SSDA ESD REPORT

42 Boorea Street

42 Boorea Street, Lidcombe, NSW 2141

PREPARED FOR
Hale Property Services Pty Ltd
Suite 903, 25 Martin Place
Sydney NSW 2000

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SSDA ESD Report

Revision Schedule

Date	Revision	Issue	Prepared By	Approved By
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1. Introduction

This Ecologically Sustainable Design (ESD) and Greenhouse Gas Assessment has been prepared on behalf of Hale Property Services for the proposed development, located on 42 Boorea Street, Lidcombe, NSW2141.

This report is intended to provide an overview of the ESD principles and greenhouse gas and energy efficiency measures that will be implemented and is intended to form part of the Environmental Impact Statement (EIS) for the State Significant Development Application (SSDA).

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 site.

1.1 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	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**
	Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	This report has benchmarked the development to the Green Building Council of Australia's rating tool to establish a Best Practice benchmark. Although the project is not targeting a particular certification it aims to incorporate the measures outlined within this report to achieve equivalency to this level.	**Section 6**
	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.	The proposal, as outlined in the report, will seek to include substantial energy, water, and material efficiency measures to minimise the proposal's greenhouse gas and carbon emissions, water consumption and material use. The proposal also includes a conservative assessment of the project's Greenhouse Gas Emissions, in line with the suggested pathway from the Green Building Council of Australia (GBCA).	**Section 3.1, 3.2 & 3.4** **&** **Section 4**

1.2 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.

2. The Proposal

2.1 Site Description

The site is located at 42 Boorea Street, Lidcombe within the Cumberland Local Government Area (LGA). The site is legally described as Lot 1 in DP 740385. The site is approximately 4.1 hectares and 151m x 276m. The site has a fall of approximately 3.75m from northeastern corner to the south western corner. A 9.1m easement for sewer runs along the western side of the site in a north south direction, a further sewer easement runs along the northern side of the site in an east west direction.

The site is located at the rear of 44 Boorea Street, Lidcombe and is accessed via an access handle from Boorea Street. The site contains a warehouse building and associated loading docks and car park. Trees and vegetation are planted along the site boundary. Refer to Figure 1 below.

2.2 Proposed Development

The proposal comprises the redevelopment of the site as summarised below:

- Construction, fit out and operation of a two-storey warehouse and distribution centre comprising approximately 39,249 m2 GFA including:
  - 35,111 m2 of warehouse and distribution GFA; and
  - 4,138 m2 GFA ancillary office space.
- Provision of 34 bicycle parking spaces, 10 motorcycle and 189 car parking spaces.
- Approximately 4,565 m2 of landscaping area.
- Provision of internal vehicle access route and loading docks on ground and first floor.
- Upgrades to existing on-site infrastructure.
- Building identification signage.
- Operation 24 hours per day seven days per week.

3. Ecologically Sustainable Development

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.

3.1 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.

3.1.1 Improved building fabric and glazing performance

The building envelope comprises of several façade types, with the proposed scheme looking to implement a combination of light-coloured metal finishes, prefabricated concrete and low-e glazing aimed at minimising heat gains throughout summer and reducing the overall demand for artificial lighting through the integration of good daylighting throughout 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.

3.1.2 Integration of Cool roofs

To address the urban heat island effect across the site and greater area, this project will look to incorporate a cool roofing system to minimize the buildup of heat within the building materials and therefore, reduce the energy demands on the HVAC system. This can be achieved through the utilization of products such as the Colorbond Coolmax steel range which provide a higher Solar Reflectance Index (SRI 95) than traditional roofing systems resulting in reduced heat gains for the building through the roofing system.

3.1.3 Natural Ventilation of Tertiary Spaces

This site is characterized by significant logistic areas requiring additional circulation measures to ensure adequate air quality is maintained for the occupants. The incorporation of a natural ventilation system and open-air system regarding the truck loading docks will significantly reduce the energy usage of the building as the natural buoyancy of air developed via temperature gradients will drive air through the system enabling temperature control within the warehouse as well as the dissipation of odours and carbon dioxide present in these high traffic loading dock areas. Central circulation spaces such as bathrooms and stairs should also incorporate natural ventilation and the use of spill air from adjacent spaces to provide passive temperature control.

3.1.4 High Volume Low Speed (HVLS) Fans:

The incorporation of HVLS Fans within the warehouse design will significantly reduce the load on the HVAC systems through their ability to circulate high volumes of air within large spaces whilst operating at low speeds. This will create an evaporative cooling effect comparable to the results of an air conditioning system through the wind chill effect resulting in enhanced indoor thermal comfort for occupants within the warehouses.

3.1.5 HVAC System Control

The proposed HVAC system will provide thermal comfort and acceptable indoor air quality to individual areas of the site. The project will look to select a HVAC system with a higher seasonal energy efficiency ratio (SEER) rating. Given the scale of the conditioned spaces this will likely be a variable refrigerant flow (VRF) energy efficiency system which will provide individual comfort control and simultaneous heating and cooling within different zones ensuring the system does not use more energy than required at any given time.

3.1.6 Energy Management System (EMS)

The project will look to include an energy management system to ensure the efficient management of energy resources across the building. This system will provide energy measurement data to users allowing for the detection energy anomalies across systems, fault detection and the opportunity to reduce energy consumption as well as costs, allowing for the optimization of the energy efficiency across the building.

3.1.7 Highly efficient lighting system

Efficient lighting systems including LED lighting and skylights throughout the building will reduce the overall energy consumption of the building. LED lights are up to 80% more efficient than traditional fluorescent lights and are characterized by an extended lifespan contributing to a reduction in carbon emissions. They are also efficient in dissipating heat and therefore reduce the heat load experienced within conditioned spaces. Additionally, the implementation occupancy sensors and timers, networked lighting controls and energy zones will collectively serve to optimize the energy efficiency of the building. The nonconditioned spaces will include skylights to harness natural daylight and reduce the need for artificial lighting.

3.1.8 Electric-Only Building

All building systems and appliances will be electric, avoiding the use of gas on-site. This also futureproofs the building and ensures that it is aligned with the NSW Government's commitment to carbon neutrality by 2050.

3.1.9 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.

3.1.10 Low Impact

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

3.2 Energy Generation:

With the above energy efficiency measures, the energy load of the facility will be significantly reduced, allowing a large portion of the sites electrical energy demand to be met through onsite renewable energy generation from a PV array. This will assist to both offset the sites energy use and minimise the sites daytime peak demand from the grid.

3.3 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:

3.3.1 Daylight Access

Daylighting systems will be integrated throughout the internal and external areas of this project to support the admission of natural light and direct sunlight throughout the design. This will be achieved using skylights within the office and translucent roof sheeting over the warehouse roof. An integrated daylight approach will improve the wellbeing of the building occupants by creating a visually stimulating and productive environment. Additionally, the provision of daylight will reduce the overall energy consumption of the building as the natural light will alleviate the need for artificial lighting whilst the direct sunlight will enhance thermal comfort during cooler months.

3.3.2 Indoor Air Quality

Maintaining adequate indoor air quality within the warehouse and office areas is vital to the health and wellbeing of all occupants. The implementation of indoor air quality monitoring systems will assist in the detection of pollutant build- up whilst ensuring areas such as the warehouse meet air quality standards devised by relevant organizations (Central Pollution Control Board etc). The incorporation of efficient electric door systems within the loading docks will significantly minimize air infiltration, limiting the exposure of indoor areas to outdoor pollutants.

3.3.3 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.

3.3.4 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.

3.4 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.

3.4.1 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

3.4.2 Water Sensitive Urban Design

This project design will incorporate a water sensitive urban design to reduce the demand on potable water, treat urban stormwater and redirect stormwater into the urban landscape to improve facilities. Rainwater gardens are a low maintenance and cost-effective way to achieve water sensitive urban design as they are designed to capture stormwater runoff within the urban environment. Benefits associated with rainwater gardens include the reduction in water pollution entering downstream receiving waters, flood mitigation in surrounding areas, nutrient supply to plants, groundwater reserve replenishments and the promotion of biodiversity through habitat provisioning.

3.4.3 Rainwater capture and reuse

This project design will include a large rainwater harvesting system to collect, store, filter and distribute rainwater to offset most of the sites potable water usage. This rainwater will be repurposed for irrigation and sprinkling systems, use in toilets and for the washdown of vehicles and equipment, consequently reducing the demand on water-supply systems.

3.4.4 Water Monitoring System

The project design will incorporate a water quality monitoring system to provide real-time information regarding contaminant exposure and the detection of wasteful leaks to help the building simultaneously preserve water and enhance its quality for the occupants.

3.5 Improved Ecology

A well- designed landscape featuring a selection of native grasses, shrubs and trees will promote the biodiversity of insects and native birds through the creation of wildlife corridors and habitat provisioning. Consequently, the design will actively contribute to conservational efforts within the urban environment, encourage positive interactions between people and nature whilst also minimizing the ongoing environmental impact of the project.

3.6 Waste Management

Effective waste management throughout 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.

3.6.1 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.

3.6.2 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.

3.6.3 Construction Waste Minimisation

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

3.7 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.

4. Greenhouse Gas Emissions Assessment

This section seeks to 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.

In the interests of achieving this, the project has followed the guidelines from the Green Building Council of Australia (GBCA) in estimating the energy consumption of an NCC Compliant 'Reference Building'.

GBCA – 15I GHG Emissions Calculation Pathway

This pathway is applicable to unconditioned Class 7b and 8 buildings with conditioned class 5 portions within the building, as defined in the NCC.

The Building Energy Demand is the annual kWh used and established by the Green Star – Design & As Built: Greenhouse Gas Emissions Calculator and based on:

- The lighting demand of the internal warehouse space and external loading dock with awnings, calculated as kWh per annum; and
- The energy demand of the office space based on an energy density of 110 kWh/m2 per annum.

The greenhouse gas emissions from this energy demand is determined from the grid emissions of New South Wales, and assumes 100% grid sourced electricity consumption. The project is likely to produce less emissions than indicated, due to the anticipated inclusion of a Solar PV Array. This analysis provided the following results.

Table 1: Greenhouse Gas Emissions – 42 Boorea Street, Lidcombe

Space Type	Area (m^2)	Annual Electricity Consumption (kWh per Year)	Annual Emissions (Tonnes CO2-E per Year)
Warehouse Space	35,111	939,671	865
Office Space	4,138	944,020	869
Total	**39,249**	**1,883,691**	**1,734**

For 42 Boorea Street, Lidcombe, the project is estimated to consume **1.88** GWh of Energy annually, or equivalent to **1,734** Tonnes of CO2-e. This is expected to be offset partially by the planned installation of Photovoltaic Solar generation to the roof of the Warehouse spaces.

5. 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 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.
    - 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.

6. Green Star Buildings V1

6.1 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 'Green Star Buildings' that may be applied at the proposal stage in order to benchmark this project to industry best practice sustainability, noting that this project is not targeting a certified rating.

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

- Responsible
- Healthy
- Resilient
- Positive
- Places
- People
- Nature
- Leadership

6.2 Responsible

The Responsible category aims to assist owners, builders, and the supply chain on the sustainability journey to ensure the building is designed, built, and handed over in a responsible manner. This proposed project design is incorporating the following areas of focus:

- Industry Development
- Responsible Construction
- Verification and Handover
- Operational Waste

6.2.1 Industry Development

Northrop has been appointed as a sustainability advisor to provide advice, support and information related to sustainability principles and processes, at all stages of the project. Additionally, efforts will be made to promote the achievements of this building to relevant stakeholders including the occupants and visitors to the site.

6.2.2 Responsible Construction

To ensure responsible construction is achieved within this project, a formalized systematic approach to the planning, implementing, and auditing phase of construction will be introduced to promote opportunities for improved environmental and social outcomes. From the onset of construction an Environmental Management System certified to the recognized standard AS/NZS ISO 14001 and environmental management plan covering the scope of construction activities will be introduced. Additionally, the project design will look to divert at least 90% of the demolition and construction waste from landfill and sustainability training will be provided to all contractors and subcontractors present onsite for more than three days regarding the sustainable attributes of the building and their role in delivering a sustainable building.

6.2.3 Verification and Handover

As discussed above the project design will look to incorporate an array of monitoring and metering systems regarding the energy and water usage of the building. These systems should be independently verified through a series of commission and tuning assessments conducted prior to, during and 12 months following the completion of the building. Relevant building information regarding the operation and maintenance of the building to deliver best practice will be provided to the building facilities management team to enhance the environmental performance of the building.

6.2.4 Operational Waste

The building design will provide bins and storage areas to ensure the efficient collection and separation of waste into appropriate waste streams by the building occupants and waste collection contractors. The waste storage area design considers safe accessibility for collection vehicles including driveway access and appropriate height clearances which are to be assessed and signed off by a waste specialist or contractor.

6.3 Healthy

The Healthy category strongly emphasizes the importance of improving the indoor environment quality of rated buildings to enhance the health and wellbeing of occupants. The proposed project design is incorporating the following areas of focus:

- Clean Air
- Light Quality
- Acoustic Comfort
- Exposure to Toxins

6.3.1 Clean Air

Outdoor air pollutant infiltration should be mitigated through compliance with ASHRAE Standard 62.1:2013 regarding the minimum separation distances between pollution sources and outdoor air intakes.

To ensure CO_2 levels do not exceed 800ppm within each occupied space an integrated indoor air quality monitoring system and CO_2 sensors should be implemented. This ventilation systems will serve to ensure the source of pollutants meet minimum emission standards and function to exhaust pollutants directly to the outside in accordance with recognized standards.

To ensure easy maintenance efforts of the air distribution system adequate access to both sides of the moisture and debris-catching components of the mechanical ventilation systems will be provided.

6.3.2 Light Quality

Lighting within the building will be flicker free with a Colour Rendering Index (CRI) of 85 to meet minimum comfort requirements and ensure occupant comfort. The project design will also look to incorporate adequate lighting levels through artificial lighting and daylight suitable for typical tasks within each space in accordance with current best practice standards and guidelines.

6.3.3 Acoustic Comfort

An Acoustic Comfort Strategy should be prepared to ensure the building design delivers acoustic comfort to the occupants. This strategy should be prepared by a qualified acoustic consultant during the design stage to ensure the proposed performance metrics for each Acoustic Comfort criteria applicable to this project type will exceed the minimum legislative and best practice guidelines.

6.3.4 Exposure to Toxins

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

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.

6.4 Resilient

The Resilient category provides building owners the opportunity to demonstrate their careful consideration towards the short-term and long-term performance and resilience of the building regarding several disruptions including climate change and other externalities ranging from pandemics to infrastructure failure. The proposed project design is incorporating the following areas of focus:

- Climate Change Resilience
- Heat Resilience

6.4.1 Climate Change Resilience

The project team have conducted a high-level assessment of the climate risk for the project (detailed in section 4), however, additional to this the project will conduct a climate change pre-screening to consider potential impacts and exposure risks to climate change for the building which will be effectively communicated to the building owner and future tenants.

6.4.2 Heat Resilience

The project design should look to improve heat resilience through the integration of strategies such as vegetation and well-designed roofing systems to reduce the Heat Island Effect present within the site. To address this the incorporation of cool roofs as detailed in Section 3.1.2 will be considered.

6.5 Positive

This category drives project designs to address critical aspects of the built environment such as the need to reduce the energy consumption of a building and a transition to renewable energy to pursue the 1.5 °C climate trajectory. This category encourages the built environment to address its emissions alongside water consumption. The proposed project design is incorporating the following areas of focus:

- Upfront Carbon Emissions
- Energy Use – Reference Building Pathway
- Energy Source
- Water Use

6.5.1 Upfront Carbon Emissions

The proposed project design will incorporate good design and responsible material selection to ensure the upfront carbon emissions are at least 10% less than those of a reference building. This is proposed to be achieved through both reductions in the impact of concrete and steel and a strong focus on a lean design for the building to prevent unnecessary resource consumption.

6.5.2 Energy Use – Reference Building Pathway

The project design will aim to reduce energy use by at least 10% in comparison to a 2019 National Construction Code Section J compliant building. This will be assessed as part of the project detailed design with a strong focus on the measures detailed in Section 3.1 of this report.

6.5.3 Energy Source

As detailed in Section 3.1.8 the project will remove fossil fuel use from the site and in line with the NSW Government Policy for Net Zero Emissions will aim to be supplied by 100% Renewable Energy by 2050.

6.5.4 Water Use

The proposed project design will look to incorporate efficient water fixtures, rainwater capture and reuse systems and infrastructure for potential future recycled water connection to reduce the potable water usage of the building by 15-45% in comparison with a 2019 National Construction Code Section J compliant building.

All sanitary fixtures and water-using appliances installed within the project's scope must, at minimum, meet the following WELS ratings:

Table 2: Sanitary Fixture Efficiency

Fixture / Equipment Type	WELS Rating
Taps	5 Star
Urinals	5 Star
Toilet	4 Star
Showers	3 Star
Clothes Washing Machines	4 Star
Dishwashers	5 Star

6.6 Places

The Places category places people at the forefront of design. Buildings inevitably impact on their wider surroundings and this category emphasizes the importance of promoting positive impacts and limiting negative ones. This is achieved through celebrating culture, promoting a sense of belonging and welcomeness to occupants and visitors. The proposed project design is incorporating the following area of focus:

- Movement and Place

6.6.1 Movement and Place

The project design will incorporate changing facilities including shower installations based on the regular occupancy of the building as well as lockers to encourage occupants and visitors to use active, low carbon and public transport options rather than private vehicles. The project design emphasizes the importance of providing safe facility accessibility to all building occupants.

6.7 People

The People category targets issues such as diversity and gender equity, inclusion, and mental health. This category encourages solutions that address social health of the community whilst bringing a new dimension to the design and construction process of buildings. The proposed project design is incorporating the following areas of focus:

- Inclusive Construction Practices

6.7.1 Inclusive Construction Practices

During the construction phase the head contractor will provide adequate onsite facilities, policies, and training to promote workplace diversity and enhance the overall wellbeing of site occupants. This will be achieved through the provision of gender inclusive bathroom facilities, gender-specific fit-for-purpose personal protective equipment as well as the enforcement of policies which address discrimination, racism and bullying onsite.

Training will be provided to all contractors and subcontractors present onsite for more than three days regarding drugs and alcohol awareness and discrimination policies present onsite. The head contractor should also look to evaluate the effectiveness of physical and mental health programs provided to the needs of the onsite workers.

6.8 Nature

The Nature category addresses the pressures placed upon ecosystems and biodiversity as a result of rapid urbanization. This category encourages building designs to minimize their impacts on the natural environment by actively bringing nature and biodiversity back into the cities. It also celebrates the positive impacts of green spaces and biodiversity on people and the urban environment. The proposed project design is incorporating the following area of focus:

- Impacts on Nature

6.8.1 Impacts on Nature

The proposed project will avoid the development of highly ecological valued sites whilst minimizing the light pollution to neighboring bodies. Outdoor lighting will be 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.

6.9 Leadership

The Leadership category provides recognition for the implementation of innovative practices, processes, and strategies that promote achievements within the built environment that surpass the scope of the rating tool as released.

To address leadership the project will consider how it can positively influence the industry or the operation of the building throughout its design, construction, and operation.

7. Conclusion

This report has addressed the ESD and Greenhouse Gas requirements to support the SSDA for the Development located on 42 Boorea Street, Lidcombe NSW 2141.

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.
- Alignment of Sustainability Strategy to the Green Star Building rating tool.

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, align the project to the NSW Government's commitment to carbon neutrality by 2050, and benchmarked the project to industry best practice sustainability.