NORTHROP

SSDA ESD REPORT

Charter Hall

Horsley Drive Business Park - CFC

PREPARED FOR
FDC Construction and Fitout
22-24 Junction Street
Forest Lodge NSW

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SSDA ESD Report

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1. Executive Summary

This Sustainability Report outlines how the proposed Horsley Drive Business Park Customer Fulfillment Centre (CFC) meets the Secretary's Environmental Assessment Requirements (SEARs) as a state significant development.

This report demonstrates how the following sustainability objectives are to be met:

- Address the Secretaries Environmental Assessment Requirements (SEARs);
- Achieve a 5 Star Green Star Rating; and
- Incorporate additional sustainability initiatives to improve the environmental and operational performance of the building addressing both efficiency of the site and future climate related risks.

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

- Space efficient building layout;
- Energy efficient heating, ventilation and air conditioning including natural ventilation to open spaces;
- Water efficient building services;
- Responsible selection of materials;
- Management of climate change adaption risk;
- The use of onsite renewable energy generation;
- Minimisation of the sites effect on Urban Heat Island through the integration of vegetation and pale roof colour;
- Waste minimisation strategies; and
- Integration of a range of transport options into the sites design.

2. Introduction

2.1 General

The project is looking to create new customer fulfilment center to service online delivery needs.

Specifically, this report addresses the sustainability and ESD related elements for the development consent for the following works at the site:

- Construction of a new customer fulfilment center including:
    - Chilled warehouse space with associated freezer areas;
    - Ambient warehouse space for storage and logistics of dry goods;
    - Support office spaces
    - Associated parking, transit and landscaping

2.2 Sustainability Objectives

The Horsley Drive Business Park - CFC project will be targeting the following sustainability objectives:

- Address the Secretaries Environmental Assessment Requirements (SEARs);
- Achieve a 5 Star Green Star Rating; and
- Incorporate additional sustainability initiatives to improve the environmental and operational performance of the building addressing both efficiency of the site and future climate related risks.

2.3 Response to Secretaries Environmental Assessment Requirements (SEARs)

This report addresses how the proposed project addresses Item 7 of the SEARs. These requirements are outlined below alongside where the response to each can be found within this report;

Item for inclusion	Action to Address Requirement	Report Location
An assessment of how the development will incorporate ecologically sustainable development principles in all phases of the development.	This ESD report details how the project aims to address ESD Principles and their incorporation into the design and ongoing operation of the project.	Section 3
Consideration of the use of green walls, green roof and/or cool roof into the design.	A roofing material with a high Solar Reflectivity Index (SRI) will be used for the project.	Section 3.1.3
Climate change projections developed for the Sydney metropolitan area and how they are used to inform the building design and asset life of the development.	A Climate Adaption Plan will be developed to address specific risks applicable to the site. The current design looks to incorporate measures including structural provisions for increase wind, storm and hail loadings. Increased heat load within the building is addressed through use of high SRI external finishes and additional capacity within the mechanical design.	Section 4
An assessment of the energy uses on-site and demonstrate the measures proposed to ensure the development is energy efficient.	Energy consumption will largely be driven by lighting, HVAC and equipment. These loads will be reduced through efficient product selection and further reductions in energy demand provided using onsite generation.	Section 3.1

2.4 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.

3. Sustainability Initiatives

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 ongoing 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 concepts 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 project has involved significant input from the Quantity Surveyor who will be involved throughout the entire design process to ensuring 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.

3.1 Energy Efficiency:

Energy efficiency will be considered throughout the design development process with the following improvements already considered as part of the design process;

3.1.1 Natural Ventilation of Tertiary Spaces

The project incorporates significant logistic areas, where achievable areas for circulation and vehicles will be naturally ventilated or open air in the case of truck loading areas. These areas will be able to operate as naturally ventilated spaces exploiting the buoyancy of air to draw ventilation through the space. Central circulation spaces such as bathrooms and stairs will also look to incorporate natural ventilation and the use of spill air from adjacent spaces.

3.1.2 Airconditioning within the Warehouse Spaces

Given the nature of the project there is a need for air conditioning and refrigeration of the warehouse areas, using an efficient HVAC set up the energy use for these spaces will be minimised. Additionally, each of the conditioned warehouse will incorporate insulation to exceed the requirements of the code and minimise heat gains into these spaces. As the detailed design of the HVAC system progresses it

will incorporate further measures to optimise energy use and to provide flexibility of conditioning within the large warehouse spaces.

3.1.3 Improved building fabric and glazing performance

The building envelope comprises several different façade types, with the proposed scheme using a combination of light coloured metal finishes, prefabricated concrete and 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.

3.1.4 Integration of Cool roofs

To address heat islanding across the site and wider area the site is incorporating colourbond roofing with a high Solar Reflectivity Index (Surfmist SRI of 82) which will minimise the buildup of heat within the roofing materials and reduce load on the HVAC system.

3.1.5 HVAC System Control

The proposed HVAC system incorporates individual area controls for thermal comfort conditions within the office spaces allowing building occupants to maintain comfort conditions suitable to the use and occupancy of spaces. This system assists in optimising the sites energy efficiency while maintaining comfortable conditions.

3.1.6 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.

3.1.7 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 office areas and improve comfort for the building occupants.

In order to address energy use concerns the design will also look to incorporate on an outdoor air economy cycle which will allow the building to exploit periods where the buildings external conditions can effectively provide thermal comfort in the space reducing the run times of the air-conditioning system.

3.1.8 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 cooled spaces and therefore lowers the energy used to condition the building. The use of efficient controlled lighting within the warehouse areas will provide a significant improvement in energy use due to the high levels of automation within these areas.

3.1.9 Energy efficient domestic hot water

The use of gas boost (or heat pump) hot water systems will be explored throughout the detailed design process with an efficient solution incorporated into the final design.

3.2 Indoor Environment Quality

Indoor environment quality is always an important consideration in spaces that are regularly occupied such as the offices and ambient warehouse areas. The following considerations have been considered as part of the building design:

3.2.1 Daylight Access

The design of the building addition aims to allow good daylight penetration into both internal and external spaces. This access to daylight throughout the building will both minimise energy used for lighting and will improve occupant connection to their external environment.

3.2.2 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.

3.2.3 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.

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

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.

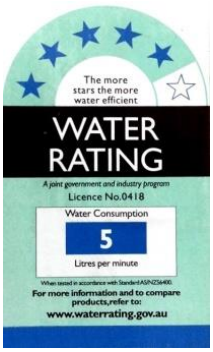
Table 2 Formaldehyde Emission Limit Values for Engineered Wood Products

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/m²hr
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1 mg/m²hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m²hr (at 3 days)
ASTM D6007	≤0.12mg/m³
ASTM E1333	≤0.12mg/m³
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m³
EN 717-2 (also known as DIN EN 717-2)	≤3.5mg/m²hr

3.3 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:

3.3.1 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

3.3.2 Use of low maintenance landscaping

The sites landscaping will endeavor to incorporate native and low maintenance vegetation where possible which will significantly reduce the potable water consumption of the site.

3.3.3 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 within the design 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.

3.3.4 Water Reclamation for Van Wash

The sites van wash area, which is expected to be a major user of water, will incorporate a water reclamation plant inclusive of 4000L of water storage. Additionally, the van wash system will be connected to the rainwater capture and reuse system.

3.3.5 Tote Washing Water Use

A highly efficient specialised tote washing system from New Smith is to be installed within the facility. Once operational this apparatus will reduce water consumption for tote washing by up to 75% (from its maximum.)

3.4 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 is currently implementing 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.

3.5 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;

3.5.1 Separated Waste and Recycling Streams

The provision of separated waste and recycling streams allows 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.

3.5.2 Construction and Demolition Waste Minimisation

The project is looking to minimise the demolition and construction waste associated with the project and aims to divert over 90% of waste from landfill to recycling or reuse facilities.

4. Climate Change Projections

As part of the Green Star Rating for the project the design team will develop a Climate Adaption Plan in accordance with the Australian Greenhouse Office (AGO), *Climate Change Impacts & Risk Management, A Guide for Business and Government* Guide (2006). This will address climate change scenarios over two timescales; to 2030 and 2040. These time scales will assess the mid-point of the building lifespan and help to understand and pre-empt possible impacts of the building at end of life. By identifying potential climate risks for the site at these two-time intervals, the tenants and the site owner, Charter Hall, can prepare appropriate maintenance measures to retain building quality during the next 25 years of its life.

A risk assessment will be developed comprising 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 will be addressed through the;
    - 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.
    - Use of waterless heat rejection system to reduce increased demand for water as a result of increased average temperatures.
- An increase in rainfall intensity will be managed through the;
    - Inclusion of rainwater and stormwater storage systems to modulate flows exiting the site
    - Ability to provide increased finished floor level (FFL) designed to be 0.30 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 will be addressed through;
    - The metal deck roof design incorporating roof bracing to fasten the roof onto the building structure to account for south-easterly 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 the façade of the office spaces.

- Decrease in humidity and increased drought conditions will be addressed through;
    - 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 as per the Climate Adaption Credit within the targeted Green Star rating.

5. Green Star Design & As Built

5.1 Overview

The Green Star rating system is a comprehensive tool for assessing environmental performance of Australian buildings.

The Green Star framework incorporates ESD principles which are categories into nine categories. Points are awarded across each category for credits that are incorporated into the project. The Design and As-Built documentation is then verified through two rounds of independent assessments by the Green Building Council of Australia (GBCA). This section outlines the project strategy for achieving a 5 Star rating under the Green Star Design and As Built Tool the Horsley Drive Business Park.

5.2 Rating Tool Eligibility and Certification

The project is being assessed against the new Design and As-Built rating tool, version v1.3. The eligibility criteria for this tool are:

- Building Type
- Spatial Differentiation
- Timing of submission for certification
- Conditional Requirements

The project achieves the minimum eligibility requirements given that it is predominantly a logistics warehouse space that has a distinct project address.

5.3 Rating Bands and Categories

Green Star awards achievement at 3 levels, depending on the points achieved after assessment by the independent panel:

- 4 Star – 45-59 points, recognising industry “Best Practice”
- 5 Star – 60-74 points, recognising “Australian Excellence”
- 6 Star – 75+ points, recognising the project as a “World Leader”

The development is targeting 66.6 points for a 5 Star Green Star rating which covers initiatives outlined in the credit categories below.

Table 3: Green Star Credit Categories

Category	Category Reference Code	Available Points
Management	Man	14
Indoor Environment Quality	IEQ	17
Energy	Ene	22
Transport	Tra	10
Water	Wat	12
Materials	Mat	14
Land Use and Ecology	Eco	6
Emissions	Emi	5
Innovation	Inn	10
Total Points		110

The proceeding sections describe each of the targeted credits and provide an understanding of what is required to achieve compliance in the design review stage.

5.4 Green Star Targeted Credits

LIST OF CREDITS			
Index	Credit	Points Available	Points Targeted
MANAGEMENT			
1	Green Star Accredited Professional	1	1
2	Commissioning and Tuning	4	3
3	Adaptation and Resilience	2	2
4	Building Information	2	2
5	Commitment to Performance	2	1
6	Metering and Monitoring	1	1
7	Construction Environmental Management	1	1
8	Operational Waste	1	1
INDOOR ENVIRONMENT QUALITY			
9	Indoor Air Quality	4	3
10	Acoustic Comfort	3	1
11	Lighting Control	3	2
12	Visual Comfort	3	3
13	Indoor Pollutants	2	2
14	Thermal Comfort	2	1
ENERGY			
15	Greenhouse Gas Emissions	20	12
16	Peak Electricity Demand Reduction	2	2
TRANSPORT			
17	Sustainable Transport	10	2
WATER			
18	Potable Water	12	8
MATERIALS			
19	Life cycle Impacts	5	1
20	Responsible Building Materials	3	2
21	Sustainable Products	3	0
22	Construction and Demolition Waste	1	1
LAND USE AND ECOLOGY			
23	Ecological Value	3	0
24	Sustainable Sites	2	0
25	Heat Island Effect	1	1
EMISSIONS			
26	Stormwater	2	2
27	Light Pollution	1	1
28	Microbial Control	1	1
29	Refrigerant Impacts	1	0
INNOVATION			
30	Innovation	10	5
Total		110	66.1

6. Conclusion

This Sustainability Report outlines how the proposed Horsley Drive Business Park CFC aims to meet the Secretary's Environmental Assessment Requirements (SEARs) as a state significant development and how the following sustainability objectives are to be met:

- Address the Secretaries Environmental Assessment Requirements (SEARs);
- Achieve a 5 Star Green Star Rating; and
- Incorporate additional sustainability initiatives to improve the environmental and operational performance of the building addressing both efficiency of the site and future climate related risks.

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

- Space efficient building layout;
- Energy efficient heating, ventilation and air conditioning including natural ventilation to open spaces;
- Water efficient building services;
- Responsible selection of materials;
- Management of climate change adaption risk;
- The use of onsite renewable energy generation;
- Minimisation of the sites effect on Urban Heat Island through the integration of vegetation and pale roof colour;
- Waste minimisation strategies; and
- Integration of a range of transport options into the sites design.

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 has worked to optimised the sites energy performance and address key climate related risks posed to the site, work that will continue to be developed throughout the detailed design process.