Masters Penrith

ESD Initiatives Report

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Prepared for

Masters Pty Ltd

Prepared by

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Table of Contents

Executive Summary

AECOM have been commissioned by Masters, a subsidiary of Woolworths, to undertake an Environmentally Sustainable Design (ESD) study to assess potential sustainable initiatives and opportunities for the Masters Penrith Store project.

The aim of the report is to:

- Outline the approach to environmental sustainability for the project;
- Identify the key sustainability priorities for the project;
- Outline the key sustainability initiatives that are fit for purpose and provide the most value for the project.

The report is a summary of the environmental benefits installed under the proposed design which offer significant environmental savings. It is predicted that more that 20-30% of carbon emissions will be reduced and 40-50% of water will be saved whilst provide a better quality environment for the occupants. The diverse range of initiatives supported by a well-developed building management system provides the project with a platform from which further ESD initiatives can be easily implemented.

Whilst there is a Director General's Requirement for the facility to be assessed against a "suitably accredited rating scheme to meet industry best practice" there is no such rating scheme applicable to a single tenant Class 6 building such as this. Woolworth Group identified this as an issue and developed the WHIS Scorecard to rate facilities that did not sit within the eligibility requirements of third party accredited schemes. The WHIS scorecard has been developed based on a range of third party schemes including Green Star, LEED and BREEAM.

Masters Penrith – Mulgoa Rd will incorporate features required to achieve a 4 star rating under the WHIS scorecard. Details of the score card are attached as an appendix to this report.

1.0 Summary of ESD Initiatives

Below is a summary of the ESD initiatives outlined in the report and are listed under their relevant categories. These items are currently confirmed to be incorporated in the design. Additional measures will be adopted, as required to meet a 4 Star rating under the WHIS Scorecard.

Table 1: Summary of ESD Initiatives

ESD Initiative	ESD Priority				
	IEQ	Water	Energy	Materials	Emissions
Daylight	✓				
High-frequency ballasts	✓				
Thermal Comfort	✓				
Low Volatile Organic Compound (VOC) paint	✓				
Formaldehyde reduction	✓				
Photo-electric indoor lighting control with ON/OFF control			✓		
Energy-efficient lamps, lamps high-output T5 fluorescent lamps			✓		
BMS control of indoor lighting system			✓		
Lighting Zoning			✓		
Light-coloured internal finishes			✓		
Efficient carpark lighting			✓		
Power Factor (PF) correction			✓		
Energy Management System (EMS)			✓		
Skylights			✓		
HVAC: Economy Cycle	✓		✓		
HVAC: Electronic expansion valves in packaged units			✓		
HVAC: Digital scroll compressor			✓		
Variable speed drives for water pressure pumps			✓		
Solar water heating for kitchen and central amenities			✓		
Energy Metering and Monitoring			✓		
Water efficient fixtures and fittings		✓			
Rainwater harvesting		✓			
Water metering		✓			
Fire test water reuse		✓			
Recycled Steel				✓	
Sustainable timber				✓	
Responsible PVC and Minimisation				✓	
Zero Ozone Depleting potential					✓
Legionella minimisation	✓				✓

2.0 ESD Initiatives

ESD initiatives considered are items that have been incorporated in to the proposed design. A summary of the initiatives can be found under section 2.0.

2.1 Indoor Environment Quality

2.1.1 Daylight

Increased level of daylighting will be provided through the extensive use of translucent skylights.

Research shows that workplaces that provide higher levels of natural daylight are more preferred by the occupants that work in these spaces that occupants of workspaces with lower levels of natural daylight. Research also suggests that increased levels of daylighting reduces stress, enhances attention capacity and cognitive work strategies, resulting in high productivity (Heschong, 2006; Heschong Mahone Group 2003)

2.1.2 High Frequency Ballasts

Fluorescent lights will be provided with High frequency ballasts provide a “flicker free” lighting environment. The lighting actually still flickers but at such a high frequency it is imperceptible to the human eye. This result in less eye strain and other underlying sub-conscious effects of the standard ballast lamps.

2.1.3 Low VOC paints and finishes

Low VOC products will be specified for paints, sealants and adhesives.

Low VOC products provide less noxious off-gassing products as they dry and though their life cycle. These VOCs are associated with higher levels of eye, skin and nose irritation as well as headaches and lethargy.

2.1.4 Formaldehyde minimisation

Low formaldehyde engineered wood products will be used in this project.

Similar to VOC off gassing of formaldehyde from engineered wood products are associated with increased incidents of skin, eye and throat irritation as well as increase asthma attacks. Formaldehyde is also classified as a carcinogen and has been linked to damage to foetus’.

2.2 Energy and Greenhouse Gas Emissions

2.2.1 Photo-electric indoor lighting control with ON/OFF control

ESD Initiative Type	Carbon Emission ($CO_{2\text{-}e}$) Saving
Energy	Up to 33% of retail area artificial lighting emissions

As natural lighting is promoted throughout the building through the installation of skylights, energy savings will be achieved through the installation of daylight sensors within the retail space. These sensors will shut off one third of all lights when the ambient light levels in the space are adequate and therefore can offer up to 33% saving when daylight is sufficient.

To accurately measure the total energy/emissions savings for this initiative a daylight model of the building would need to be created to simulate the total hours per year when sufficient natural day light penetrates through the skylights to disable the artificial lighting system. As a result the estimated emission savings has not been measured.

2.2.2 Energy-efficient Lamps

ESD Initiative Type	Carbon Emission ($CO_{2\text{-}e}$) Saving
Energy	Up to 28% of retail artificial light emissions

Low-energy, high-output T5 fluorescent lamps have been specified for the building. These lamps offer a 25-28% energy/emission reduction in lighting power consumption when compared to incandescent lamps.

2.2.3 Building Management System control of Indoor Lighting System

ESD Initiative Type	Carbon Emission ($CO_{2\text{-}e}$) Saving
Energy	Up to 5% of artificial lighting emissions

A lighting controls system is interfaced with the Building Management System (BMS) therefore ensuring that lighting is operated under a time controlled operation aligned with the occupancy of the building. The benefit of the automated lighting control system is proportional to the staff's environmental awareness program. It is estimated that a lighting control system can provide up to a 5% saving in energy/emissions when compared to relying on staff/security to manually switch all lighting circuits.

2.2.4 Lighting Zoning

ESD Initiative Type	Carbon Emission (CO_{2-e}) Saving
Energy	Less than 1% of artificial lighting emissions

The lighting system has been zoned to maximise the need to light that only requires staff/security access during after-hours occupancy.

2.2.5 Light-coloured Internal Finishes

ESD Initiative Type	Carbon Emission (CO_{2-e}) Saving
Energy	Less than 1% of artificial lighting emissions

Light-coloured interior surfaces (white painted walls) aid the distribution of light through the building – thereby reducing the amount of electric light required to light the interior

2.2.6 Efficient Carpark Lighting

ESD Initiative Type	Carbon Emission (CO_{2-e}) Saving
Energy	Less than 1% of artificial lighting emissions

Photoelectric cell controlled high output, low energy lamps are installed. A further reduction in energy consumption is enhanced by interfacing the light fittings with the lighting control system BMS control.

To accurately measure the total energy/emissions savings for this initiative a daylight model of the carpark would need to be created to simulate the total hours per year when sufficient natural day light disables the artificial carpark lighting system.

2.2.7 Power Factor (PF) Correction

ESD Initiative Type	Carbon Emission (CO_{2-e}) Saving
Energy	Nil

Power Factor Correction (PFC) is supplied for the main switchboard inclusive of the HVAC system.

Power factor correction provide a capacitance load to the power supply to offset the highly inductive load subject to the electrical supply to the building. These inductive loads are created primarily by large motors such as fan, compressor and lift motors. Whilst not directly saving energy this does allow for a more efficient energy generation network. PFC also allows the reduction in cable sizes and transformers. It also reduces the maximum demand load charges from the energy retailer, which is charged based on kVA (including power factor) and not kW (excluding power factor effects)

2.2.8 HVAC Roof Packaged Energy Savings

ESD Initiative Type	Carbon Emission (CO_{2-e}) Saving
Energy	25% of the HVAC energy consumption

The retail area is served by six roof top packaged air conditioning systems. Below is a list of features included in the air conditioning unit design to improve the energy efficiency of a standard packaged air conditioning unit. These features include;

a) Electronic expansion valves in packaged units

Electronic expansion valves (EEV) provide a greater level of accuracy when de-loading the HVAC plant compressors. EEV's enable the plant to turn down to as low as 10% of total load capacity. The benefits of this device can be notice during the shoulder season when the plant is not operating at full capacity.

b) HVAC: Digital scroll compressor

Masters have organised specialty built, multistage roof top package units fitted with digital scroll compressors. As with the EEV's a digital scroll compressor provide a greater level of accuracy when de-loading the HVAC plant.

This reduces energy associated with over cooling of the space and reduces compressor cycling, creating high start-up currents

c) HVAC: Economy Cycle

Each roof top packaged air conditioning system has an economy cycle. An economy cycle is a form of “free” cooling; when ambient temperatures are favourable (18°C-24°C) the packaged air conditioning unit deactivates the active cooling mode and drawings 100% fresh air through the air conditioning unit.

This addition of extra outside air to provide the free cooling will also decrease the levels of contaminants in the air, that can be associated with recirculating air, thereby increase indoor environment quality (IEQ)

2.2.9 Passive Night Purge

ESD Initiative Type	Carbon Emission (CO_{2-e}) Saving
Energy	5% of the HVAC energy consumption

Passive night purge will be achieve through the provision operable louvres and/or roof mounted ventilators.

Night purging allows cool air to enter the building over night, when conditions are favourable, to precool the air and structure. This reduces the initial load on the air conditioning during summer months. Due to the high thermal mass of the structure this cooling has a lasting effect through the day due to the slabs increased ability to absorb more heat , slowly through the day.

2.2.10 Variable speed drives for water pressure pumps

ESD Initiative Type	Carbon Emission (CO_{2-e}) Saving
Energy	Less than 1% of total electrical consumption

Variable speed pumping arrangements reduce power consumption when full capacity is not required. It is estimated that the pumps will operate at part load for the majority of time

2.2.11 Solar Hot Water System

ESD Initiative Type	Carbon Emission (CO_{2-e}) Saving
Energy	35-40% (compared to 100% electric heating element)

The domestic hot water system is installed with a three panel solar system. The solar hot water system with electric boost heating uses solar energy to heat water for domestic use and thereby reduces the reliance on electrical power to heat water for use in bathrooms and kitchen areas.

The current three-panel system reduces electrical energy consumption by up to 40% when compared against electric heating systems.

2.2.12 Energy Metering and Monitoring

Energy meters will provided to all major power uses in the building, such as lighting and air conditioning. These energy meter will be connected to the Building Management System (BMS) to allow routine monitoring of the energy consumption. This will allow automated alarms to be set to identify excessive energy use or unexpected energy use outside normal trading hours.

2.3 Water

2.3.1 Water-efficient Fittings and Fixtures

It is estimated that the Installation of efficient Water Efficient Labelling Standards (WELS) tap ware, fixtures, and fittings will reduce water consumption from average 4 L/min to 3.0 L/min[1] for toilets etc (depending on the product installed); will reduce the water consumption by approximately 35 per cent.

The following water-efficient fittings have been specified for the project:

Fitting	Flow Rate	WELS Rating Equivalent
WC's	4.5 / 3 litre flush	3
Urinals	0.8 litre flush	5
Basins	4.5 litres per minute	6
Showers	9.0 litres per minute	3
Sinks	6.0 litres per minute	4

2.3.2 Water Collection and Reuse

ESD Type	Water Savings
Water	Up to 90,000 Litres per month

The proposed design is inclusive of 2 x 45,000L rain water storage tanks that is used for 100% toilet flushing and a percentage of the nursery irrigation demand.

Based on the assumption that the nursery is watered twice a day, every day of the year it is estimated that the total water consumption for the nursery would equate to 115,000 litres per month.

The quantity of water required for toilet flushing is based on 30 staff at 3 flushes per day, 100 uses by public per day. Therefore the total water usage per calendar month average by the amenities is approximately 25,000 per month.

On this basis it is estimated that 75,000 litres per month or 65% of water required for irrigation purposes within the Nursery is supplied by the rainwater harvesting system.

2.3.3 Water Meters

ESD Type	Carbon Emission Savings
Water	Up to 10% of total water consumption

BMS integrated water meters are proposed throughout the facility to allow remote monitoring of water consumption of all major water uses. BMS monitoring of water allows for rapid detection of leaks, as well as improved management of water consumption throughout the building. Separate water metering should be provided for:

- Bathrooms
- Irrigations systems
- Washdown systems
- Rainwater harvesting supply

2.3.4 Fire Test Water Reuse

ESD Type	Water Savings
Water	60,000L

All fire pump test water is drawn from the fire water/test tank and recirculated back. In this way no mains water is used for pump testing and no test water is wasted. This testing is conducted each month with up to 60KL of mains water is not wasted.

[1] Based on a comparison of 3 star WELS rating with 5 star

2.4 Materials

2.4.1 Use of post-consumer recycled steel

ESD Type	Recycled content
Materials	17-20% of all Black Steel 60% in steel mesh 90% in deformed reinforcing bar

Increased levels of recycled content in steel product provides the best means of reducing the carbon content of a highly carbon intensive product.

2.4.2 Sustainable timber

Timber used in this project will either be re-used, in the case of form work, or sourced from forestry with third party accredited environmental practises, such as PEFC or FSC. This ensure that that timber used in this project is obtained from sustainable sources.

2.4.3 PVC minimisation and Best Practise

Where possible PVC will be minimised in this project through the use of XLPE sheathed cables and Polyethylene or polypropylene piping. Where this is not possible PVC products will be sourced from manufacturers subscribing to the Best Practise Guidelines for PVC.

PVC, or more particularly the by-products of PVC manufacture, can have serious adverse environmental effects. Whilst substitution with more environmentally friendly alternative is the best option, it is possible to source most PVC products from manufacturers that have production techniques adapted to reduce these adverse effects.

2.5 Emissions

2.5.1 Zero Ozone Depleting Potential

All refrigerants use in the project will have zero Ozone depleting potential. All thermal insulation will also not contain, or use in their manufacture, any ozone depleting products.

Refrigerant and blowing agents for expanded insulation, such as polyurethane and polystyrene, have historically been large source of ozone depleting gases. Ensuring that these products are ODP free reduces the impact of the project on the wider environment.

2.5.2 Legionella

All heat rejection equipment used in this project will be air cooled. This will eliminate any risk of Legionella, which can multiply in cooling towers associated with water cooled heat rejection.

Legionella is both an emission and IEQ risk as the most likely to be affected by a Legionella outbreak are those closest to the source, the cooling tower which would be required to be located on site.

Appendix A – Woolworths Home Improvement Sustainability Scorecard

1.0 Introduction

AECOM have been engaged by Woolworth's to develop a sustainable scorecard for the home improvement stores.

This document is intended to outline a pathway for Woolworth's to rate the home improvement stores using a holistic approach to sustainability for the built environment.

The document aims to achieve the following:

- Outline the purpose of the sustainability scorecard
- Outline the purpose of each credit
- Outline the methodology of each credit and how they reflect Woolworth's home improvement stores
- Provides guidance associated with each deliverable required to achieve compliance with the credit criteria

It is to be noted that the document is a "work in progress" and requires further in-depth development of each credit to clearly outline the supportive literature to ensure that the intent of each credit is achieved.

2.0 Sustainability Scorecard Framework

The sustainability scorecard uses a common language developed and established by the building environmental rating tools commonly used around the world including Green Star from Australia, BREEAM from the United Kingdom, and LEED from the United States.

The Woolworth's Home Improvement Scorecard (WHIS) maintains the common language of the global rating tools as this is familiar to the built environment industry hence ensure that the focus on developing environmental improvements with the Home Improvement Stores can be cross referenced against industry best practice.

The common theme of the existing rating tools will also eliminate a further level of complexity when measuring the performance of each Home Improvement Store.

2.1 Sustainability Rating Tools

Green Star

Green Star is a voluntary environmental rating tool created by the Green Building Council of Australia (GBCA) to holistically assess the potential opportunities for a development to reduce the environmental impact on the built environment.

The GBCA based the Green Star series of rating tools on existing overseas tools including Building Research Establishment Environmental Assessment Method (BREEAM) and Leadership in Energy and Environmental Design (LEED) rating tools. The GBCA developed the Green Star is an environmental measurement criteria relevant to the Australian marketplace and environmental context.

The GBCA have developed seven rating tools to reflect the diverse array of sectors within the built environment. The rating tools currently available include;

- Office (Design, As Built & Interiors)
- Healthcare
- Multi Unit Residential
- Industrial
- Retail Centres

Each rating tool has nine categories which represent a vast range of environmental design initiatives. The categories are divided into credits, each of which addresses an initiative that improves or has the potential to

improve the building's environmental performance. Points are awarded in each credit for actions that demonstrate that the project has met the overall objectives of the scorecard.

These categories are:

- Management
- Energy
- Water
- Land Use and Ecology
- Indoor Environment Quality (IEQ)
- Transport
- Materials
- Emissions
- Innovation

The Green Star rating tools have been researched to assess whether they can be applied to certify a Home Improvement Store. The tools researched were the *Green Star – Retail Centre v1* and *Green Star Industrial*. The findings are as shown below:

- A typical Home Improvement Store does not more than on retail business therefore Retail Centre rating tool cannot be certified.
- The primary function of a typical Home Improvement Store is not as an industrial facility and therefore the Industrial rating tool cannot be directly applied.

BREEAM and LEED

LEED and BREEAM's environmental categories a similar to the Green Star rating tool with BREEAM most closely aligned with Green Star. LEED has a slightly different representation of the categories and a different methodology of calculating the score of each credit. However it is found that the credits within both rating tools can be reassigned to the Green Star categories. Thus, the environmental categories of Green Star, BREEAM and LEED are used as the foundation of the Woolworth's Home Improvement Sustainability Scorecard.

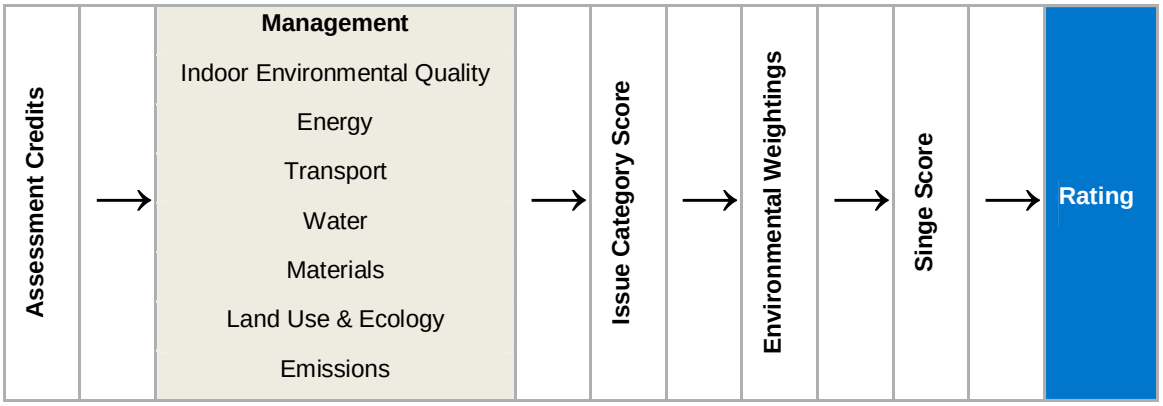
It must be noted that Green Star and LEED also offer an Innovation category, this category has been excluded from the Woolworth's Home Improvement Sustainability Scorecard.

2.2 Categories

The eight nominated categories are divided into credits, each of which addresses an initiative that improves or has the potential to improve the building's environmental performance. Points are awarded in each credit for actions that demonstrate that the project has met the overall objectives of the scorecard.

Once all credits in each category are assessed, a percentage score for the category is calculated. An environmental weighting factor is then applied to each of the category's scores to reach a single score. This is shown in Table 1.

The purpose of the weighting is to reflect differing environmental concerns across each of the categories.



For the Home Improvement Stores the weights have been adjusted when compared to the existing rating tools. The purpose of this is to reflect the functionality of the store and the limitation of embedding sustainable initiatives into this building type that are common to buildings with the education or commercial office sectors. An example of this would be the Indoor Environment Quality category initiatives.

The category weightings of the WHIS scorecard focuses on three key focus areas which have the greatest influence on improving the current building design and have the largest impact on the built environment. The focus areas are; Energy, Water and Materials.

Table 1 WHIS Scorecard weightings for each environmental category

Category	Available Points	Weighting	Weighting Factor
Management	14	13%	0.57
Indoor Environment Quality	15	14%	0.60
Energy	34	29%	1.27
Transport	7	6%	0.57
Water	15	14%	1.20
Materials	10	10%	1.09
Land Use and Ecology	7	7%	0.57
Emissions	8	7%	0.75
Total	111	100%	

2.3 Points Rating

To continue the common theme of the existing rating tools (Green Star, BREEAM and LEED) a star rating system has been developed for the WHIS scorecard. Table 2 below shows the three star ratings that have been developed for the WHIS scorecard.

Table 2 WHIS Scorecard Rating System

Overall Score	Rating	Outcome
45-59	Three Star	Good Industry Design
60-74	Four Star	Best Industry Design
75-100	Five Star	Leading Industry Design

To determine the star rating a single score is measured by adding together the Weighted Category Score. To calculate the following is required;

Weighted Category Score = Category Score (%) x Weighting Factor (%) x 100

Category Score = Number of points achieved divided by Number of points available

2.4 Credit Example

To assist the reader a credit example is shown below with the purpose of each credit explained in detail to ensure that the design team working on the project understand the objectives of the credit.

A description of the information required to demonstrate compliance with the credit is also provided to allow the client to received evidence from the design team that the credit has been achieved.

MGT 1 - Sustainability Consultant

Aim of Credit:

A brief description of why the credit has been developed and the environment benefits associated with this credit.

To encourage and recognise the adoption of environmentally sustainable principles from the earliest project stages throughout the design phase.

Credit:

Allocation of non weighted points is shown with a brief description of the supportive technical literature required to demonstrate that the building design is capable of achieving the nominated credit.

One point *for engaging a Sustainability Consultant as part of the design team to provide sustainability advice throughout the design and delivery period. The Sustainability Consultant must be engaged at the start of the prior to the start of schematic design*

3.0 Scorecard

Below is the generic WHIS scorecard, the scorecard also includes an additional column for the specific project as each project may include a number of “not applicable” credits.

Ref	Title	Criteria	Points Available [Generic]	Points Available [Store XYZ]	Points Achieved [Store XYZ]	Comments
MANAGEMENT						
MGT1	Sustainability Consultant	One point for engaging a Sustainability Consultant as part of the design team to provide sustainability advice	**1**			
MGT2	Commissioning	One point for undertaking a review of the design with respect to enabling commissioning to occur and producing a commissioning program One point for carrying out commissioning in accordance with CIBSE Commissioning Codes or ASHRAE Commissioning Guideline 1-1996 and CIBSE Commissioning Codes One point for producing a commissioning report	**3**			
MGT3	Building Tuning	One point for undertaking building tuning over 12 months	**1**			
MGT4	Building Users' Guide	One point for producing a Building Users' Guide	**1**			
MGT5	Environmental Management	One point for producing and implementing a project-specific environmental management plan One point for the contractor holding ISO 14001 accreditation	**2**			
MGT6	Waste Management	One point for recycling or reusing 60% of all demolition and construction waste Two points for recycling or reusing 80% of all demolition and construction waste	**2**			
MGT7	Waste and Recycling Management Plan	One point for developing a Waste and Recycling Management Plan to reduce the store's operational waste	**1**			
MGT8	Building Management Systems	One point for installing a building management system to monitor and control building services systems	**1**			
MGT9	Maintainability	One point for undertaking a review during the design phase of the design with respect to access, ongoing maintenance and ongoing cleaning of the building services and external building fabric	**1**			
MGT10	Whole Life Costing	One point for assessing and documenting whole of life costs for the development	**1**			
		Unweighted Sub Total	**14**	**0**	**0**	
		Weighted Sub Total			**0.00**	
INDOOR ENVIRONMENT QUALITY						
IEQ1	Ventilation Rates - Office	One point for providing air rates 50% greater than the requirements of AS1668.2-1991 Two points for providing air rates 100% greater than the requirements of AS1668.2-1991	**2**			
IEQ2	Ventilation Rates - Retail Floor	One point for providing air rates 50% greater than the requirements of AS1668.2-1991 Two points for providing air rates 100% greater than the requirements of AS1668.2-	**2**			

Ref	Title	Criteria	Points Available [Generic]	Points Available [Store XYZ]	Points Achieved [Store XYZ]	Comments
		1991				
IEQ3	Carbon Dioxide Monitoring and Control	One point for installing a CO2 monitoring and control system or providing 100% outside air	**1**			
IEQ4	Daylight - Offices	One point for all administration spaces having windows	**1**			
IEQ5	Daylight - Retail Floor	One point for providing daylight to the retail floor	**1**			
IEQ6	Internal Noise Levels - Building Services	One point is awarded where it is demonstrated that the internal noise levels from building services meets the recommended design sound levels provided in Table 1 of AS/NZS2107:2000.	**1**			
IEQ7	Volatile Organic Compounds - Paints	One point for 95% of all internal painted surfaces using low-VOC paints	**1**			
IEQ8	Volatile Organic Compounds - Adhesives & Sealants	One point for 95% of adhesives and sealants being low-VOC	**1**			
IEQ9	Volatile Organic Compounds - Flooring	One point for all carpets being low-VOC	**1**			
IEQ10	Formaldehyde Minimisation	One point for all engineered wood products having low formaldehyde emissions	**1**			
IEQ11	Electric Lighting Levels	One point for the lighting design providing maintained luminance levels no greater than 25% of the levels in AS1680.2.3	**1**			
IEQ12	External Views - Administration	One point for administration spaces having an external view	**1**			
IEQ13	Drinking Water	One point for providing a drinking fountain on the retail floor, in the garden centre and in the trading centre	**1**			
		Unweighted Sub Total	**15**	**0**	**0**	
		Weighted Sub Total			**0.00**	
ENERGY						
E1	Greenhouse Gas Emissions - Fabric	Up to seven points for achieving improvement with respect to the BCA Section J deemed-to-satisfy provisions under J1 Building Fabric and J2 Glazing	**7**			
E2	Greenhouse Gas Emissions - Systems	Up to seven points for achieving improvement with respect to the BCA Section J deemed-to-satisfy provisions under J5 Air-conditioning and Ventilation Systems and J6 Artificial Lighting and Power	**7**			
E3	Greenhouse Gas Emissions - Renewable: Electricity	Up to six points for providing renewable energy systems	**6**			
E4	Greenhouse Gas Emissions - Renewable: Hot Water	One point where 50% of annual DHW demand is provided by a solar gas boosted DHW unit Two points for 70% or greater of annual DHW demand is provided by a solar gas boosted DHW unit	**2**			
E5	Energy Sub-metering	One point for sub-metering all substantive energy uses One point for providing mechanism for monitoring energy use	**2**			
E6	Lighting Zoning	One point for dimmable lighting that achieve 160 Lux lighting level	**1**			

Ref	Title	Criteria	Points Available [Generic]	Points Available [Store XYZ]	Points Achieved [Store XYZ]	Comments
E7	Daylight Harvesting	One point for controlling artificial light levels via installation of PE Cells	**1**			
E8	Unoccupied Areas	One point for lighting automatically turning off in areas when unoccupied One point for air-conditioning turning off automatically in offices when unoccupied	**2**			
E9	Car Park Ventilation	One point for providing fans with variable speed drives controlled by carbon monoxide monitoring or naturally ventilating the car park	**1**			
E9	Trade Area Ventilation	One point for providing fans with variable speed drives controlled by carbon monoxide monitoring or naturally ventilating the car park	**1**			
E10	Efficient External Lighting	One point for providing external lighting of at least 50 lumens/watt One point for connecting external lighting to daylight sensors	**2**			
E11	Lifts	One point for providing energy efficient lifts	**1**			
E12	Escalators	One point for providing escalators which reduce operation when there is no passenger demand	**1**			
		Unweighted Sub Total	**34**	**0**	**0**	
		Weighted Sub Total			**0.00**	
TRANSPORT						
T1	Car Hire Provision	One point for providing at least one dedicated space for hired vehicle (i.e. flexicar) to take home their purchased goods Two points where the vehicle is a hybrid petrol/electric motor vehicle	**2**			
T2	Cyclist Facilities - Staff	One point for providing cyclist facilities for 5% of staff Two points for providing cyclist facilities for 10% of staff	**2**			
T3	Cyclist Facilities - Visitors	One point for providing bicycle parking for visitors in close proximity to the store entrance	**1**			
T4	Bicycle and Pedestrian Connectivity	One point for designing the site layout to provide safe access for pedestrians from the public roadway to the entry door One point for designing the site layout to provide safe access for cyclists from the public roadway to the entry door	**2**			
		Unweighted Sub Total	**7**	**0**	**0**	
		Weighted Sub Total			**0.00**	
WATER						
W1	Occupant Amenity Water	One point for providing 4 star WELS fittings and fixtures Two points for providing 5 star WELS fittings and fixtures Three points for providing 6 star WELS fittings and fixtures	**3**			

Ref	Title	Criteria	Points Available [Generic]	Points Available [Store XYZ]	Points Achieved [Store XYZ]	Comments
W2	Rainwater	One point for collecting rainwater from of the roof area and using the collected rainwater for toilet flushing and watering 50% of the garden centre usage Two points for collecting rainwater from of the roof area and using the collected rainwater for toilet flushing and 75% watering in the garden centre usage	**2**			
W3	Water Meters	One point for installing water meters One point for linking the Building Management System to the water meters to monitor usage	**2**			
W4	Landscape Irrigation	One point for using non-potable water to irrigate external landscaping or installing a xeriscape garden	**1**			
W5	Heat Rejection Water	Three points for reducing potable water consumption of water-based heat rejection systems by 50% Six points for reducing potable water consumption of water-based heat rejection systems by 90% or for not providing water-based heat rejection systems	**6**			
W6	Fire System Water	One point for re-using fire test water	**1**			
		Unweighted Sub Total	**15**	**0**	**0**	
		Weighted Sub Total			**0.00**	
MATERIALS						
M1	Recycling Waste Storage	One point for providing a dedicated storage area for recyclables	**1**			
M2	Compactor/Baler	One point for providing a compactor/baler	**1**			
M3	Concrete - Portland Cement	One point for reducing the quantity of Portland cement by 30% for in situ concrete, 20% for pre-cast concrete and 15% for stressed concrete Two points for reducing the quantity of Portland cement by 60% for in situ concrete, 40% for pre-cast concrete and 30% for stressed concrete	**2**			
M4	Concrete - Aggregate	One point for using recycled or slag aggregate	**1**			
M5	Recycled Asphalt	One point for using recycled asphalt	**1**			
M6	PVC Minimisation	One point for using non-PVC pipework One point for using non-PVC cabling	**2**			
M7	Designing for Robustness	One point for providing protection to parts of the building fabric exposed to high pedestrian traffic, vehicular and trolley movements	**1**			
M8	Regional Materials	One point for using materials or products extracted, harvested, recovered or manufactured within 500km of the project site	**1**			
		Unweighted Sub Total	**10**	**0**	**0**	
		Weighted Sub Total			**0.00**	
LAND USE & ECOLOGY						
L1	Site	One point for selecting a site which is not prime agricultural land, old-growth forest, within 100m of a natural wetland or habitat for endangered fauna and/or flora	**1**			
L2	Topsoil	One point for protecting and reusing topsoil	**1**			

Ref	Title	Criteria	Points Available [Generic]	Points Available [Store XYZ]	Points Achieved [Store XYZ]	Comments
L3	Reuse of Land	One point for re-using land which has been previously developed	**1**			
L4	Reclaimed Contaminated Land	One point for decontaminating a significantly contaminated site	**1**			
L5	Change of Ecological Value	Up to four points for maintaining or improving the ecological value of the site	**4**			
		Unweighted Sub Total	**8**	**0**	**0**	
		Weighted Sub Total			**0.00**	
EMISSIONS						
EM1	Refrigerant ODP	The use of zero ozone depleting refrigerants is mandatory	**Required**	**Required**	✓	
EM2	Insulant ODP	One point for using thermal Insulant with no ozone depleting substances in their manufacture and composition	**1**			
EM3	Stormwater Design - Peak Flows	One point for the development not increasing peak stormwater flows for rainfall events of up to a 1-in-1.5 year storm	**1**			
EM4	Stormwater Design - Loads	One point for achieving the load requirements stipulated in the Urban Stormwater Best Practice Environmental Management Guidelines	**1**			
EM5	Light Pollution	One point for complying with AS4282 Control of the Obtrusive Effects of Outdoor Lighting One point for no external luminaire having an upward light output ratio that exceeds 5%	**2**			
EM6	Legionella	One point for avoiding the use of water-based heat rejection systems	**1**			
EM7	Trade Waste Pollution	One point for installing effluent pre-treatment on site	**1**			
EM8	Noise Pollution	One point for the noise levels at the site boundary not exceeding 50dB (A) LAeq	**1**			
		Unweighted Sub Total	**8**	**0**	**0**	
		Weighted Sub Total			**0.00**	
		TOTAL	**111**	**0**	**0**	
		Weighted TOTAL			**0**	

Good Industry Design	50 - 69 pts
Best Industry Design	70 - 89 pts
Leading Industry Design	90-111 pts

4.0 Summary

The WHIS Scorecard provides Woolworths with the ability to benchmark the Home Improvement Stores against industry best practice by using the common language of global rating tools that are familiar to the built environment industry.

Categories and credits have been developed and tailored to the needs of the Home Improvements stores however the WHIS Scorecard is at an early stage of development. The level of clarity provided within this document requires further input from the Woolworth's Home Improvement team to ensure that a consistent understand of the scorecard is incorporated across all future projects and the project team.

To ensure the success of the WHIS scorecard it is required that each credit requires further development with a particular focus on the following areas;

- Points weighting to be assessed for each state, current generic design is based on Victorian environmental factors,
- Confirmation that the ability to achieve each credit is viable from a whole of lift costing perspective,
- Performance based credits are measured in a consistent format, and
- The level of supportive literature to be provides by the project team reflects the expectations of the assessor.

4.1 Management

4.1.1 MGT 1 - Sustainability Consultant

Aim of Credit:

To encourage and recognise the adoption of environmentally sustainable principles from the earliest project stages throughout the design phase.

Credit:

One point for engaging a Sustainability Consultant to be engaged as part of the design team to provide sustainability advice throughout the design and delivery period. The Sustainability Consultant must be engaged at the start of the prior to the start of schematic design.

4.1.2 MGT 2 - Commissioning

Aim of Credit:

To encourage and recognise commissioning and handover initiatives that ensures that all building services can operate to optimal design potential.

Credit:

One point for engaging a commissioning agent to review of the pre tender design documentation with respect to enabling commissioning and for the commissioning agent produce a commissioning program.

One point for carrying out commissioning in accordance with CIBSE Commissioning Codes or ASHRAE Commissioning Guideline 1-1996 and CIBSE Commissioning Codes

One point for producing a commissioning report to transfer project knowledge to the building owner/manager/tenant.

4.1.3 MGT 3 – Building Tuning

Aim of Credit:

To encourage and recognise commissioning initiatives that ensure optimum occupant comfort and energy efficient services performance throughout the year.

Credit:

One point for undertaking building tuning over 12 months

After handover, the building owner implements tuning of all building systems;

- A relevant member of the design team is involved in the tuning process;
- Monthly monitoring is undertaken and the outcomes are reported to the building owner quarterly;
- Full re-commissioning is undertaken 12 months after practical completion; and
- A Building Tuning Report on the outcomes of the tuning process is provided to the building owner and made available to the design team.

4.1.4 MGT 4 – Building User's Guide

Aim of Credit:

To encourage and recognise information management that enables building users to optimise the building's environmental performance.

Credit:

One point for producing a Building Users' Guide, which includes information relevant for the building users, staff and customers, is developed and made available to the building owner.

4.1.5 MGT 5 – Environmental Management

Aim of Credit:

To encourage and recognise the adoption of a formal environmental management system in line with established guidelines during construction.

Credit:

One point for producing and implementing a project-specific environmental management plan in accordance with Section 4 of the NSW Environmental Management System guidelines 1998.

One point for the contractor holding ISO 14001 accreditation

4.1.6 MGT 6 – Waste Management

Aim of Credit:

To encourage and recognise management practices that minimise the amount of construction waste going to disposal.

Credit:

The contractor is required to implement a Waste Management Plan (WMP), retains waste records and submits a quarterly report to the building owner; and

One point for recycling or reusing 60% of all demolition and construction waste

Two points for recycling or reusing 80% of all demolition and construction waste

4.1.7 MGT 7 – Waste Recycling Management Plan

Aim of Credit:

To encourage and recognise management systems that facilitate the reduction of waste going to landfill.

Credit:

One point for developing a Waste and Recycling Management Plan to reduce the store's operational waste

4.1.8 MGT 8 – Building Management Systems

Aim of Credit:

To encourage and recognise the incorporation of a Building Management System to actively control and maximise the effectiveness of building services.

Credit:

One point for installing a building management system to monitor and control building services, and to monitor and report (monthly) on energy and water consumption

4.1.9 MGT 9 – Maintainability

Aim of Credit:

To encourage and recognise building design that facilitates ongoing maintenance, and minimises the need for ongoing building maintenance throughout a building's lifecycle.

Credit:

One point for undertaking a review during the design phase of the design with respect to access, ongoing maintenance and ongoing cleaning of the building services and external building fabric

The person responsible for maintenance, or a suitably qualified maintenance staff member.

4.1.10 MGT 10 – Whole of Life Costing

Aim of Credit:

To encourage and recognise building design that identifies equipment that minimises capital and operational expenditure without compromising environmental benefits.

Credit:

One point for assessing and documenting whole of life costs for the development.

4.2 Indoor Environmental Quality

4.2.1 IEQ 1 – Ventilation Rates Offices

Aim of Credit:

To encourage and recognise designs that provides increased levels of outside air to counteract build-up of indoor pollutants to the office space.

Credit:

One point for providing air rates 50% greater than the requirements of AS1668.2-1991

Two points for providing air rates 100% greater than the requirements of AS1668.2-1991

4.2.2 IEQ 2 – Ventilation Rates Retail Floor

Aim of Credit:

To encourage and recognise designs that provides increased levels of outside air to counteract build-up of indoor pollutants to the retail space.

Credit:

One point for providing air rates 50% greater than the requirements of AS1668.2-1991

Two points for providing air rates 100% greater than the requirements of AS1668.2-1991

4.2.3 IEQ 3 – Carbon Dioxide Monitoring and Control

Aim of Credit:

To encourage and recognise the provision of response monitoring of carbon dioxide and other pollutant levels to ensure delivery of optimum quantities of outside air.

Credit:

One point for installing a CO2 monitoring and control system or providing 100% outside air to the space.

4.2.4 IEQ 5 – Daylight - Offices

Aim of Credit:

To encourage and recognise designs that provides good levels of daylight for staff.

Credit:

One point for all administration spaces having windows.

4.2.5 IEQ 6 – Daylight – Retail Floor

Aim of Credit:

To encourage and recognise designs that provides good levels of daylight for the customer and staff.

Credit:

One point for providing daylight to the retail floor.

4.2.6 IEQ 7 – Internal Noise Level

Aim of Credit:

To encourage and recognise buildings that are designed to maintain internal noise levels at an appropriate level.

Credit:

One point is awarded where it is demonstrated that the internal noise levels from building services meets the recommended design sound levels provided in Table 1 of AS/NZS2107:2000.

4.2.7 IEQ 8,9,10 – Volatile Organic Compounds

Aim of Credit:

To encourage and recognise interior finishes that minimise contribution of Volatile Organic Compounds in buildings.

Credit:

One point for 95% of all internal painted surfaces using low-VOC paints.

One point for 95% of adhesives and sealants being low-VOC.

One point for all carpets being low-VOC.

4.2.8 IEQ 11 – Formaldehyde Minimisation

Aim of Credit:

To encourage and recognise the products with low formaldehyde emission levels.

Credit:

One point for all engineered wood products having low formaldehyde emissions.

4.2.9 IEQ 12 – Electrical Lighting Levels

Aim of Credit:

To encourage and recognise base building provided office / warehouse lighting that is not over designed.

Credit:

One point for the lighting design providing maintained luminance levels no greater than 25% of the levels in AS1680.2.3.

4.2.10 IEQ 13 – External Views Administration

Aim of Credit:

To encourage and recognise designs that provides staff with a visual connection to the external environment.

Credit:

One point for office spaces having an external view.

4.2.11 IEQ 14 – Drinking Water

Aim of Credit:

To encourage and recognise designs that provides public access to filtered drinking water.

Credit:

One point for providing a drinking fountain on the retail floor, in the garden centre and in the trading centre.

4.3 Energy

4.3.1 E1 Greenhouse Gas Emissions – Fabric

Aim of Credit:

To encourage and recognise designs that minimise greenhouse gas emissions associated with operational energy consumption.

Credit:

One point is awarded for each 5% improvement with respect to the BCA Section J Energy Efficiency deemed-to-satisfy provisions under J1 Building Fabric and J2 Glazing.

4.3.2 E2 Greenhouse Gas Emissions – Systems

Aim of Credit:

To encourage and recognise designs that minimise greenhouse gas emissions associated with operational energy consumption.

Credit:

One point is awarded for each 5% improvement with respect to the BCA Section J Energy Efficiency deemed-to-satisfy provisions under J5 Air-conditioning and Ventilation Systems and J6 Artificial Lighting and Power.

4.3.3 E3 Greenhouse Gas Emissions – Renewable: Electricity

Aim of Credit:

To encourage and recognise designs that utilise natural resources such as the sun or wind to generate onsite electricity.

Credit:

One point is awarded for each 1% reduction in annual greenhouse gas emissions.

4.3.4 E4 Greenhouse Gas Emissions – Renewable: Hot Water

Aim of Credit:

To encourage and recognise designs that utilise natural resources such as the sun to generate onsite heating.

Credit:

One point where 50% of annual DHW demand is provided by a solar gas boosted DHW unit
Two points for 70% or greater of annual DHW demand is provided by a solar gas boosted DHW unit

4.3.5 E5 Energy Sub Metering

Aim of Credit:

To encourage and recognise the installation of energy sub-metering to facilitate ongoing management of energy consumption.

Credit:

One point for sub-metering all substantive energy uses

One point for providing mechanism for monitoring energy use

4.3.6 E6 Lighting Zoning

Aim of Credit:

To encourage and recognise lighting design practices that offer greater flexibility for light switching and automated control which make it easier to light only occupied areas.

Credit:

One point for dimmable lighting that achieves a minimum 160 Lux lighting level

4.3.7 E7 Unoccupied Areas

Aim of Credit:

To encourage and recognise designs that minimise or eliminate energy use for spaces when unoccupied.

Credit:

One point for lighting automatically turning off in areas when unoccupied

One point for air-conditioning turning off automatically in offices when unoccupied

4.3.8 E8 Car park Ventilation

Aim of Credit:

To encourage and recognise designs that facilitate reduction of energy consumption of the car park ventilation system.

Credit:

One point for providing fans with variable speed drives controlled by carbon monoxide monitoring or naturally ventilating the car park

4.3.9 E8 Trade Area Ventilation

Aim of Credit:

To encourage and recognise designs that facilitate reduction of energy consumption of the trade area ventilation system.

Credit:

One point for providing fans with variable speed drives controlled by carbon monoxide monitoring or naturally ventilating the car park

4.3.10 E9 Efficient External Lighting

Aim of Credit:

To encourage and recognise designs that facilitate the reduction in energy consumption by controlling external lighting.

Credit:

One point for providing external lighting of at least 50 lumens/watt and

Two points for connecting external lighting to daylight sensors

4.3.11 E10 Efficient Lifts

Aim of Credit:

To encourage and recognise designs that minimise energy use for vertical transportation.

Credit:

One point for providing energy efficient lifts with one of the following initiatives;

- Gearless AC Permanent Magnet Machines
- Variable Voltage Variable Frequency Drives
- LED Lift Car Lighting
- Lift car lighting and fans with shut off timers

4.3.12 E11 Escalators

Aim of Credit:

To encourage and recognise designs that minimise energy use for vertical transportation.

Credit:

One point for providing escalators which reduce operation when there is no passenger demand and one of the following initiatives;

- Variable Voltage Variable Frequency Drives
- Soft Start feature

- Standby speed operation

4.4 Transport

4.4.1 T1 Car park Hire Provisions

Aim of Credit:

To encourage and recognise developments that provides low emission vehicles for customer use.

Credit:

One point for providing at least one dedicated vehicle space for hired vehicle (flexicar) to take home their purchased goods.

Two points where the vehicle is a hybrid petrol/electric motor vehicle.

4.4.2 T1 Cyclists Facilities – Staff

Aim of Credit:

To encourage and recognise building design that promotes the use of bicycles by ensuring adequate cyclist facilities are provided.

Credit:

One point for providing secured cyclist facilities for 5% of staff.

Two points for providing secured cyclist facilities for 10% of staff.

4.4.3 T2 Cyclists Facilities – Customer

Aim of Credit:

To encourage and recognise building design that promotes the use of bicycles by ensuring adequate customer cyclist facilities are provided.

Credit:

One point for providing bicycle parking for visitors in close proximity to the store entrance.

4.4.4 T2 Bicycle and Pedestrian Connectivity

Aim of Credit:

To encourage and recognise developments that promote non vehicle transportation to the site and a safe direct pathway to the building entry/exit point.

Credit:

One point for designing the site layout to provide safe access for pedestrians and cyclists from the public roadway to the entry door.

4.5 Water

4.5.1 W1 Occupant Amenity Water

Aim of Credit:

To encourage and recognise designs that reduce potable water consumption by building occupants.

Credit:

One point for providing 4 star WELS fittings and fixtures.

Two points for providing 5 star WELS fittings and fixtures.

Three points for providing 6 star WELS fittings and fixtures.

4.5.2 W2 Rainwater

Aim of Credit:

To encourage and recognise the design of systems that aim to reduce the consumption of potable water.

Credit:

One point for collecting rainwater from of the roof area for toilet flushing and watering 50% of the garden centre usage.

Two points for collecting rainwater from of the roof area for toilet flushing and 75% watering in the garden centre usage.

4.5.3 W3 Water Meters

Aim of Credit:

To encourage and recognise the design of systems that monitors and manages water consumption.

Credit:

One point for installing water meters.

One point for linking the Building Management System to the water meters to monitor usage.

4.5.4 W4 Landscape Irrigation

Aim of Credit:

To encourage and recognise the design of systems that aim to reduce the consumption of potable water for landscape irrigation.

Credit:

One point for using non-potable water to irrigate external landscaping or installing a xeriscape garden.

4.5.5 W5 Heat Rejection Water

Aim of Credit:

To encourage and recognise design that reduces potable water consumption from heat rejection systems.

Credit:

Three points for reducing potable water consumption of water-based heat rejection systems by 50%.

Six points for reducing potable water consumption of water-based heat rejection systems by 90% or for not providing water-based heat rejection systems.

4.5.6 W6 Fire System Water

Aim of Credit:

To encourage and recognise building design which reduces consumption of potable water for the building's fire protection and essential water storage systems.

Credit:

One point for re-using fire test water.

4.6 Materials

4.6.1 M1 Recycling Waste Storage

Aim of Credit:

To encourage and recognise the inclusion of storage space that facilitates the recycling of resources used within industrial premises and ancillary offices to reduce waste going to disposal.

Credit:

One point for providing a dedicated storage area for recyclables.

4.6.2 M2 Compactor/Baler

Aim of Credit:

To encourage and recognise the inclusion of facilitates that minimise waste disposal.

Credit:

One point for providing a compactor/baler

4.6.3 M3 Concrete – Portland Cement

Aim of Credit:

To encourage and recognise the reduction of embodied energy and resource depletion occurring through use of concrete.

Credit:

One point for reducing the quantity of Portland cement by 30% for in situ concrete, 20% for pre-cast concrete and 15% for stressed concrete.

Two points for reducing the quantity of Portland cement by 60% for in situ concrete, 40% for pre-cast concrete and 30% for stressed concrete.

4.6.4 M4 Concrete – Aggregate

Aim of Credit:

To encourage and recognise the reduction of embodied energy resource depletion occurring through use of concrete.

Credit:

One point for using recycled or slag aggregate

4.6.5 M5 Concrete – Recycled Asphalt

Aim of Credit:

To encourage and recognise the reduction of embodied energy resource depletion occurring through use of asphalt.

Credit:

One point for using recycled asphalt

4.6.6 M5 Steel – Steel

Aim of Credit:

To encourage and recognise the reduction of embodied energy and resource depletion associated with reduced use of virgin steel.

Credit:

One point for 20% or more of the total steel, by mass, shall be post consumer recycled.

4.6.7 M6 PVC Minimisation

Aim of Credit:

To encourage and recognise the reduction in use of Poly Vinyl Chloride (PVC) products in buildings.

Credit:

One point for using non-PVC pipework.

One point for using non-PVC cabling.

4.6.8 M7 Designing for Robustness

Aim of Credit:

To encourage and recognise products that are durable to high customer usage and withstand wear and tear over an extended period of time.

Credit:

One point for providing protection to parts of the building fabric exposed to high pedestrian traffic, vehicular and trolley movements

4.6.9 M8 Regional Materials

Aim of Credit:

To encourage and recognise the supply and installation of locally made products and to reduce the environmental impact associated with vehicle transportation.

Credit:

One point for using materials or products extracted, harvested, recovered or manufactured within 500km of the project site

4.7 Land Use & Ecology

4.7.1 L1 Site

Aim of Credit:

To encourage and recognise development on land that has limited ecological value and to discourage development on ecologically valuable sites.

Credit:

One point for selecting a site which is not prime agricultural land, old-growth forest, within 100m of a natural wetland or habitat for endangered fauna and/or flora.

4.7.2 L2 Topsoil

Aim of Credit:

To encourage and recognise construction practices that preserve the ecological integrity of topsoil.

Credit:

One point for protecting and reusing topsoil.

4.7.3 L3 Reuse of Land

Aim of Credit:

To encourage and recognise the re-use of land that has previously been developed.

Credit:

One point for re-using land which has been previously developed.

4.7.4 L4 Reclaimed Contaminated Land

Aim of Credit:

To encourage and recognise developments that reclaim contaminated land that otherwise would not have been developed.

Credit:

One point for decontaminating a significantly contaminated site.

4.7.5 L5 Change of Ecological Value

Aim of Credit:

To encourage and recognise developments that maintain or enhance the ecological value of their sites.

Credit:

Up to four points for maintaining or improving the ecological value of the site.

4.8 Emissions

4.8.1 EM1 Refrigerant ODP

Aim of Credit:

To encourage and recognise the selection of refrigerants that do not contribute to long-term damage to the Earth's stratospheric ozone layer.

Credit:

The use of zero ozone depleting refrigerants is mandatory.

4.8.2 EM2 Insulant ODP

Aim of Credit:

To encourage and recognise the selection of insulates that do not contribute to long-term damage to the Earth's stratospheric ozone layer.

Credit:

One point for using thermal Insulant with no ozone depleting substances in their manufacture and composition

4.8.3 EM3 Stormwater Design – Peak Flows

Aim of Credit:

To encourage and recognise developments that minimise stormwater run-off to, and the pollution of, the natural watercourses.

Credit:

One point for the development not increasing peak stormwater flows for rainfall events of up to a 1-in-1.5 year storm.

4.8.4 EM4 Stormwater Design - Loads

Aim of Credit:

To encourage and recognise developments that minimise stormwater run-off to, and the pollution of, the natural watercourses.

Credit:

One point for achieving the load requirements stipulated in the Urban Stormwater Best Practice Environmental Management Guidelines.

4.8.5 EM5 Light Pollution

Aim of Credit:

To encourage and recognise developments that minimise discharge into the night sky.

Credit:

One point for complying with AS4282 Control of the Obtrusive Effects of Outdoor Lighting.

One point for no external luminaire having an upward light output ratio that exceeds 5%.

4.8.6 EM6 Legionella

Aim of Credit:

To encourage and recognise building systems design that eliminates the risk of Legionnaires disease

Credit:

One point for avoiding the use of water-based heat rejection systems

4.8.7 EM7 Trade Waste Pollution

Aim of Credit:

To encourage and recognise building systems design that minimise pollution of, the natural watercourses.

Credit:

One point for installing effluent pre-treatment on site

4.8.8 EM8 Noise Pollution

Aim of Credit:

To encourage and recognise buildings that are designed to maintain site noise levels at an appropriate level

Credit:

One point for the noise levels at the site boundary not exceeding 50dB (A) LAeq