## D.6 MAN-6 Metering and Monitoring

### D.6.1 MAN-6.0 Metering

#### D.6.1.1 Credit Requirements:

The Contractor shall ensure that accessible metering is provided to monitor all building energy and water common uses and major uses for all energy and water sources provide by the base building.

The Contractor shall ensure that:

- All energy and water consumption in the building is metered
- All energy loads that exceed 5% of the total energy use for the building, or 100kW (whichever is smaller), are separately sub-metered
- All water uses that consume more than 10% of the projects total water use are separately sub-metered
- All utility meters must meet metering guidelines under the weights and measures legislation, as outlined under the current *National Measurement Regulations*. The Contractor shall verify that all utility meters meet these requirements
- All sub-meters must be validated using the '*Validating Non-Utility Meters for NABERS ratings*' protocol
- Meters must be located in an area that allows regular monitoring and maintenance by facilities managers and other facilities management personnel
- All meters and metering network (including sub-meters) has been validated in accordance to a recognised standard or practice, including, but not limited to, NABERS protocol and NMI standards
- Demonstrate that the metering network is able to produce alerts if any inaccuracies are found. Inaccuracies are defined as in excess of meter tolerances (e.g. 'Class 1' meters shall not have inaccuracies of more than 1% due to metering accuracy class) The Monitoring system is to be continual (15mins to 1 hr interval readings) and meter accuracy reconciled to appropriate standards, including, but not limited to, NABERS Protocol or National Measurement Institute (NMI) standards

#### D.6.1.2 Documentation Requirements:

The Contractor shall provide:

- A meter monitoring plan indicating all of the energy and water loads in the development and how they are metered



- As Built drawings clearly identifying all meter locations and the load connected to them
- As built metering schedule (See **Appendix E.2.1** for example Schedules)
- Commissioning Results demonstrating validation of the meters in accordance with the 'Validating Non-Utility Meters for NABERS rating protocol'

## D.6.2 MAN-6.1 Monitoring Systems

### D.6.2.1 Credit Requirements:

The Contactor shall ensure that the monitoring strategy is developed in accordance with a recognised standard, such as CIBSE TM39 Building Energy Metering. Although this standard has been created to be used for developing energy metering and monitoring strategies, for the purpose of this credit, the same principles described in the standard shall be used for developing water metering and monitoring strategies.

The monitoring strategy must include a metering schedule. This schedule shall address the estimated loads for energy and water and must list:

- The incoming input (e.g. electricity, gas, water, etc.)
- The end use (e.g. lighting, HVAC, fans)
- The estimated energy consumption for the end use
- Which meter(s) provide the required information
- The individual estimated end consumption

The monitoring schedule shall also address the location and the type of meter. The end uses shall be estimated and included in the strategy, though if not known at the initial stage, they can be established from the first full month of readings.

The Contractor shall ensure an automatic monitoring system is provided which has the following capabilities:

- Collects data from all meters
- The monitoring system must accurately and clearly present the metered data and include reports on consumption trends, in accordance with the following requirements
  - Quarter hourly, hourly, daily, monthly, and annual energy use for all meters
- The monitoring schedule shall include the location and the type of meter
- The end uses first year shall be estimated and included in the strategy where possible
- Raising an alarm when the energy or water use increase beyond certain parameters and automatically and instantly issue an alert the facilities manager
- Providing a breakdown of the information by building system (mechanical, electrical, etc.), or by space (or by tenanted floor)
- Including the consumption water or energy, the load versus time (load profile), and the power factor (in the case of energy)
- Producing, as a minimum, a quarterly report that is automatically emailed to the facilities manager responsible for the building



#### D.6.2.2 Documentation Requirements:

The Contractor shall provide:

- A meter monitoring strategy document
- As built drawings showing meter monitoring system
- Automatic monitoring system data sheets describing the systems features and capabilities
- Commissioning report demonstration that the meter monitoring system is connected to all meters and correctly recording meter data

### D.7 MAN-7 Responsible Construction Practices

#### D.7.1 MAN-7.0 Environmental Management Plan (EMP)

##### D.7.1.1 Credit Requirements:

The Head Contractor shall implement a comprehensive, project-specific Environmental Management Plan (EMP) for the works in accordance with Section 4 of the NSW Environmental Management System Guidelines and shall implement a formalised systematic and methodical approach to planning, implementing and auditing this EMP during construction, to ensure the construction team achieves compliance with the EMP.

All Contractors shall make themselves and all of their staff aware of all requirements in this EMP and shall follow all guidance provided in this EMP.

##### D.7.1.2 Documentation Requirements:

The Contractor shall provide:

- Site Specific Environmental Management Plan (EMP)
- Evidence of compliance with Section 4 of the NSW Environmental Management System Guidelines
- Confirmation of sub-contractor adherence to the EMP requirements

#### D.7.2 MAN7.1 Environmental Management System (EMS)

##### D.7.2.1 Credit Requirements:

The Contractor shall ensure the environmental management system used on site throughout all construction phases that has been formalized by a third-party organization that provides independent verification of system compliance to one of the following standards:

- ISO 14001
- BS 7750
- The European Community's EMAS

The third party organization must be a member of the International Accreditation Forum.

##### D.7.2.2 Documentation Requirements:

The Contractor shall provide:

- Contractor formalised EMS including an external auditors report OR Contractor ISO14001 certificate issued prior to the commencement of construction works
- Inspection reports from EMS showing that site audits took place as per the EMS and conformity was verified and nonconformity was corrected



## D.7.3 MAN7.2 High Quality Staff Support

### D.7.3.1 Credit Requirements:

The Contractor shall ensure that high quality staff support practices are in place which:

- Promote positive mental & physical health outcomes of site activities and culture of site workers through programs and solutions on site in accordance with the following:
  - Healthier eating and active living
  - Reduced harmful alcohol, drug and tobacco free living
  - Increase social cohesion, community and cultural participation
  - Understanding depression
  - Preventing violence and injury
  - Suicide prevention; and
  - Decrease psychological distress

Programs and policies must go beyond legal requirements for occupational health & safety and extend into wellbeing promotion. A minimum of three (3) distinct issues must be addressed with mental health being at least one.

- Enhance site workers knowledge on sustainable practices through on-site, off-site, or online education programs in accordance with the items outlined below:
  - The training must provide information on the sustainable certifications sought;
  - Explain the value of the certification;
  - The role site workers can play in delivering a sustainable building.

The training must be provided to all Contractors and sub-contractors who spend a minimum of 3 days on-site during the project.

### D.7.3.2 Documentation Requirements:

The Contractor shall provide:

- Extracts of training such as screenshots, presentation, or similar, showing the information provided as part of training.

## D.8 MAN-8 Operational Waste

### D.8.1 MAN-8.1A Operational Waste – Specialist Plan

#### D.8.1.1 Credit Requirements:

The Contractor shall employ a qualified waste auditor, or other waste professional specialist, to prepare an Operational Waste Management Plan for the project. The Contractor shall also ensure that the requirements or recommendation made in the Operational Waste Management Plan are incorporated into the design and construction of the building's facilities.



#### D.8.1.2 Documentation Requirements:

The Contractor shall provide:

- An Operational Waste Management Plan;
- Evidence of waste auditor qualifications outlining previous experience and qualifications;
- As Built Drawings highlighting how the recommendations and requirements of the WMP have been incorporated into the building facilities.

### D.9 IEQ-9 Indoor Air Quality

#### D.9.1 IEQ-9.1 Ventilation System Attributes

##### D.9.1.1 Credit Requirements:

The Contractor is to allow for a system in line with the following:

- Entry of Outdoor Pollutants  
The entry of outdoor air pollutants to the space shall be minimised. The building services shall be installed to comply with ASHRAE Standard 62.1:2013 in regards to minimum separation distances between pollution sources and outdoor air intakes.
- Design for Ease of Maintenance and Cleaning  
Any mechanical ventilation system within the fitout, whether existing or new, shall be designed to provide adequate access for maintenance, to both sides of all moisture and debris-catching components, within the air distribution system.
- Cleaning Prior to Use and Occupation  
All new and existing ductwork that serves the building shall have been cleaned in accordance with the recognised Standards.

##### D.9.1.2 Documentation Requirements:

The Contractor shall provide:

- As Built Mechanical drawings for each ventilated space
- Extract(s) from the Commissioning Report demonstrating that the HVAC and CO<sub>2</sub> monitoring systems are operating as intended
- Statement confirming all ductwork provided is new and installed in line with ASHRAE 62.1:2013 in regards to minimum separation

#### D.9.2 IEQ-9.2 Provision of Outdoor Air

##### D.9.2.1 Mechanical Ventilation

##### Credit Requirements:

The Contractor shall provide the following design provision

- ensure that all mechanically ventilated or mixed mode Primary and Secondary Spaces are provided with outside air at a rate 50%/100% greater than the minimum required by AS 1668.2:2012 OR



- CO2 sensors are installed such that the CO2 concentrations are maintained below 800 / 700ppm with evidence that the outside air rates supplied are sufficient to ensure this can be maintained at all times

Documentation Requirements:

The Contractor shall provide:

- As built Mechanical drawings demonstrating location of CO2 sensors for ventilated space (where relevant) and outside air rates and demonstrating the system is appropriately sized to deliver this air quantity
- Commissioning results demonstrating that the HVAC and CO2 monitoring systems (where relevant) are operating as intended
- Mechanical Ventilation schedule (See **Appendix E.2.2** for example Schedules)

D.9.2.2 Natural Ventilation

Credit Requirements:

The Contractor shall ensure that all naturally ventilated or mixed mode Primary and Secondary Spaces are provided with operable areas that comply with the requirements of AS1668.4-2012.

Documentation Requirements:

- As built drawings demonstrating the requirements of AS1668.4-2012 are met

D.9.3 IEQ-9.3 Exhaust or Elimination of Pollutants

D.9.3.1 Credit Requirements:

The Contractor shall ensure that all pollutants from printing and photocopy equipment, cooking processes and equipment and vehicle exhaust, are limited from the nominate area by either

- Removing the source of pollutants
- Exhausting the pollutants directly to the outside

For spaces that are affected by all other pollutant sources, any sources of pollutants shall be exhausted directly to the outside of the project in accordance with a recognised standard; and/or physically separated from occupants.

**D.9.3.1.1 Print and Photocopy Room**

Where applicable, each print/photocopy room must achieve a minimum exhaust ventilation flow rate in accordance with AS 1668.2-2012 (Table B1). The exhaust facility must be a dedicated exhaust facility and exhausted air shall not be recycled to other enclosures. The fans must be installed as part of the base building; provision of the fans for future installation (e.g. by a tenant) does not meet the credit criteria. The project must demonstrate compliance regardless of delivery as a shell and core or integrated fitout project.

Alternatively, where printing and/or photocopying equipment is present, all printing or photocopying equipment located throughout the project must be certified in accordance with one of the following test methodologies: ECMA-328, RAL-UZ 171 or GGPS.003.

**D.9.3.1.2 Cooking Processes and Equipment**

Where applicable, the Contractor shall ensure all kitchens must be ventilated in accordance with AS 1668.2-2012. A separate exhaust system must be provided for the kitchen exhaust. This exhaust system must not recycle air to other enclosures or recirculate the exhaust within the space. The kitchen must be physically separated from the adjacent spaces or have an opening no larger than an area of 2.5m<sup>2</sup> to ensure adequate containment of kitchen exhaust.

A 'kitchen' is defined as a space that includes cooking equipment such as stove tops or ovens. Kitchenettes or tea points with basic tea/coffee making or simple reheat equipment is not included.



#### **D.9.3.1.3 Vehicle Exhaust**

Where applicable, all pollutants from vehicles in an enclosed space must be exhausted to a dedicated exhaust riser, in accordance with section 4 of AS 1668.2-2012. This exhaust system must not recycle air to other enclosures. In addition to the exhaust system, the space where the vehicle is located must be physically separated from the rest of the project (a door will suffice).

#### **D.9.3.2 Documentation Requirements:**

The Contractor shall provide:

- Mechanical drawings for each ventilated space
- Extract from the ventilation system commissioning report demonstrating correct operation of the system.
- Where relevant, certificates for all printing or photocopying equipment in accordance with one of the following methodologies: ECMA-328, RAL-UZ 122 or GGPS.003

### **D.10 IEQ-10 Acoustic Comfort**

#### **D.10.1 IEQ10.1 Internal Noise levels – Credit Not Targeted**

#### **D.10.2 IEQ-10.2 Reverberation – Credit Not Targeted**

#### **D.10.3 IEQ-10.3 Acoustic Separation**

##### **D.10.3.1 Credit Requirements:**

The Contractor shall ensure the project addresses noise transmission in enclosed spaces by providing:

- The inter-tenancy apartment construction to habitable areas results in airborne noise isolation standard of  $Rw+Ctr > 55$ ; and
- All inter-tenancy walls should include Discontinuous Construction as defined by the Building Code of Australia
- Walls between apartments and public corridors results in airborne noise isolation standard of  $Rw > 55$ ; and
- The floor construction above habitable rooms and wet areas of adjacent dwellings (i.e. floor cover) results in an impact isolation standard of  $Ln,w + CI < 55$ .
- Apartment entry doors include acoustic seals and achieve laboratory acoustic rating of  $Rw 30$ .

##### **D.10.3.2 Documentation Requirements:**

The Contractor shall provide:

- As built drawings including reference to acoustic design features
- Commissioning report results by a qualified acoustic consultant detailing the relevant measured noise levels and targeted noise levels.

### **D.11 IEQ-11 Lighting Comfort**

#### **D.11.1 IEQ-11.0 Minimum Lighting Comfort**



#### D.11.1.1 Credit Requirements:

The Contractor is to be aware that that all lights are flicker-free and that all light sources have a minimum Colour Rendering Index (CRI) of 80. As a minimum, This is applicable to the following fitting types (if any):

- A minimum Class A1 & A2 ballast
- High frequency ballasts for all fluorescent lamps
- Electronic ballasts in High Intensity Discharge (HID) lighting

#### D.11.1.2 Documentation Requirements

The Contractor shall provide:

- Confirmation that all lighting installed meets the credit requirements
- As Built Electrical Drawings
- Lighting Specifications/Schedules
- Product Data Sheets

#### D.11.2 IEQ-11.1 General Illuminance and Glare Reduction

##### D.11.2.1 Credit Requirements:

The Contractor shall ensure the lighting levels comply with best practice guidelines and glare is eliminated.

- General Illuminance

The Contractor shall ensure that that the lighting levels for each task within each space has a maintained illuminance that meets the levels recommended in the relevant section of AS 1680. This includes:

- Circulation and other general areas Table D1 of AS1680.2.1
- Office Spaces Table 3.1 AS 1680.2

- For Residential Spaces

For residential spaces, the point will be awarded where in living spaces, kitchen, bathrooms and bedrooms:

- The lighting design includes or permits general fixed lighting that provides good maintained illuminance values for the entire room
- The installed fittings all have fittings with rated colour variation not exceeding 3 MacAdam Ellipses (decorative fittings being exempt)

The maintained illuminance level shall be calculated on an area-weighted average for each distinct space. The maintained Illuminance values must achieve a uniformity of no less than that specified in Table 3.2 of AS 1680.1:2006, with an assumed standard maintenance factor of 0.8.

Where maintained illuminance values for a particular space are not specified, the values to be used must relate to the closest type of task as defined in AS 1680.1:2006 Table 3.1

- Glare Reduction

The Contractor shall ensure that all bare light sources are fitted with baffles, louvers, translucent diffusers, ceiling design, or other means that obscures the direct light source from all viewing angles of occupants, including looking directly upwards





#### D.11.2.2 Documentation Requirements:

The Contractor shall provide:

- As Built Electrical Drawings
- Lighting Specifications/Schedules
- Product Data Sheet
- Isolux Plot Drawings
- Photographic evidence of lighting installed
- General Illuminance and Glare Reduction Schedules (See **Appendix E.2.3** for example Schedule)

#### IEQ-11.2 Surface Illuminance

##### D.11.2.3 Credit Requirements:

The Contractor shall employ a suitably qualified professional to design and quantify the lighting design to ensure a combination of lighting and surfaces that improve uniformity of lighting, to give visual interest in the nominated area.

All the spaces in the Primary and Secondary spaces must be modelled to show that:

- The average ceiling luminance (excluding light fixtures) does not exceed 0.5 kcd/m<sup>2</sup> and the maximum luminance at any point on the ceiling does not exceed 1.5 kcd/m<sup>2</sup>; and
- The ceiling area has an average surface illuminance of at least 30% of the lighting levels on the working plane; and
- In rooms less than 100m<sup>2</sup> or in rooms where more than 20% of workstations are located within 3m of walls: the wall area above the working plane has an average surface illuminance of at least 50% of the lighting levels on the working plane.

The illuminance values for ceilings, walls, and floors must be calculated in accordance with AS/NZS 1680.1:2006.

The material and reflectance values used must correspond to the installed items. Where these are not available, reflectance may be estimated from AS/NZS 1680.1:2006 Table E1. Where the reflectance values are not included in the standard, or through manufacturer's data, the closest conservative value must be used.

#### D.11.3 IEQ-11.3 Localised Lighting Control

##### D.11.3.1 Credit Requirements:

The Contractor shall ensure that in all Primary and Secondary spaces that occupants have the ability to control the lighting in their immediate environment, including the ability to turn lights on and off, and adjusting their light levels.

Justification as to why and how the ability for one light to be controlled by one or more individuals is conducive to localised control.

The project team shall identify what the 'immediate environment' is:

Appropriate task lighting must be provided for kitchens, bathrooms and service areas.

In residential spaces this can be met through the provision of sufficient power outlets for future task lights/lamps around the predicted furniture layouts used in the space. In addition, appropriate task lighting must be provided for kitchens, bathrooms and service areas.

##### D.11.3.2 Documentation Requirements:

The Contractor shall provide:

- As Built Lighting Drawings with switching options highlighted



## D.12 IEQ-12 Visual Comfort

### D.12.1 IEQ12.0 Glare Reduction

#### D.12.1.1 Credit Requirements:

The Contractor shall include any combination of external shading and internal blinds designed to reduce internal glare in accordance with the Green Star Submission Guideline.

All blinds or screens in the nominated area must meet the following criteria:

- The blinds must provide glare reduction to at least 95% of the floor area
- Blinds must be controlled by all affected occupants within each individual space
- Blinds must have a visual light transmittance (VLT) of  $\leq 10\%$

Manual or automated internal, in-glazing, or external blinds can be used

#### D.12.1.2 Documentation Requirements:

The Contractor shall provide:

- As Built drawings demonstrating the shading devices and location of blinds where installed
- Glare Reduction Schedules (See **Appendix E.2.4** for example Schedule)

### D.12.2 IEQ12.1 Daylight

#### D.12.2.1 Credit Requirements:

The Contractor shall commission a suitably qualified engineer to perform daylight modelling to ensure that all Primary and Secondary areas receive high levels of daylight during 80% of the occupied daylight hours. This can be demonstrated using one of three methods:

- Prescriptive method – Manual calculations in accordance with the GBCA's *Green Star Daylight and Views Hand Calculation Guide*. See the GBCA website for further details; OR
- Daylight factor modelling – Model the Primary Spaces to demonstrate they have a Daylight Factor of at least 2.0% at finished floor level under either a CIE overcast sky or a CIE Uniform sky; OR
- Daylight autonomy modelling – Model the Primary Spaces to demonstrate they have a Daylight Illuminance (DI) of at least 160 lux based on an annual dynamic simulation model, during 80% of the nominated occupied daylight hours

#### D.12.2.2 Documentation Requirements:

The Contractor shall provide:

- As Built drawings showing all windows and shading
- Daylight modelling report showing the relevant daylight calculations for all primary spaces
- As Built drawings showing all windows and shading

### D.12.3 IEQ12.2 Views

#### D.12.3.1 Credit Requirements:

The project has been designed for at least 60% of the nominated area has a clear line of sight to a high quality internal or external view. All floor areas within 8m from a compliant window, atrium, or view can be considered to meet this credit



criterion. If any changes to these elements are proposed, the impact on external views must be quantified to ensure that it does not exceed the allowance in the Green Star Submission Guideline.

#### D.12.3.2 Documentation Requirements:

The Contractor shall provide:

- As Built drawings showing all windows as per the design documentation
- Calculations showing the proportion of the Primary Spaces that complies with the credit criteria
- As Built drawings showing all windows, marked up to show the areas that comply with the credit criteria

## D.13 IEQ13 - Indoor Pollutants

### D.13.1 IEQ-13.1 Paints, Adhesives, Sealants and Carpets

#### D.13.1.1 Credit Requirements:

The Contractor shall ensure that minimum 95% paints, carpets, adhesives and sealants have a low volatile organic compound (VOC) content, and are to provide evidence from suppliers quantifying the products supplied and information confirming the products supplied were used.

The Contractor is required to obtain approval from the Design Team or Principal before substituting any finishes listed in this specification.

The following items are excluded from this credit:

- Glazing film, tapes, and plumbing pipe cements
- Products used in car parks
- Paints, adhesives and sealants used off-site, for example applied to furniture items in a manufacturing site and later installed in the fitout; and Adhesives and mastics used for temporary formwork and other temporary installations

#### D.13.1.1.1 Paints, Adhesives and Sealants

There are two methods (or combination thereof) for demonstrating that a paint, adhesive or sealant complies with this criterion.

1. The product is certified under a recognised Product Certification Scheme at the time of project registration or submission. The current list of recognised schemes is shown on the GBCA website: <http://new.gbca.org.au/product-certification-schemes/>;

OR

2. The following table lists the maximum VOC limits allowed for the paints, adhesives and sealants

Product Type	Maximum VOC Content (g/litre)
General purpose adhesives	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65



One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100

Note this credit must be met as well as the Innovation credit for Zero VOC paints, outlined in **Section C.29.4**. That is a minimum 95% of all paints must achieve the above table, AND minimum 50% of paints achieve the limits stated in **Section C.29.4**.

#### D.13.1.1.1.1 Paints, adhesives and sealants testing methods

The following VOC test methods are relevant to paints:

- ISO Method 17895 (2005), for a material with a presumed VOC content <1 %
- ISO Method 11890-2 (2006), for a material with a presumed VOC <15%
- ISO Method 11890-1 (2007), for a material with a presumed VOC content >15%
- ASTM 03960, which is comprised of four individual testing procedures that measures TVOC (02369) as well as density (014 75) and water content (04017). Exempt compounds (04457) must not be subtracted in the calculation of VOC content.

The testing method for adhesive and sealants is the ASTM D3960 as detailed for paints as well as South Coast Air Quality Management District Rule 1168.

#### D.13.1.1.1.2 Theoretical VOC Calculations

Where TVOC content for the individual paints, adhesives and sealants ingredients is known, a theoretical calculation based on the subtotal of the known VOC values of the product's raw material components is acceptable. This is not relevant to carpets and engineered wood products where experimental testing is required. The calculations must include the following:

- Numerical TVOC results expressed in g/L of product
- Statement that the results have been obtained based on the subtotal of the known TVOC values of the product's raw ingredients

#### D.13.1.1.2 **Carpets**

The Contractor shall ensure if carpets are installed they comply with one of the following 2 methodologies.

The Contractor is required to obtain approval from the Design Team or Principal before installing or substituting any finishes not specified.

#### **Method 1 – The products comply with the following test standards**

Test protocol	Limit
ASTM D5116 Total VOC limit	0.5mg/m <sup>2</sup> per hour
ASTM D51164-PC(4-Phenylcyclohexene)	0.05mg/m <sup>2</sup> per hour
ISO 16000 I EN 1341 9 TVOC at three days	0.5 mg/m <sup>2</sup> per hour



ISO 10580 I ISO/TC 219 (Document N238) TVOC at 24 hours	0.5mg/m2 per hour
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**Method 2 – Product Certification**

The product is certified under a recognised GBCA product certification scheme. The following schemes and relevant standards have been assessed as compliant with the requirements of the GBCA's Assessment Framework for Product Certification Schemes. Click on the relevant scheme below for detail.

D.13.1.1.2.1 [Carpet Institute of Australia Limited, Environmental Certification Scheme \(ECS\) v1.2](#)

- ECS Level 2 - Level C recognition
- ECS Level 3 - Level B recognition
- ECS Level 4 (two options) - Level A recognition

D.13.1.1.2.2 [Ecospecifier GreenTag GreenRate v3.2](#)

- GreenTag GreenRate Level C - Level C recognition
- GreenTag GreenRate Level B - Level B recognition
- GreenTag GreenRate Level A - Level A recognition

D.13.1.1.2.3 [Australasian Furnishing Research and Development Institute, Sustainability Standard for Commercial Furniture - AFRDI Standard 150](#)

- AFRDI Green Tick Level C/Silver - Level B recognition
- AFRDI Green Tick Level B/Gold - Level A recognition
- AFRDI Green Tick Level A/Platinum - Level A recognition

D.13.1.1.2.4 [Good Environmental Choice Australia \(GECA\), including six standards](#)

- GECA 28-2010 v2 - 'Furniture and Fittings' - Level A recognition
- GECA 50-2011 v2 - 'Carpets' - Level A recognition
- GECA 25-2011 v2 - 'Floor Coverings' - Level A recognition
- GECA 04-2011 v2 - 'Panel Boards' - Level A recognition
- GECA 40-2008 v1.1 - 'Hard Surfacing' - Level A recognition
- GECA 28-2006 Modified 2010 v2 - 'Furniture and Fittings' - Level B recognition

The Institute for Market Transformation to Sustainability (MTS) Sustainable Materials Rating Technology standard version 4.0 - SMaRT 4.0

- SMaRT 4.0 Sustainable Platinum - Level A recognition
- SMaRT 4.0 Sustainable Gold - Level A recognition

See GBCA Website for more information. The certificate is to include the products name and model.

D.13.1.2 Documentation Requirements:

The Contractor shall provide:

- A master tracking sheet for each material type demonstrating compliance with the project's materials (See **Appendix E.2.5** for example VOC Schedules)



- Product VOC certificates or data sheets demonstrating emission levels:
  - For every compliant product nominated
  - For every datasheet provided, the compliant VOC levels must be highlighted and referenced in the short report
  - Stating the calculation method followed to determine Tvoc levels of each specified product
  - The datasheets must come from a NATA or ISO/IEC 17025 registered laboratory quoting the TVOC level of each specified product or the manufacturer documenting the calculation method followed to determine TVOC levels of each specified product
- Invoices or other proof of purchase for all relevant products used on site

### D.13.2 IEQ-13.2 Engineered Wood Products

#### D.13.2.1 Credit Requirements

The Contractor shall ensure all engineered wood products meet the formaldehyde emission limits specified below. There are two methods for demonstrating than an engineered wood product complies:

1. The product is certified under a recognised Product Certification Scheme at the time of project registration or submission. The current list of recognised schemes is shown on the GBCA website: <http://new.gbca.org.au/product-certification-schemes/>; or

OR

2. Laboratory testing showing all engineered wood products meet the formaldehyde emission limits specified below.

Engineered wood products include;

- Particleboard
- Plywood
- Medium Density Fibreboard (MDF)
- Laminated Veneer Lumber (LVL)
- High-Pressure Laminate (HPL)
- Compact Laminate
- Decorative overlaid wood panels

Timber veneers are excluded. Where only part of a product is composed of an engineered wood product, the limits apply only to that portion of the product, not the entire item.

The following applications of engineered wood products are excluded from this credit: Formwork; Car park applications; Non-engineered wood products such as milled timber.

All engineered wood products used in the building must meet the relevant limits specified below as per the specified test protocol, or have product specific evidence that it contains no formaldehyde.

Formaldehyde emission limit values for engineered wood products

Test Protocol	Emission limit/Unit of Measurement
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11 :2005 method1 0 for Plywood	<1 mg/L



AS/NZS 1859.1 :2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1 .5 mg/L
AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1 mg/L
AS/NZS 4357.4- Laminated Veneer Lumber (LVL)	≤1 mg/L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11)- LVL	≤1 mg/L
JIS A 5908:2003- Particle Board and Plywood, with use of testing Procedure JIS A 1460	≤1 mg/L
JIS A 5905:2003- MDF, with use of testing procedure JIS A 1460	≤1 mg/L
JIS A 1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1 mg/m2hr*
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1 mg/m2hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1mg/m2hr (at 3 days)
ASTM D6007	≤0.12mg/m3**
ASTM E1 333	≤0.12mg/m3***
EN 717-1 (also known as DIN EN 717-1 )	≤0.12mg/m3
EN 717-2 (also known as DIN EN 717-2)	≤3.5mg/m2hr

\*mg/m2hr may also be represented as mg/m2/hr.

\*\*\*The test report must confirm that the conditions of the Table above comply for the particular wood product type, the final results must be presented in EN 717-1 equivalent (as presented in the table) using the correlation ratio of 0.98.

\*\*\*The final results must be presented in EN 717-1 equivalent (as presented in the table), using the correlation ratio of 0.98.

#### D.13.2.2 Documentation Requirements:

The Contractor shall provide:

- A formaldehyde tracking schedule demonstrating compliance with the project's materials (See **Appendix E.2.6** for example Schedule)
- Product certificates or data sheets demonstrating formaldehyde contents
- Invoices or proof of purchase for all products used on site

## D.14 IEQ-14 Thermal Comfort

### D.14.1 IEQ14.1 Thermal Comfort



## D.14.1.1 Credit Requirements:

The Contractor must appoint a suitably qualified professional to perform thermal comfort calculations to ensure that all Primary and Secondary Spaces achieve a high degree of thermal comfort, equivalent to 80% of the occupants being satisfied in the space. The building fabric and building services must be selected to ensure this outcome is achieved. Where the selections required to achieve this result deviates significantly from the requirements in other documentation, this must be Project Superintendent must be notified in writing as soon as practicable.

A combination of the 3 methods must be used to demonstrate compliance:

- **Naturally ventilated spaces** – The internal temperatures in each space are within 80% 90% of Acceptability Limit 1 of ASHRAE Standard 55-2013. It must be shown that the occupants have direct control over the opening and closing of windows, and that these are the main sources of ventilation. These spaces can contain ceiling fans or a heating system
- **Mechanically ventilated spaces** – The space meets either the specified prescriptive criteria for Thermal Comfort or the Predicted Mean Vote (PMV) levels are between -1 and +1 -0.5 and +0.5, as outlined in the Green Star Submission Guidelines
- **Residential spaces** – An average NatHERS rating of 7 Stars or greater is achieved, in accordance with the NCC Section J modelling requirements
- Note: where a space is 'mixed mode' it must be demonstrated that it complies with both the Naturally ventilated spaces requirement and the Mechanically ventilated spaces requirements

## D.14.1.2 Documentation Requirements:

The Contractor shall provide:

- Modelling report showing the results of the NatHERS compliance method.
- Modelling report demonstrating that the thermal comfort levels achieved in all relevant areas
- Drawings showing thermal properties of roof, windows, and facade
- As Built Mechanical drawings showing details of the HVAC system and zones
- Commissioning results that the building has been commissioned and the installed systems operate as intended by the design

## D.14.2 IEQ-14.2 Advanced Thermal Comfort – Credit Not Targeted

## D.15 ENE-15 Greenhouse Gas Emissions

## D.15.1 General

The Contractor shall be aware that the project is targeting points by demonstrating that the building's predicted greenhouse gas emissions have been reduced below the "standard practice benchmark". Points are awarded independently for improving on the building's fabric energy performance.

The Contractor must ensure that all building energy consuming and generating systems are installed and commissioned to operate as designed. The Contractor must obtain prior approval from the nominated Green Star Accredited Professional for this job before modifying any building features or systems that will impact on the energy efficiency of the design.

Energy modelling report can be provided by the Sustainability Consultant upon request. The following notes the pathway for demonstrating compliance with Green House Gas Emissions.





## D.15.2 ENE-15B GHG Emissions Reduction - NatHERS Rating Pathway (residential areas)

### D.15.2.1 Credit Requirements:

The Contractor shall be aware that the project is targeting points by demonstrating that the building complies with prescriptive requirements below

- Lighting: Illumination density is to be 10% less than the maximum illumination densities of BCA Part J6, AND Independent light switching to be provided to each room and each functional area of each sole occupancy unit; AND Common area lighting to be controlled by automated lighting control system inclusive of motion detection and daylight harvesting where appropriate
- Ventilation and Air Conditioning: Air conditioning and Heating equipment to have energy star rating of at least 3 Stars as per AS3823.2-2013. The rated cooling or heating capacity of the unit does not exceed the design cooling or heating load, whichever is greater, by more than 15%, or the closest capacity on the market.
- Domestic Hot Water to be either electric heat pump (COP 3.5) or waste heat from another process
- Appliances: Any domestic appliance installed is to be within 1 star of best energy rating for that appliance type and capacity. Appliances include refrigerators/freezers, dishwashers, clothes washers and clothes dryers.

### D.15.2.2 Documentation Requirements:

The Contractor shall provide:

- NatHERS certification and report
- As built drawings and equipment schedules
- Building fabric technical data
- Building Services technical data sheets and schedules
- Documentation showing the heat load and cooling load for each area served by a heater or air-conditioner.
- Lighting schedule
- Domestic hot water documentation and schematic
- Domestic appliance technical data sheets and schedules
- Commissioning results confirming the building operates as intended by the design

## D.16 TRA-17 Sustainability Transport

### D.16.1 TRA-17B Prescriptive Pathway



#### D.16.1.1 Credit Requirements:

The Contractor shall implement sufficient transport options to ensure that the project achieves 6 Green Star points. The prescriptive requirements can be found in section 17B of the Green Star Design and As Built Submission Guidelines available from the GBCA.

- Access to Public Transport
- Reduced Car Parking Provision.
- Low Emission Vehicle Infrastructure (5% of total car parking must be dedicated to electric vehicles and charging infrastructure)
- Walkable Neighbourhoods.

#### D.16.1.2 Documentation Requirements:

The Contractor shall provide:

- A description of the prescriptive transport facility requirements included in the project.
- Technical data for electric vehicle infrastructure
- Relevant GBCA calculators demonstrating the transport facilities assessment.
- As built drawings showing car parking in the development.
- Occupant and Parking Schedules (See Appendix D.2.6 for example Schedule.)

## D.17 WAT-18 Potable Water

### D.17.1 WAT-18B Prescriptive Pathway

#### D.17.1.1 Credit Requirements:

The Contractor shall ensure that the project achieves water efficiency via prescriptive performance requirements and includes the following features:

#### **Sanitary Fixtures**

The Contractor shall ensure that all fixtures and fittings are within one star of the following WELS ratings:

#### **Tapware**

- Taps – 6 Star
- Urinals – 6 Star
- Toilets – 5 Star
- Showers – 3 Stars (>4.5 but <= 6.0 L/min)

#### **White Goods (where installed)**

- Dishwashers – 6 Star
- Clothes Washing Machines - 5 Star

#### **Rainwater Reuse**

The Contractor shall install a suitably sized rainwater tank system to provide non potable water to the following features:

- Toilet flushing



- Landscape Irrigation

#### Heat Rejection

Mechanical systems are to be air cooled systems and no water is used for heat rejection.

#### Landscape Irrigation

The landscaping and associated irrigation systems shall reduce the consumption of potable water required for irrigation through the installation of subsoil drip irrigation and moisture sensor controls.

#### Fire Protection System Test Water

The fire system shall not expel water for testing; or, the fire system includes temporary storage for 80% of the routine fire protection system test water and maintenance drain-downs for reuse on-site. If sprinkler systems are installed, each floor shall be fitted with isolation valves or shut-off points for floor-by-floor testing.

#### D.17.1.2 Documentation Requirements:

The Contractor shall provide:

- WELS certificates for all fixtures and fittings clearly showing the water consumption rates of each item.
- Manufacturers technical data sheet for commercial-scale laundry equipment
- As Built Drawings:
  - Fire; for each typical floor showing isolation valves for floor-b-floor testing of the fire sprinkler system and drawings of the water storage and re-use systems(s)
  - Hydraulic; showing potable and non-potable water systems, drain downs and any re-use systems
  - Mechanical; showing the location of all heat rejection equipment installed on the project, and any process cooling water usage loops
  - Landscaping Irrigation showing the landscape design and the irrigation system, listing the name, location and plant species / zone
- Manufacturer information of the landscaping irrigation system
- Plant selection schedule
- WELS Fittings and Fixtures Schedule (See **Appendix E.2.7** for example Schedule)
- Rainwater Reuse Summary (See **Appendix E.2.7** for example Schedule)
- Fire Protection System Testing Summary (See **Appendix E.2.7** for example Schedule)

## D.18 MAT-19 Life Cycle Impact

### D.18.1 MAT-19A Performance Pathway - Life Cycle Assessment (LCA)

#### D.18.1.1 Credit Requirements:

The Contractor shall employ a suitably qualified professional to implement a Life Cycle Assessment (LCA) to demonstrate the reduction of environmental impacts when compared to the reference building. Points are awarded based on the extent of environmental impact reduction achieved against nominated environmental impacts categories.

The LCA shall use a whole-of-building, whole-of-life methodology and an appropriately defined reference building. The LCA shall be peer reviewed. Both the LCA and the peer review shall be carried out by a competent LCA practitioner.



The Contractor shall describe in a narrative how the LCA was used as a decision making tool for the resulting material selection, project design or other project features. Points are awarded based on a cumulative percentage impact reduction calculation. This is defined as the sum of all impact category changes between the project and the reference building.

The LCA methodology shall comply with the following requirements:

- Scope - Whole-of-Building as defined in EN 15978. In particular, refer to Section 7.5 'The Building Model'
- System Boundary - Cradle to grave including all life cycle modules (modules A to D) and scenarios as detailed in EN 15978
- Functional Unit – Impacts are assessed and reported on a per square metre (m<sup>2</sup>) project Gross Floor area (GFA) basis. In addition, project teams may report on other functional units as desired
- Service Life - The service life required by the client or through regulations. If no required service life is defined, a default service life of 60 years is to be applied

The selection of data shall be based on EN 15978. Data quality shall be reported and peer reviewed.

See the Green Star Design and As Built Submission Guidelines available from the GBCA for additional details on the LCA requirements.

In addition to the above, the LCA must report on the following five impact categories:

Impact Category	Unit	Characterisation Methods
Human Toxicity	CTUh    R2.19A.06	USEtox – sum of cancer and noncancer effects
Land use	Land Transformation Mg C ha    R3.19A.04	Soil Organic Matter method (Mila I Canals et al 2007)    R2.19A.07
Resource depletion - water	m <sup>3</sup> water use related to local scarcity of water	Water Stress Indicator
Ionising Radiation	kBq U-235 equivalent	Human Health Effect model
Particulate Matter	kg PM2.5 equivalent	RiskPoll

#### D.18.1.2 Documentation Requirements:

The Contractor shall provide:

- Elemental Bill of Quantities or similar listing all materials used and associated quantities
- As built documentation demonstrating all of the materials and systems used in the development

## D.19 MAT-20 Responsible Building Materials

### D.19.1 MAT-20.1 Structural and Reinforcing Steel



#### D.19.1.1 Credit Requirements:

The Contractor shall ensure 95% (by mass) of the buildings steel is sourced from a Responsible Steel Maker; AND

For steel framed buildings at least 60% of the fabricated structural steelwork is supplied by a steel fabricator/steel Contractor accredited to the Environmental Sustainability Charter of the Australian Steel Institute (ASI).

For concrete framed buildings at least 60% (by mass) of all reinforcing bar and mesh is produced using energy-reducing processed in its manufacture (measured by average mass by steel maker annually).

The Contractor is required to obtain approval from the Design Team or Principal before substituting any building materials listed in the architectural schedules.

All benchmark calculations in this credit are based on the mass of steel in the building.

#### D.19.1.2 Documentation Requirements:

The Contractor shall provide:

- Steel Quantity Summary tabulating the steel quantity (by weight), source and specification
- The steel making facilities where the structural and/or reinforcing steel for the project is sourced have a currently valid and certified ISO 14001 Environmental Management System (EMS) in place
- The steel maker supplying the steel is a member of the World Steel Association's (WSA) Climate Action Programme (CAP)
- Product Data sheets
- Invoices confirming steel installed on site
- Responsible Steel Product schedules for all steel on site confirming compliance with credit criteria (See **Appendix E.2.8** for example Schedule)
- Current certificates must be provided. Certificates must be current at the time that the Green Star documentation is submitted to achieve points for this credit

#### D.19.2 MAT-20.2-Timber

##### D.19.2.1 Credit Requirements:

The Contractor is to ensure that at least 95% of timber provided is to be either:

- Certified by a forest certification scheme that meets the GBCA's 'Essential' criteria for forest certification; or
- From a reused source

Timber uses include, but are not limited to:

- Formwork and other temporary installations of timber (e.g. hoardings)
- Structural and non-structural timber, including internal walls, floors and roof structures
- External and internal cladding
- Flooring, wall, and ceiling finishes
- Internal and external joinery (windows, doors)
- Other specialist uses of timber, such as installed furnishings or balustrades

Furniture items are not included in this credit.



#### **D.19.2.1.1 Certified Timber- GBCA's 'Essential' criteria for forest certification**

For this option timber that is certified must be sourced from forests that have been certified by forest certification schemes that are deemed to satisfy the minimum requirements of the GBCA's 'Essential' criteria for forest certification, see guidance. Timber and timber products sourced from certified forests must be accompanied by a relevant Chain of Custody (CoC) in order to be recognised as certified timber.

Timber is only considered as 'certified' if it has been sourced from forests that have been certified by forest certification schemes that are deemed to satisfy the minimum requirements of the GBCA's 'Essential' criteria for forest certification. Currently in Australia, FSC International and PEFC accredited forest certification schemes both meet the GBCA 'Essential' criteria.

For this option timber that is reused includes timber that is pre-existing in a fitout and timber that is procured from a second hand source.

#### **D.19.2.1.2 Formwork**

New formwork must be made from certified timber to comply with this credit criterion. Formwork, not made from certified timber, that is purchased as new for a project and is reused within the same project may not be claimed as reused and does not comply with the credit criteria irrespective of the number of times it is reused on the same project. Formwork, not made from certified timber and that has been previously used in another project, and is used again in a new project, can be claimed as reused.

#### **D.19.2.1.3 Recycled Timber**

If a timber product is produced from 100% post-consumer recycled timber without the incorporation of any virgin timber content, then this shall be included as 'reused timber'. Third-party verification, in the form of a signed statement, is required to confirm the 100 percent recycled content, in order for the product to be recognised as 'reused timber'. The third-party verification statement must be provided by an auditor registered by the Registrar Accreditation Board Quality Society of Australasia (RABQSA), or other equivalent national or international auditor accreditation system.

#### **D.19.2.1.4 Reused Timber**

Timber that is pre-existing in a fitout or building, or timber and/or timber products (flooring, walls and cladding, ceiling finishes, joinery, etc.) procured from a second hand source. Reused timber sources may include second hand retailers, removalists, auction houses, and demolition works from previous sites. New paint or coatings may be applied to a reused item.

#### **D.19.2.1.5 Virgin Timber**

Refers to timber and wood-derived products that are not recycled. Sawmill coproducts are deemed to fall within the category of virgin timber.

The Contractor is required to obtain approval from the Green Star Accredited Professional before substituting any building materials listed in the architectural fitout schedule.

#### **D.19.2.2 Documentation Requirements:**

The Contractor shall provide:

- As Built Timber Schedule
- Invoices confirming the type and quantities of timber product including the Chain of Custody code
- Timber Product tracking schedules for all timber on site confirming compliance with credit criteria (See **Appendix E.2.9** for example Schedule)

#### **D.19.3 Mat 20.3 - Permanent Formwork, Pipes, Flooring, Blinds and Cables**



#### D.19.3.1 Credit Requirements:

The Contractor shall ensure that at least 90% (by cost) of all cables, pipes, floor and blinds either do not contain any PVC or meet the GBCA *Best Practice Guidelines for PVC in the Built Environment*.

The costs of non PVC items must be accounted for in the analysis as per PVC containing products.

To demonstrate that a product complies with the Best Practice Guidelines for PVC in the Built Environment it must have one of the following:

- ISO 14001 certified Environmental Management System (EMS) that includes the requirements of the Best Practice Guidelines for PVC in the Built Environment
- Independently audited manufacturer's declaration of compliance to the Best Practice Guidelines for PVC in the Built Environment
- Product third party certification of compliance to the guidelines (ISO type 5 certificate or eco label)

The 'total cost of PVC products' for the purpose of providing cost calculations shall be determined by the cost of the entire product (excluding installation costs). Construction materials containing PVC will have to comply with 'best practice' guidelines and be independently certified to a minimum of one of the following criteria compliance to demonstrate a compliant product:

See the *Best Practice Guidelines for PVC in the Built Environment* documentation on the GBCA website.

#### D.19.3.2 Documentation Requirements:

The Contractor shall provide:

- As Built Schedule of all permanent formwork, pipes, flooring, blinds and cables indicating material type (See **Appendix E.2.10** for example Schedule)
- Invoices confirming quantity (by cost) and types of permanent formwork, pipes, flooring, blinds and cables products
- Safety Data Sheet (SDS) or Environmental Product Declaration (EPD) for products that do not contain PVC.
- Valid audit verification certificate or product accreditation certificate from a Green Building Council of Australia accredited scheme to demonstrate compliance of PVC products with *Best Practice Guidelines for PVC in the Built Environment* for relevant products or

## D.20 MAT-21 Sustainable Products

### D.20.1 MAT21.0 Product Transparency and Sustainability

#### D.20.1.1 Credit Requirements:

The Contractor shall aim to maximise the use of Sustainable Products on this project where practical. The Contractor shall offer product selections which contain a high proportion of sustainable content. The sustainable content includes:

- Reused Products
- Recycled Content Products
- Environmental Product Declarations
- Third-Party Certification
- Stewardship Programs

The Contractor must aim to provide at least 3% by cost of sustainable product content when compared to the Project Contract Value (PCV).



All eligible building projects and materials may be included in this Sustainable Products calculation, apart from the concrete and steel which have already been included in previous credits.

Typical products and materials that may be included are:

- Loose furniture;
- Fixed furniture;
- Internal Partitions;
- Assemblies;
- Joinery;
- Flooring;
- Wall coverings;
- Ceilings
- Cladding
- Masonry
- Glazing
- Timber
- Steel
- Concrete
- Other Products or materials used in the project which could potentially have a transparency or sustainability initiative

Points are calculated based on specified benchmarks for the percentage of compliant products used in the project.

To calculate the sustainability value that an individual product can contribute towards points in this credit, the dollar cost of the product must be multiplied by a Sustainability Factor (SF) that reflects the weighted benefit of the initiative,  
 $\text{Sustainability value} = \text{Product cost}(\$) \times \text{SF}$

**Table 1: Sustainability Factors**

Transparency and Sustainability Initiative	Sustainability Factor (SF)
Reused Product	1.0
Recycled Content Product	Decimal fraction of product that is recycled material (e.g. 20% recycled = 0.2)
Environmental Product Declarations - product-specific	0.75
Environmental Product Declarations – industry-wide	0.5
Product has Level A Third Party Certification	1.0
Product has Level B Third Party Certification	0.75
Product has Level C Third Party Certification	0.5
Stewardship Program	0.5

The Project Contract Value is the dollar value that will be required to complete the works for the entire project, including site works (landscaping, external paving, etc.). The following items must be excluded from this definition:

- Demolition works
- Consultants, design fees, project management fees
- Works outside the project site area
- Buildings or areas within the site that are not being assessed for purposes of Green Star

#### Reused Products





Reused products are items that have been previously used and are incorporated in the project without significant changes to the structure or function of the item. Cleaning, making good, repairs, recovering and resurfacing are allowed.

#### Recycled Content Products

Recycled content items are items produced with recovered materials. The Sustainability Factor of recycled content product is 1. The product's value entered into the calculator should be the percentage of the recycled content in the product by mass. For example, if a product is worth \$100 and 75% is recycled content, enter \$75.

#### Environmental Product Declarations (EPDs)

There are several independent EPD schemes operating globally, providing services associated with the release and publishing of EPDs on behalf of scheme participants. EPD schemes can differ in format and scope, including in the life cycle stages considered and whether the EPDs are independently verified.

Only EPDs published by schemes that consider a minimum cradle-to-gate scope and include independent verification are recognised in this credit. Published EPDs shall confirm compliance to listed standards and include the scope considered, and by whom the EPD was verified.

For compliance with this credit, two EPD formats are recognised as follows:

#### Products with a product-specific, third-party verified EPD

For this format the following minimum requirements apply:

- The EPD is issued in conformance with ISO 14025 or EN 15804
- The EPD must be independently-audited
- The EPD must be based on a cradle-to-gate scope as a minimum

#### Products with an industry-wide, third-party verified EPD

For this format the following minimum requirements apply:

- The EPD is issued in conformance with ISO 14025 or EN 15804
- The EPD must be independently-audited
- The EPD must be based on a cradle-to-gate scope as a minimum
- The product manufacturer must be recognised as a participant in the EPD

#### Third Party Certification

Third Party Certification levels are defined in the GBCA's Framework for Product Certification Scheme.

Several certification schemes have been assessed against the GBCA Framework for Product Certification Scheme and meet the requirements for the Third Party Certification requirement in this credit. These schemes are listed on the GBCA website. Other certification schemes can apply for assessment.

For more information, refer to the Product Certification Project information page on the GBCA's website:  
<http://www.gbca.org.au/green-star/technical-support/materials-category/product-certificationschemes/2933.htm>

#### Stewardship Programs

Product stewardship programs encourage projects and suppliers to share responsibility for the effective reduction, reuse, recycling or recovery of products. Product stewardship also helps manage environmental harm arising from the product when it becomes waste.

Products stewardship programs must be demonstrated with a product stewardship contract. The two types of Product Stewardship Contracts, for a leased item and a purchased item, are defined below.



#### Product Stewardship Contract – Leased Item

For this arrangement the following minimum requirements apply:

The contract must be between a supplier and the building owner or tenant;

The supplier must agree to collect the item at the lease end for re-lease, re-use or recycling; and

The contract may not include exemptions which relate to timing, quality or quantity that will be accepted for collection.

#### Product Stewardship Contract – Purchased Item

Contract between supplier and building owner or tenant.

Supplier agrees to collect item at the end of use for re-lease, re-use or recycling.

Contract is not to include exemptions which relate to timing, quality or quantity that will be accepted for collection.

#### D.20.1.2 Documentation Requirements:

The Contractor shall provide:

- A completed Green Star Sustainable Products Calculator
- Confirmation from supplier that products are reused, contain recycled content and the cost of the recycled/reused content; OR
- Product Third Party Certification and evidence of product costs; OR
- Environmental Product Declarations certificates and evidence of product costs; OR
- Product Stewardship agreement evidence of product costs
- Transparency and Sustainability tracking schedule for all sustainable products (See **Appendix E.2.11** for example Schedule)

## D.21 ECO-23 Ecological Value

### D.21.1 ECO-23.0 Endangered, Threatened or Vulnerable Species

#### D.21.1.1 Credit Requirements:

The Contractor shall be aware that the Principal has ensured that the site does not contain “critically endangered, endangered, or vulnerable species or ecological communities” as defined in the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). If the Contractor encounters any information in the course of performing any building works that contradicts this, the Principal must be informed as soon as practicable.

#### D.21.1.2 Documentation Requirements:

No documentation required.

### D.21.2 ECO-23.1 Ecological Value

#### D.21.2.1 Credit Requirements:

The Contractor shall be aware that the project is targeting points for the improvement to the ecological value of the land. The Contractor shall:

- Deliver the landscape design as documented



- Ensure that any proposed modifications to the landscaping or site design do not adversely affect the ecological value calculator. A copy of the ecological value calculator can be provided upon request.

#### D.21.2.2 Documentation Requirements:

The Contractor shall provide:

- As Built Landscape Drawings and Specifications

## D.22 ECO-25 Heat Island Effect Reduction

### D.22.1.1 Credit Requirements:

The Contractor shall ensure that at least 75% of the total project site area comprises of building or landscaping elements that reduce the impact of heat island effect, which include the following:

- Vegetation
- Solar photovoltaic roof mounted panels
- Roofing materials, including shading structures, having the following:
  - For roof pitched <15° a three year SRI >64
  - For roof pitched >15° a three year SRI >34
- Only where three year SRI for products is not available use the following:
  - For roof pitched <15° an initial SRI > 82
  - For roof pitched >15° an initial SRI > 39
- Un-shaded hard-scaping elements with a three year SRI > 34 or an initial SRI >39;
- Hard-scaping elements shaded by overhanging vegetation or roof structures;
- Water bodies and/or water courses; and
- Areas directly to the south of vertical building elements, including green walls and areas shaded by these elements at the summer solstice.

### D.22.1.2 Documentation Requirements:

The Contractor shall provide: As built Site Plan, nominating the soft scaped areas, hardscape and types of roofing;

- An area schedule listing the SRI values of each area;
- Supplier documentation for compliant roofing and hardscape materials highlighting the three year or initial SRI for the product, as applicable.

## D.23 EMI-26 Stormwater

### D.23.1 EMI26.1 Stormwater Peak Discharge

#### D.23.1.1 Credit Requirements:

The Contractor shall ensure that the post-development peak event storm water discharge from the site does not exceed the pre-development peak event storm water discharge, using a 1 year Average Recurrence Interval (ARI) storm event.



The Contractor shall employ a suitably qualified professional to perform the following stormwater simulation required to demonstrate compliance with this credit:

- Continuous simulation of a minimum of 10 years
- A six (6) minute time step (intervals)
- Localised climatic sequences
- Water balances
- Treatment train operation

Discharging stormwater to groundwater systems (aquifer recharge) either directly or indirectly is a legitimate means of achieving compliance with the credit criteria, however it must be ensured that the stormwater being discharged meets the relevant Pollution Reduction Targets as described in Emi 26.2, and that pollutants are not contaminating groundwater supplies.

#### D.23.1.2 Documentation Requirements:

The Contractor shall provide:

- Calculation / modelling report by a suitably qualified professional describing how this credit has been achieved
- As built Civil drawings demonstrating storm water design
- As built Hydraulic drawings demonstrating storm water design

#### D.23.2 EMI-26.2 Stormwater Pollution Targets

##### D.23.2.1 Credit Requirements:

The Contractor shall employ a suitably qualified professional to ensure that all stormwater discharges from site meet the pollution reduction targets listed in column B of Table 26.2.

**Table 26.2 Pollution Reduction Targets**

Pollutant	Reduction Target (% of the typical urban annual load)		
	A	B	C
Total Suspended Solids (TSS) <sup>1</sup>	80%	80%	90%
<b>Gross Pollutants</b>	85%	90%	95%
Total Nitrogen (TN) <sup>2</sup>	30%	45%	60%
Total Phosphorus (TP) <sup>2</sup>	30%	60%	70%
Total Petroleum Hydrocarbons <sup>3</sup>	60%	90%	90%
Free Oils <sup>3</sup>	90%	90%	98%

**Notes:**

- Load based on the following particulate size distribution (by mass): 20% <20 µm; 20% 20-60 µm; 20% 60-150 µm; 20% 150-400 µm; 20% 400-2000 µm
- Load includes particulate and dissolved fraction



- This requirement is not applicable where the site contains less than a total of 200m<sup>2</sup> of uncovered areas where vehicles are likely to transit and/or park e.g. roads, loading docks, refuelling bays, car parking etc

#### D.23.2.2 Documentation Requirements:

The Contractor shall provide:

- Modelling report by a suitably qualified professional describing how this credit has been achieved
- As built Civil drawings demonstrating storm water design
- As built Hydraulic drawings demonstrating storm water design

### D.24 EMI-27 Light Pollution

#### D.24.1 EMI-27.0 Light Pollution to Neighbouring Bodies

##### D.24.1.1 Credit Requirements:

The Contractor shall ensure that all outdoor lighting on the project complies with AS 4282: 1997 Control of the Obtrusive Effects of Outdoor Lighting. This applies to all inhabited boundaries, apart from boundaries with roads. The boundary shall be taken as the site boundary, with no setback and no consideration of the location of adjacent buildings (i.e. worst-case scenario).

##### Documentation Requirements:

The Contractor shall provide:

- As Built drawings showing all external luminaires, the aiming point and mounting orientation
- Calculation Plots demonstrating compliance with AS 4282

#### D.24.2 EMI-27.1 Light Pollution to Night Sky

##### D.24.2.1 Credit Requirements:

The Contractor shall design, install and commission all external lighting to ensure one of the following options is implemented:

- Control of Upward Light Output Ratio (ULOR):

No external luminaire on the project has a ULOR that exceeds 5%, relative to its actual mounted orientation

Awnings can be used as a means of achieving compliance with the 5% ULOR requirement where a section drawing showing the light output of the luminaire can be provided, and where the awning has the effect of blocking 95% of the output of the lamp above the horizontal

OR

- Control of Direct Illuminance:

Direct illuminance from external luminaires on the project produces a maximum initial point illuminance value no greater than 0.5 Lux to the site boundary and 0.1 Lux to 4.5m beyond the site into the night sky, when modelled using a calculation plane set at the highest point of the building

Calculations shall be in accordance with AS 4282: 1997. The calculation plane shall cover the area between the site boundary and building façade or vertical service to be illuminated. The horizontal calculation plane shall be set at the top of the building fabric, excluding spires. Calculation plane grid points shall have 0.5m spacing. All illumination results shall be reported to within 2 decimal places



#### D.24.2.2 Documentation Requirements:

The Contractor shall provide:

- As Built Drawings showing the location of all external luminaires and showing the aiming point and mounting orientation of all external luminaires
- Luminaire schedule for all external lighting, nominating the type, lighting distribution and quantity of each luminaire and including the relevant photometric data showing that the luminaires do not have an upward light output ratio that exceeds 5%
- OR
- Calculation Plots for all external lighting, showing that all grid points on the calculation plane return a maximum reading of 0.5 Lux to the site boundary and no greater than 0.1 Lux to 4.5m beyond the site into the night sky

### D.25 EMI-28 Microbial Control

#### D.25.1.1 Credit Requirements:

The Contractor shall ensure that no water-based heat rejection systems are installed.

#### D.25.1.2 Documentation Requirements:

### D.26 EMI-28.0 Legionella Impacts from Cooling Systems

#### D.26.1.1 Credit Requirements:

The Contractor shall ensure that no water-based heat rejection systems are installed.

#### D.26.1.2 Documentation Requirements:

The Contractor shall provide:

- As Built Mechanical Drawings demonstrating waterless heat rejection systems only

### D.27 EMI-29 Refrigerant Impacts – Credit Not Targeted

### D.28 INN-30 Innovation

#### D.28.1 INN-30C Stormwater Pollution Targets

##### D.28.1.1 Credit Requirements:

The Contractor shall demonstrate achieving Pollution Reduction Targets from column B (1 points) as stated in Table 26.2.

##### D.28.1.2 Documentation Requirements:

The Contractor shall provide:

- As built Civil drawings demonstrating storm water design
- As built Hydraulic drawings demonstrating storm water design
- Independently verified performance certification to show that the equipment is capable of achieving the targets

#### D.28.2 INN-30D Financial Transparency



#### D.28.2.1 Credit Requirements:

The Contractor shall provide estimated costs associated with achieving the initiatives included the Green Star credits targeted in this rating. This will be provided on a credit-by-credit basis and in line with the Green Star credit for “Financial Transparency”

#### D.28.2.2 Documentation Requirements:

The Contractor shall provide:

- As Built Costs associated with Green Star on credit-per-credit basis
- Completed Financial Transparency Disclosure Template (in excel format), comprehensively itemising the costs associated with Green Star
- 

#### D.28.3 INN-30D Occupant Engagement

##### D.28.3.1 Credit Requirements:

Pre and post occupancy surveys shall be conducted by the Principle. This information will be made available to the GBCA to improve the pool of research on the sustainability performance of assets.

##### D.28.3.2 Documentation Requirements:

The Contractor shall provide:

#### D.28.4 INN-30D Local Products and Materials

##### D.28.4.1 Credit Requirements:

To claim this Innovation Challenge the project team must:

- Demonstrate that a percentage of the products and materials used in the project were produced or manufactured in Australia. The percentage achievement must be significant in comparison to industry standard

##### D.28.4.2 Documentation Requirements:

The Contractor shall provide:

- Supporting evidence to demonstrate that a percentage of the products and materials used in construction were produced or manufactured in Australia
- Supporting evidence to show that the percentage achievement is significant in comparison to industry standard.

#### D.28.5 INN-30D Community Benefits

##### D.28.5.1 Credit Requirements:

To claim this Innovation Challenge the project team will:

- Perform a ‘needs analysis’ of the surrounding community. This may include community briefings, meetings or workshops. Develop a strategy for how the project will provide social/community benefits and consult with the broader community on the proposed plan; and
- Implement the plan and deliver outcomes as defined by the community benefits strategy.

We understand that this body of works will be conducted by Homes Victoria.

##### D.28.5.2 Documentation Requirements:

The Contractor shall provide:



No documentation required.

#### D.28.6 INN-30E Safe Places

##### D.28.6.1 Credit Requirements:

- All public areas, such as playgrounds, skate parks and community food gardens, must be visible from at least one street.
- A crime risk assessment process is undertaken; and
- A design strategy has been adopted that incorporates designing out crime principles.

##### D.28.6.2 Documentation Requirements:

The Contractor shall provide:

- Documentation to demonstrate that the project site has been built with the minimum requirements for visibility.
- Documentation to demonstrate that the project site has been built including the adopted designing out crime principles incorporated in the masterplan.





## PART E. Appendices

### E.1 Appendix D.1 – GBCA Recognised Product Certification Schemes

The following schemes and relevant standards have been assessed as compliant with the requirements of the GBCA's Assessment Framework for Product Certification Schemes. Click on the relevant scheme below for detail.

#### Carpet Institute of Australia Limited, Environmental Certification Scheme (ECS) v1.2

- ECS **Level 2 - Level C** recognition
- ECS **Level 3 - Level B** recognition
- ECS Level 4 (two options) - Level A recognition

#### Ecospecifier GreenTag GreenRate v3.2

- GreenTag GreenRate Level C - Level C recognition
- GreenTag GreenRate Level B - Level B recognition
- GreenTag GreenRate Level A - Level A recognition

#### Australasian Furnishing Research and Development Institute, Sustainability Standard for Commercial Furniture - AFRDI Standard 150

- AFRDI Green Tick Level C/Silver - Level B recognition
- AFRDI Green Tick Level B/Gold - Level A recognition
- AFRDI Green Tick Level A/Platinum - Level A recognition

#### Good Environmental Choice Australia (GECA), including six standards

- **GECA 28-2010 v2** - 'Furniture and Fittings' - **Level A** recognition
- **GECA 50-2011 v2** - 'Carpets' - **Level A** recognition
- **GECA 25-2011 v2** - 'Floor Coverings' - **Level A** recognition
- **GECA 04-2011 v2** - 'Panel Boards' - **Level A** recognition
- **GECA 40-2008 V1** - 'Hard Surfacing' - **Level A** recognition
- **GECA 28-2006 Modified 2010 v2** - 'Furniture and Fittings' - **Level B** recognition

#### The Institute for Market Transformation to Sustainability (MTS) Sustainable Materials Rating Technology standard version 4.0 - SMaRT 4.0

- SMaRT 4.0 Sustainable Platinum - Level A recognition
- SMaRT 4.0 Sustainable Gold - Level A recognition

See GBCA Website for more information.



## E.2 Appendix D.2 – Tables for Completion by Contractor

The Contractor shall sign and submit this sheet at practical completion stage to confirm that the credit requirements for each of the Green Star credits has been incorporated into the building by both the Contractor and any sub-contractors on this project in accordance with this specification and the other design documentation. All credits must be achieved to show compliance with the Green Star equivalent requirements.

**Contractor Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

Cat	Credit	Credit Name	Contractor Sign Off
Man	1.0	Green Star Accredited Professional	
Man	2.0	Commissioning and Tuning - Environmental Performance Targets	
Man	2.1	Commissioning and Tuning - Services and Maintainability Review	
Man	2.3	Commissioning and Tuning - Building Systems Tuning	
Man	2.4	Independent Commissioning Agent	
Man	3.1	Climate Adaptation Plan	
Man	4.1	Building Information – Building Operations and Maintenance Information	
Man	5.1	Commitment to Performance – Environmental Building Performance	
Man	5.2	End of life Waste Performance	
Man	6.0	Metering and Monitoring – Metering	
Man	6.1	Monitoring Systems	
Man	7.0	Environmental Management Plan	
Man	7.1	Environmental Management System	
Man	7.2	High Quality Staff Support	
Man	8A	Performance Pathway: Specialist Plan	
IEQ	9.1	Ventilation System Attributes	
IEQ	9.2	Quality of Internal Air – Provision of Outside Air	
IEQ	9.3	Quality of Internal Air – Exhaust or Elimination of Pollutants	
IEQ	10.3	Acoustic Separation	
IEQ	11.0	Lighting Comfort – Minimum Lighting Comfort	



IEQ	11.1	Lighting Comfort - General Illuminance and Glare Reduction	
IEQ	11.2	Surface Illuminance	
IEQ	11.3	Localised Lighting Control	
IEQ	12.0	Visual Comfort - Glare Reduction	
IEQ	12.1	Visual Comfort - Daylight	
IEQ	12.2	Visual Comfort - Views	
IEQ	13.1	Indoor Pollutants - Paints, adhesives, sealants and carpets	
IEQ	13.2	Indoor Pollutants - Engineered wood products	
IEQ	14.1	Thermal Comfort	
Ene	15.0	Greenhouse Gas emissions - Conditional Requirement	
Ene	15.B	Greenhouse Gas emissions - NatHERS Pathway	
Tra	17B	Sustainability Transport - Prescriptive Pathway	
Wat	18.2	Potable Water - Prescriptive Pathway	
Mat	19A	Performance Pathway – Life Cycle Assessment	
Mat	19A.1	Comparative Life Cycle Assessment	
Mat	19A.2	Additional Reporting	
Mat	20.1	Responsible Building Materials - Steel	
Mat	20.2	Responsible building materials – Timber	
Mat	20.3	Responsible building materials – Permanent Formwork, Pipes, Flooring, Blinds and Cables	
Mat	21.1	Sustainable products -product transparency and sustainability	
Eco	23.0	Endangered, Threatened or Vulnerable Species	
Eco	23.1	Ecological Value	
Eco	25.1	Heat Island Effect Reduction	
Emi	26.1	Stormwater – Stormwater Peak Discharge	
Emi	26.2	Stormwater Pollution Targets	
Emi	27.0	Light Pollution to Neighbouring Bodies	



Emi	27.1	Light Pollution to Night Sky	
Emi	28.0	Legionella Impacts from cooling towers	
Inn	30C	Stormwater Pollution Targets	
Inn	30D	Financial Transparency	
Inn	30D	Occupant Engagement	
Inn	30D	Local Procurement	
Inn	30D	Community Benefits	
Inn	30E	Safe Places	

## E.2.1 MAN-6 Metering and Monitoring

### Metering Strategy

The following information relates to the MAN-6 Credit: Metering and Monitoring. See **Section D.6** for further details.

Complete the following schedules and submit at Practical Completion.

The following meter schedules must include all of the end-use energy/water consumption and generation for the site. Where there are any unmetered loads or loads that are to be virtually metered using a difference calculation between two meters, these loads must be included in these schedules with a relevant description in the Meter Name column.



Electricity Metering Schedule

Meter Name	Type of meter	Energy end use description	Estimated Load (kW)	Proportion of total building energy (%)



**Gas Metering Schedule**

Meter Name	Type of meter	Energy end use description	Estimated Load (kW)	Proportion of total building energy (%)

**Water Metering Schedule**

Meter Name	Type of meter	Water end use description	Estimated Load (kL)	Proportion of total building water (%)



## E.2.2 IEQ-9 Quality of Internal Air

The following information relates to the IEQ-9 Credit: Quality of Internal Air. See **Section D.9** for further details.

Complete the following schedules and submit at Practical Completion.

### Provision of Outdoor Air

Complete the following schedules and submit at Practical Completion.

Summary of Mechanically Ventilated Spaces								
Air Handling Unit	Space/ Floor	Area (m <sup>2</sup> )	AS1668.2 Requirements			Project Rates	% Improve- ment	Points claimed [1, 2]
			Net Floor Area per person	Quantity (L/S/ Person)	Min OA per Space (L/s)	Min OA per Space (L/s)		
[e.g. AHU – North]	<b>[e.g. 1<sup>st</sup> Floor]</b>	[100m <sup>2</sup> ]	[10m <sup>2</sup> ]	[e.g. 7.5l/s/ person]	[e.g. 75L/s]	[e.g. 115 L/s]	[e.g. 53%]	[e.g. 1 point]
[e.g. AHU – North]	<b>[e.g. Laboratory]</b>							
[e.g. AHU – North]	<b>[e.g. 2<sup>nd</sup> Floor]</b>							



Summary of Naturally Ventilated Spaces				
Space/Floor	Nominated Area (m <sup>2</sup> )	Required Opening Size	Opening Provided	Compliant? (Y/N)
		m <sup>2</sup> open area	m <sup>2</sup> open area	
[e.g. 1 <sup>st</sup> Floor]	[m <sup>2</sup> ]	[m <sup>2</sup> ]	[m <sup>2</sup> ]	[Y/N]
[e.g. Laboratory]				
[e.g. 2 <sup>nd</sup> Floor]				

Summary of Mixed Mode Spaces			
Space/Floor	Nominated Area (m <sup>2</sup> )	Compliant with Mechanical Ventilation Requirements (Y/N)	Compliant with Natural Ventilation Requirements (Y/N)
[e.g. 1 <sup>st</sup> Floor]	[Mechanical Natural]	[Y/N]	[Y/N]
[e.g. Laboratory]			
[e.g. 2 <sup>nd</sup> Floor]			





Exhaust or Elimination of Pollutants

Summary of Pollutant Exhaust						
Floor	Area (m <sup>2</sup> )	Required Exhaust rate (L/s/m <sup>2</sup> )	Required Air Flow Rate (L/s)	Air Flow Rate Provided (L/s)	Floor take off size capacity (L/s)	Floor take off size capacity as air floor rate (L/s/m <sup>2</sup> )
[Level 1]						
[Level 2]						
[Level 3]						
[Level 4]						

E.2.3 IEQ-11 Lighting Comfort

The following information relates to the IEQ-11 Credit: Lighting Comfort. See **Section D.11** for further details.

Complete the following schedules and submit at Practical Completion.



General Illuminance and Glare Reduction

Summary of illuminance levels				
Space/Floor	Task/activity type	'Best practice general illuminance'	Area weighted average illuminance	Compliant [Y/N]

Summary of uniformity values				
Space/Floor	Task/activity type	Required uniformity level (Table 3.2 of AS1680.1:2006)	Uniformity level in space	Compliant [Y/N]



Summary of Glare Reduction Measures					
Space/Floor	Lighting description	Select compliance option(s) for each space/floor			Compliant [Y/N]
		Option A	Option B	Option C	

Surface Illuminance

Surface Illuminance Summary				
Space/Floor	Lighting description	Surface Description	Compliance Method [A/B]	Compliant [Y/N]



## E.2.4 IEQ-12 Visual Comfort

The following information relates to the IEQ-12 Credit: Visual Comfort. See **Section D.12** for further details.

Complete the following schedules and submit at Practical Completion.

### Glare Reduction

Fixed Shading Device Summary		
Glazing Configuration Test Point	% working plane hours/year shaded via Fixed Shading	Describe why these points are representative of the glazing configuration
[Space 1 / Level 1]		
[Space 2 / Level 2]		
[Space 3 / Level 3]		

Blinds or Screens Summary			
Glazing Configuration Test Point	Blind/screen type(s)	VLT	Can be controlled by affected occupants
[Space 1 / Level 1]			[Y/N]
[Space 2 / Level 2]			
[Space 3 / Level 3]			



E.2.5 IEQ-13 Indoor Pollutants

The following information relates to the IEQ-13 Credit: Indoor Pollutants. See **Section D.13** for further details.

Complete the following schedules and submit at Practical Completion.

Paints, adhesives, sealants and carpets

Summary of paint VOC Levels					
Paint product name	Type	Benchmark TVOC Limit	Actual TVOC	Reference to datasheet	Compliant (y/n)

Summary of adhesive and sealant VOC Levels					
Paint product name	Type	Benchmark TVOC Limit	Actual TVOC	Reference to datasheet	Compliant (y/n)



Summary of carpet VOC Levels					
<i>Paint product name</i>	<i>Type</i>	<i>Benchmark TVOC Limit</i>	<i>Actual TVOC</i>	<i>Reference to datasheet</i>	<i>Compliant (y/n)</i>

**Formaldehyde**

Summary of formaldehyde Levels			
<i>Engineered wood product</i>	<i>Formaldehyde Content</i>	<i>Emission Limit</i>	<i>Compliant (y/n)</i>

**E.2.6 TRA-17 Sustainable Transport**

The following information relates to the TRA-17 Credit: Sustainable Transport. See **Section D.17** for further details.

Complete the following schedules and submit at Practical Completion.



Prescriptive Pathway

Summary of Expected Building Occupant Numbers	
Expected Numbers	
Regular Occupants	[x]
Visitors	[x]
Staff	[x]
Peak Occupancy	[x]
[other occupant type]	[x]

Car parking Provisions					
Space Use Type	Number of Occupants	Maximum Car Parking Ratio	Max Spaces Permitted	Spaces Provided	Points Claimed
[space use]	[x]	[1 to 30]	[x]	[x]	[0.5, 1]
[space use]	[x]	[1 to 30]	[x]	[x]	
[space use]	[x]	[1 to 30]	[x]	[x]	



## E.2.7 WAT-18 Potable Water

The following information relates to the WAT-18 Credit: Potable Water. See **Section D.18** for further details.

Complete the following schedules and submit at Practical Completion.

**Potable Water - Performance Pathway**

Summary of WELS rated Fittings and Fixtures					
Item	Schedule Code	WELS Rating	Flowrate (L/min or L/flush)	Quantity of fixtures	Highest Available WELS Rating
[Toilet A]					5
[Toilet B]					5
[Urinal A]					6
[Urinal B]					6
[Shower A]					3
[Shower B]					3
[Tap A]					6
[Tap B]					6
[Dishwasher A]					5
[Washing machine A]					5

Summary of rainwater reuse system	
System Component	Details
Tank size required to meet credit requirements	
Tank Size	
Treatment Installed	
Overflow/Top-up	





Summary of fire protection system testing				
Total Maximum Fire System Test Water				
Percentage of water reused / recycled (%)				

### E.2.8 MAT-20 Responsible Building Materials

The following information relates to the MAT-20 Credit: Responsible Building Materials. See **Section D.20** for further details.

Complete the following schedules and submit with the Tender Package. An As Built schedule shall also be submitted at Practical Completion.

#### Steel

Responsible Steel Products Summary			
Product	Steel Maker	Valid ISO 14001 Certification	Mass of Steel Supplied (tonnes)
Reinforcement	One Steel	[yes/no]	[20000 tonnes]
Total			
Percentage Compliant			

Steel Fabricator Summary		
Product	Non-ASI Fabrication (tonnes)	ASI-ESC Fabrication (tonnes)
E.g. Fabricator 1		



[insert rows as needed]		
Total		
Percentages	X%	X%

Energy Reducing Technologies in Steel Reinforcement Manufacture			
Product	Reinforcing steel (tonnes)	Manufacturer's annual average production using ERT (%)	Average mass of ERT steel (tonnes)
Supplier name	[x] tonnes	[x]%	= [x] tonnes * [x]%
e.g. reinforcing bar supplier 1	205	73%	150
Supplier 2			
Supplier 3			
Total			
Percentage Compliant	(Total average ERT steel/ Total steel)		[x]%

## E.2.9 MAT-20 Responsible Building Materials

The following information relates to the MAT-20 Credit: Responsible Building Materials. See **Section D.21** for further details.

Complete the following schedules and submit with the Tender Package. An As Built schedule shall also be submitted at Practical Completion.

### Timber

Timber Schedule				
Description of Timber Use and/or Timber Products	Reused; Certified; or	Total cost reused	Total cost certified	Total cost uncertified



Uncertified Timber				
Wood Panels (e.g. plywood, particleboard and MDF used for formwork, joinery, kitchens, bathrooms)				
Doors				
Furniture covers timber used in loose furniture, tables, workstations, chairs, lockers, etc.				
Skirting boards				
Architraves				
Structural Timber (pylons, beams, laminate beams, etc.)				
[Other timber uses and timber products not mentioned in table]				
Sub-total costs		\$	\$	\$
Total cost of all timber specified in the building and construction works		\$		
Combined total costs of reused and certified timber		\$		
Total cost of reused and certified timber as a percentage of total timber cost		%		

## E.2.10 MAT-20 Responsible Building Materials

The following information relates to the MAT-20 Credit: Responsible Building Materials. See **Section D.22** for further details.

Complete the following schedules and submit with the Tender Package. An As Built schedule shall also be submitted at Practical Completion.

### Permanent Formwork, Pipes, Flooring, Blinds and Cables

Type of Common PVC Use	Product Name	Supplier Name	Compliant with Best Practice Guidelines for PVC (Y/N)	Type of Compliance Documents Provided and Reference to Attachments to Schedule*	Quantity by area (m <sup>2</sup> ), lineal metres (lm), or number of items (no) **	Total Cost Compliant Products	Total Cost Non - Compliant Products
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Total Cost of All Compliant PVC Product							
Total Cost of All Non-Compliant PVC Product							
Combined Cost of all PVC products in schedule							
Percentage of PVC Products Compliant with Best Practice Guidelines for PVC (Cost of Compliant Products / Combined Cost of All Non PVC Product) x 100%							

\* Provide certificates for compliance documentation as attachments to schedule.

\*\* Measurements and cost estimates of PVC products must be conducted in accordance with The Australian Standard Method of Measurement for Building Works – Fifth Edition, published by the Australian Institute of Quantity Surveyors

### E.2.11 MAT-21 Sustainable Products

The following information relates to the MAT-21 Credit: Sustainable Products. See **Section D.23** for further details.

Complete the following schedule and submit with the Tender Package. An As Built schedule shall also be submitted at Practical Completion.

#### Product Transparency and Sustainability

Transparency and Sustainability Initiative	
REFERENCE TABLE	Sustainability Factor (SF)
Reused Product	1.00
Recycled Content Product	1.00
Environmental Product Declarations – product-specific	0.75
Environmental Product Declarations – industry-wide	0.50
Product has Level A Third Party Certification	1.00
Product has Level B Third Party Certification	0.75



Product has Level C Third Party Certification				0.50
Stewardship Program				0.50
	\$ -			



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