



SSDA ESD REPORT

## Eastern Creek Quarter – Stage 3

Rooty Hill Road South, Rooty Hill NSW 2766

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# SSDA ESD Report

## Revision Schedule

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# 1. Introduction

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This Ecologically Sustainable Design (ESD) has been prepared for Frasers Property Australia to support a State significant development application (SSD-31515622) submitted to the Department of Planning and Environment (DPE) relating to Lot 3 of the Eastern Creek Quarter Site at Rooty Hill Road South, Eastern Creek. The application seeks approval for the detailed design and operation of a new retail outlet center at Lot 3 with supporting food and beverage tenancies and an amusement center.

This report addresses the following items of the Secretary's Environmental Assessment Requirements (SEARs):

- Identify how ESD principles (as defined in clause 7(4) of Schedule 2 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development.
- Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.
- Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.

This report addresses the above and provides an overview of the ESD principles and greenhouse gas and energy efficiency measures that will be implemented.

Specific sustainability initiatives proposed for the building include, but are not limited to:

- Space efficient building layout.
- Water Sensitive urban design principles
- High Efficiency Electrical Systems
- Large scale on-site renewable energy generation
- Increased use of daylighting to reduce power usage
- Installation of a rainwater capture and reuse system for all buildings on-site
- Energy Efficient heating, ventilation and air conditioning including natural ventilation to open spaces.
- Waste Minimisation strategies.

Through the implementation of the initiatives noted in this report, the project addresses, and endeavors to mitigate against negative environmental, social and economic impacts associated with the development of the site.

## 1.1 The Site

The 34ha Eastern Creek Quarter site is situated to the north of the Great Western Highway between Rooty Hill Road South and the M7 Motorway. Church Street marks the site's northern boundary. The site forms part of the Western Sydney Parklands and is located within the Blacktown Local Government Area. It is located approximately 1.5km south east of Rooty Hill Station.

This SSDA relates to Lot 3 of the ECQ site, which is the final lot proposed to be developed. It is located in the northern part of the site and has an area of approximately 7.32ha (refer to **Figure 1** below).

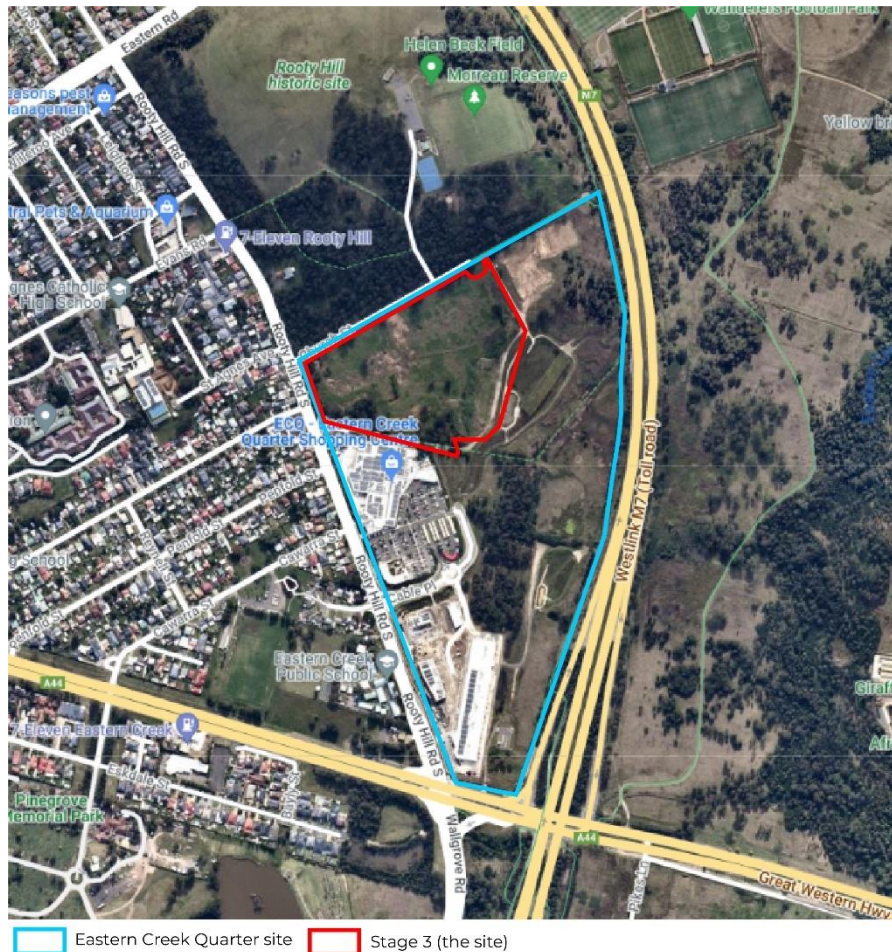


Figure 1 – Site location

Source: Nearmap

## 1.2 Overview of the Proposed Development

This SSDA seeks approval for the detailed design and operation of Phase A of the outlet centre in accordance with the proposed Concept Plan (SSD-10457). Phase A of the outlet centre will have a total GFA of **29,703 m<sup>2</sup>** (out of a total of 39,500m<sup>2</sup> for Lot 3) including **16,431m<sup>2</sup>** of retail outlet tenancies, **1,501m<sup>2</sup>** of amusement uses, and **1,878m<sup>2</sup>** of food and drink tenancies/pop-up retail shops.

In summary, the proposal includes:

- the construction and operation of a single storey retail factory outlet centre on Lot 3 of DP31130 with approximately 101 tenancies (subject to prospective tenant requirements), the majority of which will accommodate retail factory outlet stores;
- the extension of ECQ Social;
- signage zones;
- ground level car parking in the northern portion of the site with approximately 444 spaces;
- basement level car parking with approximately 727 spaces;

- detailed landscape design; and
- external infrastructure upgrades, including the upgrade of the Rooty Hill Road South / Church Street
- 4-way signalised intersection

This report is based on the Detailed Design prepared by i2C. The Site Plan illustrating the proposal is provided at **Figure 2** below.

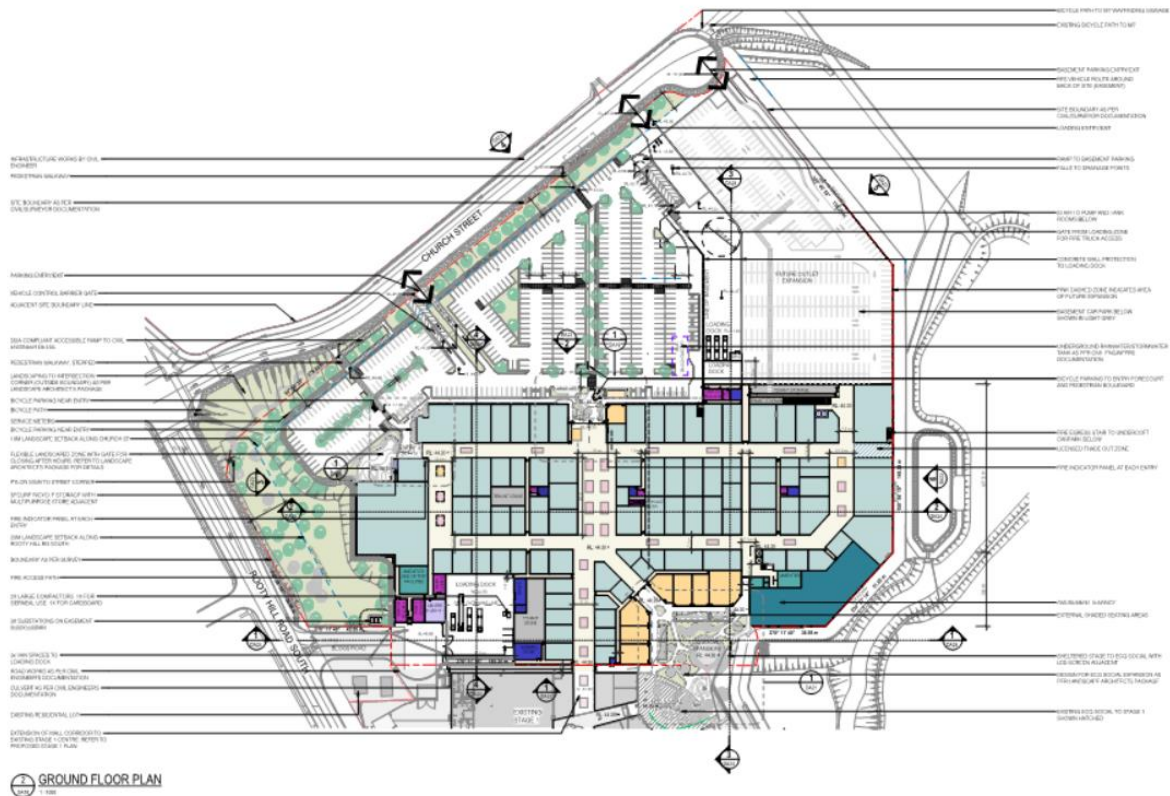


Figure 2 – Proposed Site Plan

Source: i2C (Not to Scale)

### 1.3 Response to Secretaries Environmental Assessment Requirements (SEARs)

This report addresses how the proposed project addresses the SEARs. These requirements are outlined below alongside where the response to each can be found within this report.

Key Issue	Item for inclusion	Action to Address Requirement	Report Location
Ecologically Sustainable Development	Identify how ESD principles (as defined in clause 7(4) of Schedule 2 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development.	ESD principles are addressed throughout with a summary of how the specific elements of ESD addressed in Section 5.	Section 2
	Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.	This report includes sections that nominate the materials, energy and water efficiency measures proposed. The use of fossil fuels throughout all base building services has been included within the design to align to Frasers commitment to achieve Carbon Neutrality by September 2028 and to reflect the NSW Governments Net Zero by 2050 targets.	Section 2.1, Section 2.4 & Section 2.6
	Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	The project is committed to achieving an Australian Excellence 5 star Green Star rating exceeding the best practice level nominated within the SEARs.	Section 4

### 1.4 Limitations

Due care and skill have been exercised in the preparation of this report.

No responsibility or liability to any third party is accepted for any loss or damage arising out of the use of this report by any third party. Any third party wishing to act upon any material contained in this report should first contact Northrop for detailed advice, which will consider that party's requirements.

All simulations and performances noted within this report are estimations only. They are based on the existing design of the facility and best practice estimation techniques. These figures are indicative only and should not be used for cost or other analysis purposes.

## 1.5 The Proposal

### 1.5.1 Project Details

Component	Description
Site Name	Eastern Creek Quarter Stage 3
Address and Legal Description	Rooty Hill Road South, Rooty Hill NSW 2766 Lot 101, DP581882
Site Area	Total area of 73,253 m2 (Approximate)

The site is in Eastern Creek, 40km west of the Sydney CBD and 20km from Parramatta. The site affords road linkages to Rooty Hill Road South and Church Street, the M4 Western Motorway and the Westlink M7.

## 2. Ecologically Sustainable Development

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The following section describes how ESD principals (as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) are being incorporated in the design, construction, and operation phases of the project. These initiatives illustrate how the project addresses the following;

- The precautionary principle – through the implementation of environmental management and an assessment of the building's operational maintainability, the project attempts to incorporate adaptability and resilience into the project design. The concept behind the precautionary principle is to create spaces that can both; accommodate for changes, which may eventuate in the future, and avoid the risk of serious or irreversible damage to the environment.
- Inter-generational equity to ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations – through the inclusion of zero ozone depleting refrigerants, best practice PVC and low impact paints, sealants and adhesives, alongside a focus on providing greater vegetation and support for the buildings connection with nature, the project demonstrates a strong commitment to the preservation of environmental health, diversity and productivity of the local area.
- Conservation of biological diversity and ecological integrity – through the planting of native vegetation, improvement of stormwater runoff from the site and use of integrated landscaping, the project will act to improve, conserve and support the local biological diversity and integrity.
- Improved valuation, pricing and incentive mechanisms - the design process should involve significant input from the Quantity Surveyor who will be involved ensure that the project both remains on budget and effectively considers environmental factors in the valuation of assets and services. Furthermore, the project will look at maintainability and the operational costs associated with individual design initiatives and the overall design.

Through the inclusion of the above and the sustainability initiative outlined within this report the project clearly addresses the ESD Principles into the design, construction and operation of the building as defined in clause 7(4) of schedule 2 of the Environmental Planning and Assessment Regulation 2000. Further detail of the general sustainability initiatives is outlined below.

### 2.1 Energy Efficiency:

Energy efficiency will be considered throughout the design development process with the following improvements to be considered by the design team. It is expected that the measures outlined in the following section, alongside a large solar array, will significantly reduce the site's grid electricity demands when compared to a standard practice building.

#### 2.1.1.1 *Improved building fabric and glazing performance*

The building envelope comprises several different façade types, with the proposed scheme using a combination of light-colored metal roof finishes and low-e glazing to lower heat gains throughout summer while maintaining good daylighting throughout of the building.

The use of well-designed glazing and building materials will also assist the projects targets for energy efficiency, acoustic performance, and thermal comfort.

#### **2.1.1.2 Integration of Cool roofs**

To address heat islanding across the site and wider area, the site should incorporate cool roofing with a high Solar Reflectivity Index (SRI 82) which will minimise the buildup of heat within the material and reduce load on the HVAC system.

#### **2.1.1.3 HVAC System Control**

The proposed package HVAC system incorporates central controls for thermal comfort conditions within the overall center spaces allowing occupants to maintain comfort conditions suitable to the use and operate efficiently throughout the very large space. This system assists in optimising the sites energy efficiency while maintaining comfortable conditions and providing maximum flexibility within the space for future alterations.

#### **2.1.1.4 Energy Metering and Monitoring**

An energy metering and monitoring strategy is to be considered to effectively monitor the main energy uses within the building, alongside the lighting and small power use. This aims to provide fault detection and monitoring of the different areas of the building.

#### **2.1.1.5 Improved Outdoor Air Provision**

The project will aim to improve the outdoor air provided to regularly occupied spaces. This will minimise CO2 build up within the internal areas and improve comfort for the building occupants.

#### **2.1.1.6 Highly efficient lighting system**

The installation of LED lighting throughout the building will assist in the minimisation of lighting energy use. Improved lighting energy also reduces the heat loads within conditioned spaces and therefore lowers the energy used to condition the building. The use of efficient controlled lighting within the retail areas will provide a significant improvement in energy use.

#### **2.1.1.7 Environmentally Friendly Refrigerants**

Where required, the use of Environmentally friendly refrigerants, such as hydrofluorocarbons (HFC's), are targeted within the project to minimise global warming potential and ozone depletion potential

#### **2.1.1.8 Low Impact**

Embodied energy will be reduced by avoiding unnecessary use of materials and procuring materials with a low carbon footprint where appropriate options are available

### **2.1.2 Energy Generation:**

With the above energy efficiency measures, the energy load of the facility will be reduced, allowing a large portion of the sites electrical energy demand to be met through the suggested inclusion of a PV Solar Array. This will assist to both offset the sites energy use and minimise the sites daytime peak demand from the grid. The current design includes a 400kW solar array (with roof areas reinforced for potential future expansion) for the facility.

### **2.1.3 Energy Use Assessment**

The site will seek to meet all aspects of the National Construction Code, and surpass the Energy Efficiency requirements nominated within section J. This commitment is reflected in the targeted 5 Star Green Star Design & As-Built Rating. The project is targeting a 75% reduction in energy consumption when compared to a reference case building.

A high-level Energy Use Assessment has been completed for the purpose of addressing the SEARs for the project this has identified that the building systems are likely to consume approximately **1,280**

**MWh a year with circa 65%** of this energy consumption **offset using the** onsite power generated from the **solar array**.

#### **2.1.4 Energy Source**

The project has removed the use of fossil fuels throughout all base building services and restricted access to gas as part of their expected leasing provisions, this is both to align to Frasers commitment to achieve Carbon Neutrality by September 2028 across all of their assets and to help achieve the NSW Governments Net Zero by 2050 targets.

### **2.2 Indoor Environment Quality**

Indoor environment quality is always an important consideration in spaces that are regularly occupied such as the management office and shopping center. The following considerations have been considered as part of the building design:

#### **2.2.1 Daylight Access**

The design of the facility has aimed to allow good daylight penetration into both internal and external spaces. Daylighting is provided through the considered placement of skylights and entry area glazing, whilst avoiding the addition of significant thermal gains. This access to daylight throughout the building will both minimise energy used for lighting and will improve occupant connection to their external environment.

#### **2.2.2 Interior noise level control**

Internal noise levels will be actively considered with the building layout and systems design considering how noise will reverberate through the building. The use of acoustic insulation and sound isolation will ensure that interior noise levels to be maintained below acceptable limits.

#### **2.2.3 Material selection**

Materials selection for the project aims to improve the internal environment of the site with materials with low volatile organic compound and formaldehyde content preferred to help minimise respiratory issues for building occupants.

### **2.3 Sustainable Transport**

#### **2.3.1 End of Trip Facilities**

End of trip facilities, including at least 63 bicycle spaces and three showers, will be provided to encourage walking and cycling by staff. Bicycle spaces will be accessible to both staff and patrons. Additional to this the center will also be providing at least 16 long stay bicycles spaces in line with the centers transport plan.

#### **2.3.2 Electric vehicle charging**

Select car parking spaces will include the provision for future installation of electric vehicle chargers to support the potential use of electric delivery vehicles.

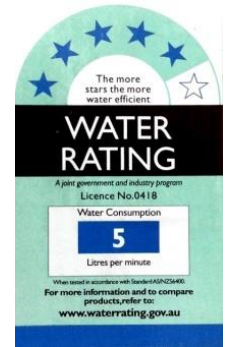
### **2.4 Water Efficiency**

A strong focus has been put on the effective management of water within the building with the following initiatives being included in the design in all areas throughout the project. It is expected that these initiatives will reduce the sites potable water demand by more than 50% compared to a standard practice building.

### 2.4.1 Water efficient fixtures and fittings

Water Efficient fixtures and fitting will reduce the water consumption of the site. As an indication, the following should be targeted:

- Wash hand basin taps 6-star WELS
- General taps 6-star WELS
- Toilets dual flush 4-star WELS
- Urinals 0.8 L per flush 6-star WELS
- Shower heads 7-9 L per minutes 3WELS



### 2.4.2 Water Sensitive Urban Design

The project will look to incorporate a strong focus on water sensitive urban design with the external landscape design assisting to minimise water use for irrigation. The inclusion of landscaped area will also assist in the reduction of site stormwater discharge and assist in the management of the projects broader impact on urban stormwater flows. The site will incorporate a trunk stormwater bio-retention system, which will increase green space within the estate.

### 2.4.3 Rainwater capture and reuse

A large rainwater capture and reuse system could be designed for installation to offset the sites water usage for washdown, toilet flushing and other facets of production. This system would have the ability to offset most of the sites potable water usage. Based on the calculations completed for the previous stages of the project this system is likely to offset over half of the sites potable water demand.

## 2.5 Improved Ecology

Through planting native vegetation and promoting improved interaction with the natural environment, the project will look to improve the site's ecology and minimise the ongoing environmental impact of the project. The project will also implement the following:

- Incorporation of a site vegetation.
- Minimisation of light spill from the facility which impacts on migratory animals and insects; and
- Reduced dissolved pollutants in stormwater discharged from the site.

In addition to the provision of native vegetation the proposed landscaping within ECQ central has aimed to create a strong connection to the adjacent Western Sydney Parklands, and to provide interactive natural space for the community.

The project has incorporated a strong focus on tree canopy aiming to provide the maximum canopy cover allowed on the site at 14.9%.

## 2.6 Waste Management

Effective waste management throughout demolition, construction and operation of the site will help to promote resource efficiency and minimise the adverse environmental impacts of the project. The following are being considered as part of the design process.

### 2.6.1 Waste Management Plan

A Waste Management Plan will be prepared with the following key objectives:

1. To minimise the environmental impacts of the operations of the development
2. To minimise the impact of the management of waste within the development
3. To ensure waste is managed to reduce the amount landfilled and to minimise the overall quantity generated

These objectives will be achieved through strategies such as the integration of recycling bins and back-of-house separation areas, which will encourage recycling and separation of cardboard/paper waste, glass, food waste and comingled recycling and general waste.

### 2.6.2 Separated Waste and Recycling Streams

The provision of separated waste and recycling streams could allow for more effective recycling of the project's operation waste. Providing separate bins for cardboard/paper waste, glass, food wastes, comingled recycling and general waste will improve the buildings operational efficiency and result in significant environmental benefits.



### 2.6.3 Construction and Demolition Waste Minimisation

The project should look to minimise the demolition and construction waste associated with the project and can aim to divert over 90% of waste from landfill to recycling or reuse facilities.

## 2.7 Green Infrastructure

Green infrastructure will be integrated into the project to provide urban cooling, slowing, and filtering of rainwater, climate resilience, strengthen biodiversity and improved community nature connection.

### 2.7.1 Urban Heat Island Effect Management

The project has considered the increased impacts of Urban Heat Island Effect as a result of the development, this is seen through the inclusion of shaded undercroft carparking, use of pale roof colours, and inclusion of planning for carpark shade structures (which are being investigated).

Close to 15% of the site has included tree canopy to provide natural cooling through both shade and evapotranspiration. This inclusion of large trees rather than smaller vegetation allows shading without a significant increase in irrigation demand in the long term.

### 2.7.2 Surface Water Management

The car park areas have included raingardens to help manage the flow of surface water through the development and encourage the permeation of this water into the ground rather than entering municipal stormwater management systems. This is also achieved through the integration of landscaping and courtyards at the entry points to the buildings.

The inclusion of the pocket park at entry 2 of the center helps to manage the potential issues around longer term flash flooding while adding outdoor recreation space useable by the community.

### 2.7.3 Connectivity to Parklands

ECQ social and the broader center have aimed to create a strong connection with the adjacent Western Sydney Parklands creating a place of respite within the recreation spaces and promoting an appreciation of the local natural systems. The water play and seating areas in ECQ social aim to create a social meeting place that has historically been absent in the local area.

### 3. Climate Change Projections

As part of the design review the project has completed a risk assessment for the sites climate adaption risks based on the CSIRO climate change projections for Western Sydney. This risk assessment reviewed the following three elements:

- Consequence: what will be the effect of the development should the impact occur?
- Likelihood: how likely is it that the impact will occur?
- Risk Rating: what is the associated risk of the development when the likelihood of it happening is measured against the possible consequence of the impact?

Key risks posed to the site which will be addressed as part of this process and high-level issues are outlined below with comment on how these are addressed within the current design; further detail will be developed within the projects detailed design development stages.

- Changing Surface Temperatures should be addressed through the following.
  - Use of high reflectivity roofing to minimise heat gain and heat island effects.
  - Integration of solar panels to provide shading to areas of the roof and provide increased power to the site when peak energy use for cooling is required.
  - Incorporation of heating, ventilation, air conditioning (HVAC) systems designed to modulate in the event of changing outside air temperatures. Equipment will be rated to continue operating during higher temperatures.
- An increase in rainfall intensity should be managed through the following.
  - Inclusion of rainwater and stormwater storage systems to modulate flows exiting the site.
  - Ability to provide increased finished floor level (FFL) designed to be 0.50 m above freeboard requirement to account for increased flooding potential at the site.
  - Inclusion of awnings to the entry access points to promote allow continued operation during adverse conditions.
- An increase to wind speed intensity should be addressed through the following.
  - The metal roof design incorporating roof bracing to fasten the roof onto the building structure to account for increasingly strong winds on site and prevent damage to the roof due to prevailing winds.
  - Improved structural integrity to ensure that the building is not significantly impacted in the event of high intensity wind loads. This includes wind loading on loading dock awnings and doors.
- Decrease in humidity and increased drought conditions will be addressed through the following.
  - Increased capacity within the fire safety systems to assist in the management of bushfire risk associated with dryer conditions.
  - Additional non potable water supply for irrigation needs and the integration of native and drought tolerant vegetation.

Overall, the current design incorporates significant measures to address key projections for climate change in the near term. The project will incorporate further initiatives to address all high and extreme risks posed to the site.

## 4. Best Practice Sustainability – Green Star

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### 4.1 Overview

The Green Building Council of Australia's provides an internationally recognised system to assess sustainable outcomes throughout the life cycle of the built environment. It was developed by the Australian Building Industry through the Green Building Council of Australia (GBCA), which is now the nation's leading authority on sustainable buildings and communities.

This section provides a summary of elements drawn from the Green Star tool that may be applied at the proposal. Whilst the project is targeting a Five (5) Star Green Star Rating, the credits referred to in the summary below are subject to change.

The Green Star system incorporates ESD principals across nine major categories:

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

It is noted that a Certified 5 Star Green Star Design & As-Built Rating is being targeted at this stage.

### 4.2 Management

The credits within the Management category promote the adoption of environmental principles from project inception, design, and construction phase, to commissioning, tuning and operation of the building and its systems. The following credits are currently being considered for incorporation.

#### 4.2.1 Accredited Professional

The project team have engaged with an accredited professional to provide advice, support and information related to sustainability principles and processes, at all stages of the project.

#### 4.2.2 Commissioning and Tuning

##### 4.2.2.1 Services and Maintainability Review

The project team will perform a comprehensive services and maintainability review led by the head contractor or the owner's representative (or the ICA) during the design stage and prior to construction.

The services and maintainability review is to facilitate input from the design team, the facilities manager and operations staff, and any relevant suppliers and subcontractors. The review looks to address the following aspects of the project:

- Commissionability;
- Controllability;
- Maintainability;
- Operability, including 'Fitness for Purpose'; and

- Safety.

#### **4.2.2.2 Building Commissioning**

The project team will demonstrate that the pre-commissioning and commissioning activities have been performed based on the approved standards and guidelines.

#### **4.2.2.3 Building Systems Tuning**

The project team will demonstrate a formal commitment to a tuning process for all nominated building systems. At a minimum, this includes quarterly adjustments and measurement for the first 12 months of occupation.

### **4.2.3 Adaption and Resilience**

#### **4.2.3.1 Implementation of a Climate Action Plan**

The project will consider the impacts of climate change through identifying and addressing all high and extreme risks posed over the expected lifecycle of the project. This will be done through the creation of a Climate Adaption Plan.

#### **Climate Adaption Plan**

The Climate Adaption Plan will contain as a minimum the following information:

- Summary of project's characteristics (site, location, climatic characteristics);
- Assessment of climate change scenarios and impacts on the project using at least two time scales, relevant to the project's anticipated lifespan. This must include a summary of potential direct and indirect (environmental, social and economic) climate change impacts on the project;
- Identification of the potential risks (likelihood and consequence) for the project and the potential risks to people. This risk assessment is to be based on a recognised standard;
- A list of actions and responsibilities for all high and extreme risks identified; and
- Stakeholder consultation undertaken during plan preparation and how these issues have been.

#### **4.2.4 Metering and Monitoring**

The project team will include implementation of effective energy and water metering and monitoring systems, which will be at a minimum on a floor by floor basis. Items with energy usages greater than 5%, or 100 kW, will be independently metered.

#### **4.2.5 Formalised Environmental Management System**

A formalised systematic and methodical approach to planning, implementing and auditing will be in place during construction, to ensure compliance with the Environmental Management Plan and align to the Design Guidelines for ECQ Business Hub. A site-specific Environmental Management System will be in place and independently certified to a recognised standard, such as AS/NZS ISO 14001.

This EMS will support a comprehensive Environmental Management Plan that aligns with the NSW EMS Guidelines will be developed to provide a framework to reduce the environmental impact of the development to ensure that the project incorporates the appropriate use of energy efficient materials during construction.

### 4.3 Indoor Environment Quality

#### 4.3.1 Indoor Air Quality

##### 4.3.1.1 *Paints, Adhesives, Sealants and Carpets*

At least 95% of all internally applied paints, adhesives, sealants and carpets meet the below stipulated 'Total VOC Limits' (TVOC).

Maximum TVOC limits for paints, adhesives and sealants are detailed in the table below.

Table 1 Maximum TVOC Limits for Paints, Adhesives and Sealants

Product Category	Max TVOC content in grams per litre (g/L) of ready to use product
General purpose adhesives and sealants	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

To demonstrate compliance for the use of carpets all products will be certified under a recognised Product Certification Scheme or other recognised standards. With the certification current at the time of specification.

##### 4.3.1.2 *Engineered Wood Products*

At least 95% of all engineered wood products including: particleboard, plywood, Medium Density Fibreboard (MDF), Laminated Veneer Lumber (LVL), High-Pressure Laminate (HPL), Compact Laminate and decorative overlaid wood panels meet stipulated formaldehyde limits or no new engineered wood products are used in the building.

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

Table 2 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 method 10 for Plywood	≤1mg/ 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	≤1mg/ L
AS/NZS 4357.4 - Laminated Veneer Lumber (LVL)	≤1mg/ L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL	≤1mg/ L
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1 mg/m <sup>2</sup> hr*
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1 mg/m <sup>2</sup> hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m <sup>2</sup> hr (at 3 days)
ASTM D6007	≤0.12mg/m <sup>3</sup> **
ASTM E1333	≤0.12mg/m <sup>3</sup> **
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m <sup>3</sup>
EN 717-2 (also known as DIN EN 717-2)	≤3.5mg/m <sup>2</sup> hr

\*mg/m<sup>2</sup>hr may also be represented as mg/m<sup>2</sup>/hr.

\*\*The test report must confirm that the conditions of Table 3 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.

#### 4.3.2 Acoustic Comfort

To create an acoustically comfortable and appropriate space for occupants, the project will achieve the following standards.

- Internal ambient noise levels, in the nominated area, are no more than 5dB(A) above the “satisfactory” sound levels provided in Table 1 of AS/NZS 2107:2016.

- "Reverberation time in the nominated area must be below the maximum stated in the 'Recommended Reverberation Time' provided in Table 1 of AS/NZ 2107:2016"
- The partition between the spaces should be constructed to achieve a weighted sound reduction index (Rw) of at least 45.

### **4.3.3 Lighting Comfort**

#### **4.3.3.1 Minimum Lighting Comfort**

The project lighting design has ensured that all lights in internal spaces are flicker free and accurately address the perception of colour in the space.

Flicker-free lighting refers to luminaires that have either:

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

#### **4.3.3.2 General Illuminance and Glare Reduction**

The project team has also ensured that, in the nominated area, lighting levels comply with best practice guidelines for Retail Spaces; corresponding to Table 3.1 of AS 1680.2. and that glare is eliminated using baffles, louvers, translucent diffusers, ceiling design, or other means that obscures the direct light source from all viewing angles of occupants.

### **4.3.4 Thermal Comfort**

The project team will also ensure that the facility will provide a thermally comfortable space for occupants. This is achieved through meeting National Construction Code 2019: Section J JV3 compliance, and additional Green Star modelling.

## **4.4 Energy**

The 'Energy' category aims to facilitate reductions in greenhouse gas emissions by facilitating efficient energy usage and encouraging the utilisation of energy generated by low-emission sources.

### **4.4.1 Greenhouse Gas Emissions – Comparison to a Reference Building Pathway**

The current project design is targeting a 75% reduction in the predicted energy consumption and GHG emissions compared to a minimum code compliant building.

Prediction of the building performance against this benchmark is to be confirmed using building performance modelling that assesses potential energy use for building services systems including:

- Mechanical Services
- Electrical Services
- Communications, AV and security systems
- Hydraulic Services
- Vertical Transportation Systems

#### 4.4.2 Peak Electricity Demand Reduction – Reference Building

By using efficient systems and on-site generation sources the project is targeting a reduction in peak electricity demand by at least 20%. Peak electricity demand is the predicted annual peak calculated as the sum of all distribution boards (to include all miscellaneous loads) relevant to the building as shown in the as-installed electrical schematics.

### 4.5 Sustainable Transport

Sustainable transport criteria aim to provide design and operational measures that reduce the carbon emissions arising from occupant travel to and from the project, when compared to a benchmark building. In addition, it also promotes the health and fitness of commuters, and the increased accessibility of the location.

#### 4.5.1 End of Trip Facilities

End of trip facilities will be provided within the facility for employees. The inclusion of these facilities will encourage commuters to consider cycling or walking to work. Bicycle storage is also to be provided, ensuring security for those who choose to cycle.

#### 4.5.2 Parking Provisions

The Parking areas provided for employees will include provisions for electric charging, to encourage the transition to electric vehicles. The parking areas should also provide fuel-efficient car parking spaces, as well as encouraging parking space for car share vehicles.

### 4.6 Water

The aim of the credit is to encourage building design that minimises potable water consumption in operations. The potable water credit will be considered for implementation as follows.

#### 4.6.1 Sanitary Fixture Efficiency

The project is looking to further improve fixture water efficiency to achieve WELS ratings within one star or those stated in the table below.

Table 3 Sanitary Fixture Efficiencies

Fixture / Equipment Type	WELS Rating
Taps	6 Star
Urinals	6 Star
Toilet	5 Star
Showers	3 Star (> 4.5 but <= 6.0)

#### 4.6.2 Heat Rejection Water

A waterless heat rejection system is proposed on site, eliminating water usage for the purposes of air conditioning.

#### 4.6.3 Water Harvesting System

Water Harvesting system provisioned to minimise potable water usage of Refrigeration system. This system is provision to serve approximately 65% of the water requirement of the Refrigeration system.

#### 4.6.4 Landscape Irrigation

Rainwater supported drip irrigation with moisture sensor override is to be installed to minimise potable water used for the project irrigation.

### 4.7 Materials

The aim of the materials credits is to reward projects that include building materials that are responsibly sourced or have a sustainable supply chain. Should these be targeted the project would need to consider.

#### 4.7.1 Life Cycle Impacts

#### 4.7.2 Responsible Building Materials

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

90% (by cost) of all cables, pipes, flooring and blinds in the project will either:

- Do not contain PVC and have an Environmental Product Declaration (EPD); or
- Meet Best Practice Guidelines for PVC.

#### 4.7.3 Construction and Demolition Waste – Percentage Benchmark

This project should target 90% of the waste generated during construction and demolition being diverted from landfill. Compliance verification summaries should also be provided for the waste contractor and waste processing facilities.

### 4.8 Land Use and Ecology

The 'Land Use & Ecology' category aims to reduce the negative impacts on sites' ecological value because of urban development and reward projects that minimise harm and enhance the quality of local ecology.

#### 4.8.1 Endangered, Threatened or Vulnerable Species

At the date of site purchase or date of option contract, the project site did not include old growth forest or wetland of 'High National Importance' or did not impact on 'Matters of National Significance'.

#### 4.8.2 Heat Island Effect Reduction

At least 75% of the whole site area (when assessed in plan view) comprises of one or a combination of the following:

- Vegetation;
- Roofing materials, including shading structures, having the following:
  - For roof pitched <15° – a three year SRI >64; or
  - For roof pitched >15° – a three year SRI >34.
- Only where the three year Solar Reflectance Index (SRI) for products is not available, use the following:
  - For roof pitched <15° – an initial SRI > 82; or
  - For roof pitched >15° – an initial SRI > 39.

- Unshaded hard-scaping elements with a three year SRI > 34 or an initial SRI > 39;
- Hard-scaping elements shaded by overhanging vegetation or roof structures, including solar hot water panels and photovoltaic panels;
- Areas directly to the south of vertical building elements, and areas shaded by these elements at the summer solstice.

## 4.9 Emissions

The 'Emissions' category aims to assess the environmental impacts of 'point source' pollution generated by projects. Negative impacts commonly associated with buildings include damage to the environment through refrigerant leaks or disturbances to native animals and their migratory patterns as a result of light pollution.

### 4.9.1 Stormwater

#### 4.9.1.1 Reduced Peak Discharge

The project is aiming to achieve a post-development peak event discharge from the site which does not exceed the pre-development peak event discharge using the design Average Recurrence Interval (ARI) that corresponds to the associated flooding risk identified in the Climate Change and Adaption Assessment undertaken as part of the Adaption and Resilience credit. This is being managed by the site wide systems for each stage of the project.

#### 4.9.1.2 Reduced Pollution Targets

Additionally, the project aims to demonstrate that all stormwater discharged from the site meets the pollution reduction targets in Table 4 below.

Table 4 Minimum Pollution Reduction Targets

Pollutant	Reduction Target (% of the Typical Urban Annual Load)
Total Suspended Solids (TSS)	80%
Gross Pollutants	85%
Total Nitrogen (TN)	30%
Total Phosphorus (TP)	30%
Total Petroleum Hydrocarbons	60%
Free Oils	90%

### 4.9.2 Light Pollution

#### 4.9.2.1 Light Pollution to Neighbouring Bodies

The project design ensures that all outdoor lighting on the project complies with AS 4282:1997 at all inhabited boundaries, apart from boundaries with roads.

#### **4.9.2.2 Light Pollution to Night Sky**

Outdoor lighting has been designed to achieve control of upward light output ratio (ULOR) by demonstrating that no external luminaire on the project has a ULOR that exceeds 5%, relative to its actual mounted orientation.

#### **4.9.3 Microbial Control**

The project would look to integrate no water-based heat rejection systems preventing the buildup of microbes in these systems.

### **4.10 Innovation**

The 'Innovation' category aims to recognise the implementation of innovative practices, processes and strategies that promote sustainability in the built environment.

#### **4.10.1 Market Transformation**

The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world. Through the targeting of world leading sustainability principles, the project is contributing to a broader market transformation that repositions tenant health and well-being as a key indicator of sustainability.

#### **4.10.2 Innovation Challenge – Financial Transparency**

This Innovation Challenge aims to encourage owners, developers, and operators to disclose the costs of sustainable building practices, and to agree to participate in a yearly report developed by GBCA that will inform the building industry on the true costs of sustainability.

## 5. Conclusion

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This report has addressed the ESD requirements to support the SSDA for the Development located on Rooty Hill Road South, Rooty Hill NSW 2766.

Specific sustainability initiatives proposed for the building include, but are not limited to:

- Space efficient building layout.
- Water Sensitive urban design principles
- High Efficiency Electrical Systems
- Large scale on-site renewable energy generation
- Increased use of daylighting to reduce power usage
- Installation of a rainwater capture and reuse system for all buildings on-site
- Energy Efficient heating, ventilation and air conditioning including natural ventilation to open spaces.
- Waste Minimisation strategies.

Overall, through the implementation of the initiatives noted within this report the project clearly demonstrates the site's commitment to ESD principles throughout the design, construction, and operation. Additionally, the project design team has worked to optimise the sites energy performance, address key climate related risks posed to the site, and align to Frasers Commitment to Carbon Neutrality by 2028.

Additionally as noted in Section 4.2.5 of this report, a comprehensive Environmental Management Plan that aligns with the NSW EMS Guidelines will be developed to provide a framework to reduce the environmental impact of the development and ensure that the project incorporates the appropriate use of energy efficient material and achieves the ambitions laid out within this report.