Muswellbrook Shire Council Infrastructure Depot

ESD Report

For CCG Architects

Revision	Date	Description	Author	Reviewer
1	14/02/2025	ESD Report - For Client Review	SA	KNR
2	07/03/2025	Updated as per Town Planner comments	SA	KNR

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Contents

Executive Summary

This ESD report supports the Development Consent requirements of the SEPP Sustainable Buildings Policy for the new Muswellbrook Shire Council Infrastructure Depot development comprises of administration offices, meeting rooms, delivery office, meal room, reception, workshop, storeroom, and toilets. The Proposed development is located at 252 Coal Road, Muswellbrook NSW.

This report will address the following requirements as outlined under Chapter 3 of the State Environmental Planning Policy – Sustainable Buildings 2022, in particular the development consent requirements for non-residential development :

- the minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials,
- a reduction in peak demand for electricity, including through the use of energy efficient technology,
- a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,
- the generation and storage of renewable energy,
- the metering and monitoring of energy consumption,
- the minimisation of the consumption of potable water.
- 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.

Reference and benchmarking are made to the following standard and best practice guidelines to demonstrate compliance with SEPP Sustainable Buildings Chapter 3.2 requirements:

- National Construction Code (NCC) 2022 Volume One – Section J
- Muswellbrook Shire Council Local Environmental Plan 2009 (Current Version for 29/11/24)
- Green Star Building v1.0 framework by the Green Building Council of Australia (GBCA)

In coordination with the ESD influences/drivers outlined within this report, the project will implement several sustainable design principles and include initiatives designed to mitigate the environmental impact of the following:

Energy & Carbon – including on-site renewable energy, improved energy efficiency across the building and its associated sources as well as consideration to embodied carbon within the building construction.

Water Management – including water reuse, reduced potable water demand and appropriate stormwater management.

Health & Wellbeing – improving indoor air quality, maximising daylight, providing comfortable amenities and unified access to all building occupants.

Sustainable Building Materials – considering the whole of life impact of materials and considering their retention and selection to minimise harm to the environment, including efficiency and construction.

Sustainable Transport – reducing the dependence on private commute modes and promoting low-carbon transportation to access site.

Resilience – including a site-specific climate change risk assessment and adaptation plan.

Cumulative impacts: The intent is to deliver a project where environmental impacts have been minimised. This includes reduced greenhouse gas emissions through efficient building envelope and HVAC systems, reduced potable water usage, reduced embodied carbon emissions and consideration of sustainable building materials, etc.

Reference Documents

This report is based on the following architectural drawings by:

Architect: CCG Architects

LEVEL 2, 5 WILSON STREET, NEWTOWN, NSW 2042

Relevant documents and drawings used in compiling this report are as follows:

Drawing/ Document No.	Revision Date	Title
DA002	25.02.2025	SITE PLAN
DA003		SITE PLAN - WEST END OPERATIONAL PARKING
DA004		SITE PLAN - EAST END STAFF & VISITOR PARKING
DA101		PROPOSED DEPOT BUILDING UPPER-LEVEL FLOOR PLAN
DA102		PROPOSED DEPOT BUILDING LOWER-LEVEL FLOOR PLAN
DA103		PROPOSED DEPOT BUILDING ROOF PLAN
DA201		PROPOSED DEPOT BUILDING ELEVATIONS SHEET 1
DA202		PROPOSED DEPOT BUILDING ELEVATIONS SHEET 2
DA303		SITE CROSS SECTIONS SHEET 1
DA304		SITE CROSS SECTIONS SHEET 2
DA501		SCHEDULE OF FINISHES SHEET

Table 1: Reference documents

Project Overview

The proposed community development is located at 252 Coal Road, Muswellbrook NSW 2333. The overall development comprises of administration offices, meeting rooms, delivery office, meal room, reception, workshop, storeroom, and toilets.

This ESD report supports Development Consent requirements of the SEPP Sustainable Buildings Policy.

The new industrial development is situated on a site area of 15,835 m² and includes the main depot and ancillary office spaces on the lower level, and workshop, storeroom, administration, and office spaces on upper level. The area summary is as per the table below:

Development Summary	Area
SITE AREA	15,835 m²
LOWER LEVEL Garage/Store	460 m²
UPPER LEVEL Workshop/Store Admin/Amenities	 575 m² 700 m²
TOTAL BUILDING AREA	1,735 m²

Table 2 : Development area Summary

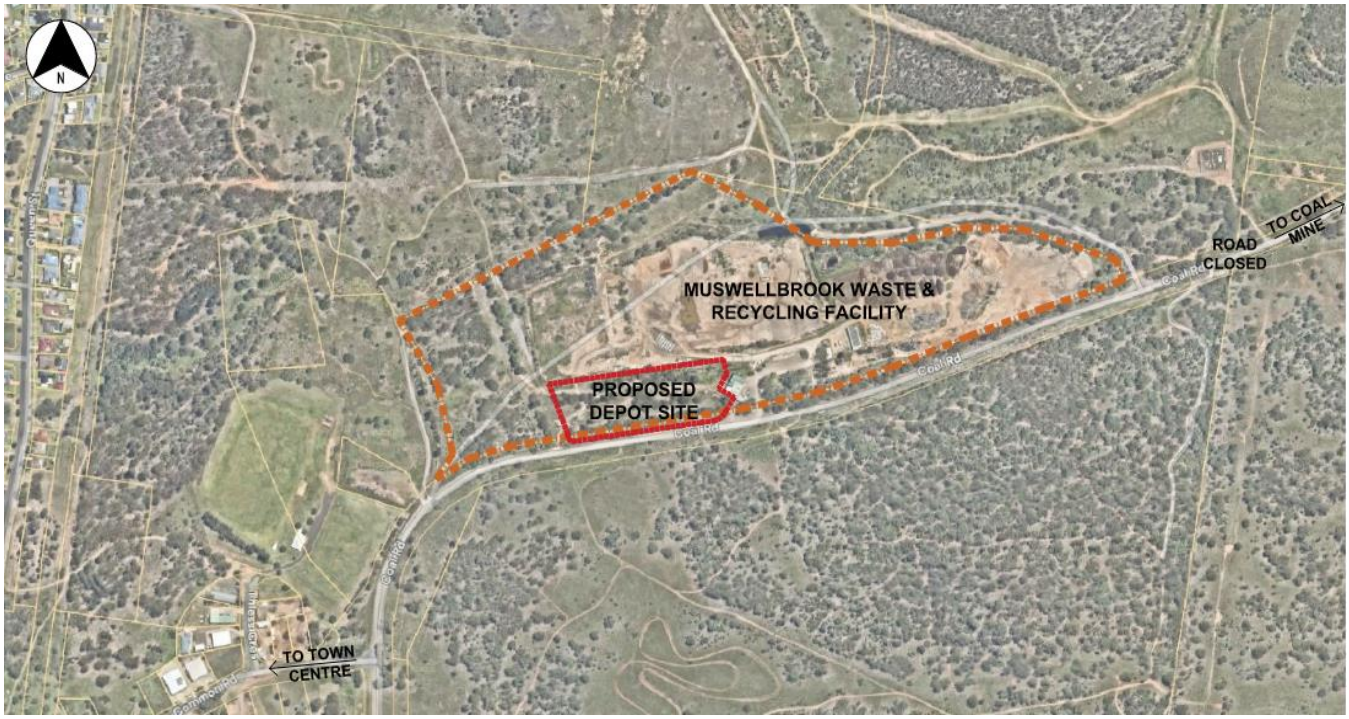


Figure 1: Locality Plan (source: CCG Architects)

The proposed development is classified into following classification based on its function as per the NCC Building Classifications –

- Class 5 - Office Building

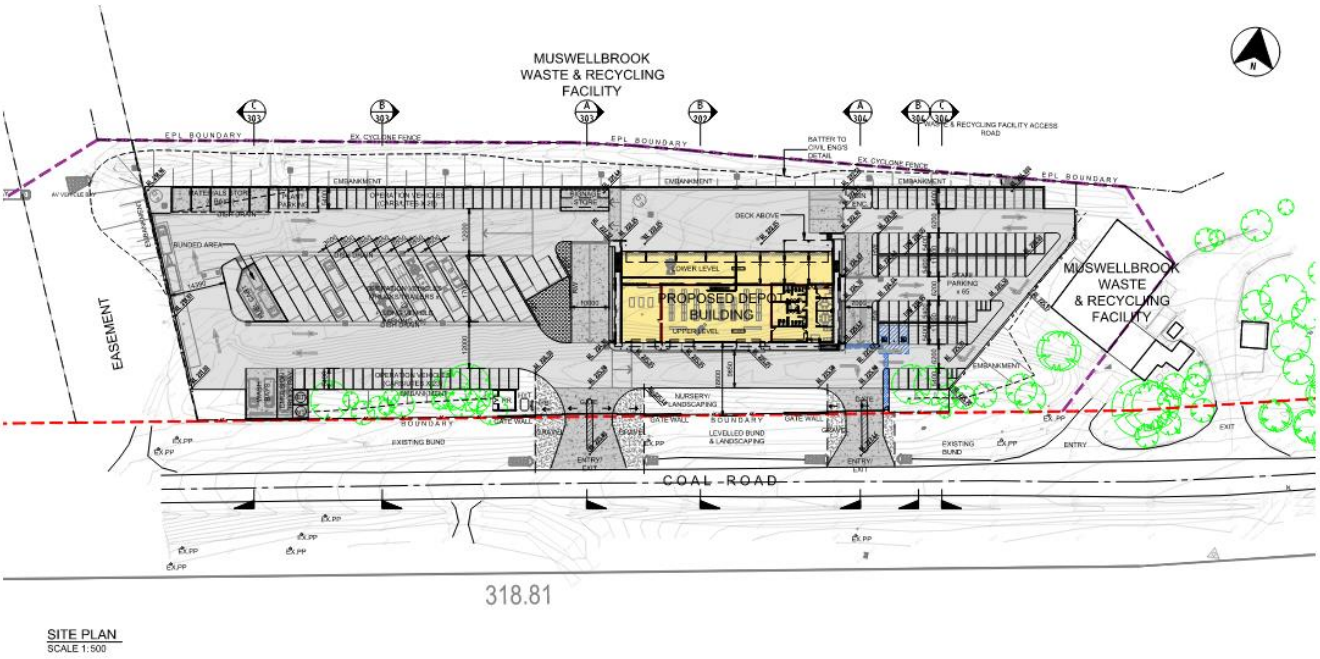


Figure 2: Site Plan of 252 Coal Road, Muswellbrook NSW 2333 (Source: CCG Architects : Drawing DA 002)

Climate Zone

The site is located at 252 Coal Road, Muswellbrook NSW 2333. The site is bordered with dense vegetated areas on all sites just outside the Muswellbrook suburban residential area. The site is under the jurisdiction of Muswellbrook Shire Council. The proposed project site is located within climate zone 6 – mild temperate conditions, which is associated with:

- Four distinct seasons: summer and winter can exceed human comfort range; spring and autumn are ideal for human comfort
- Hot to very hot summers with low to moderate humidity
- Mild to cool winters with low humidity
- Low diurnal temperature range near coast to high diurnal range inland

Information Sources

The following information sources have been used in the preparation of this report:

- Environmental Planning and Assessment Regulation 2021
- NSW Sustainable Buildings State Environmental Planning Policy (SEPP)
- Net zero statement technical note
- Embodied emissions technical note
- NSW and ACT Government Regional Climate Modelling (NARCliM) climate change projections
- NCC Section J 2022
- Muswellbrook Shire Council Local Environmental Plan 2009
- Green Star Buildings v1.0 Submission Guidelines
- Architectural drawings prepared by CCG Architects

ESD Frameworks & Legislation

Relevant sustainability frameworks and legislation applicable to the proposed development are detailed in the following sub-sections.

Sustainable Buildings SEPP

In August 2022, the NSW Government made the new State Environmental Planning Policy (Sustainable Buildings) 2022 (Sustainable Buildings SEPP) and associated amendments to the Environmental Planning and Assessment Regulations 2001 and the Environmental Planning and Assessment (Development Certification and Fire Safety Regulation) 2001.

Together, the Sustainable Buildings SEPP and EP&A Regulation changes will help the NSW Government deliver its commitments under the NSW Net Zero Plan stage 1: 2020-2030 and the national Trajectory for Low Energy Buildings. The Sustainable Buildings SEPP is a first step in introducing sustainability measures for non-residential buildings. It also improves the existing standards for residential buildings that under the BASIX SEPP and non-regulatory frameworks such as NABERS.

The Sustainable Buildings SEPP establishes a framework for the delivery of sustainable buildings and contributes to NSW's target of achieving net zero by 2050. The new provisions set out a modern, transparent, and fair framework, improved flexibility, and the ability for industry to take the lead and respond to the commitment by the NSW Government to achieve net zero emissions and move towards a circular economy.

Non-Residential – Chapter 3

All new non-residential development with an estimated development cost over $5 million and any renovation with an estimated development cost over $10 million must consider general and embodied emissions provisions.

Under Chapter 3 of the State Environmental Planning Policy – Sustainable Buildings 2022, in particular the development consent requirements for non- residential development :

- the minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials,
- a reduction in peak demand for electricity, including through the use of energy efficient technology,
- a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,
- the generation and storage of renewable energy,
- the metering and monitoring of energy consumption,
- the minimisation of the consumption of potable water.
- 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.

Large commercial developments also need to demonstrate net zero capacity and offset any onsite fossil fuel use and any performance gap in operational energy.

National Construction Code (NCC) 2022 Volume One

The National Construction Code (NCC) is produced and maintained by the Australian Building Codes Board (ABCB) on behalf of the Australian Government with the aim of achieving nationally consistent, minimum necessary standards of relevant health and safety, amenity, and sustainability objectives efficiently. Section J of the NCC Volume 1 2022 sets out the minimum energy efficiency requirements for all commercial buildings in Australia.

There are 6 Deemed-to-Satisfy subsections, focusing on different aspects of energy efficiency as follows:

- J4 - Building Fabric (i.e., the ability of the roof, walls, and floor to resist heat transfer)
- J5- Building Sealing (i.e., how well parts of a building are sealed to ensure comfortable indoor environments are efficiently maintained)
- J6 - Air Conditioning and Ventilation Systems (i.e., the efficiency and energy saving features of heating, ventilation, and air-conditioning systems)
- J7 - Artificial Lighting and Power (i.e., power allowances for lighting and electric power saving features)
- J8 - Hot Water Supply and Swimming Pool and Spa Pool Plant (i.e., the efficiency and energy saving features of hot water supply)
- J9 – Facilities for Energy Monitoring (i.e., access to certain energy efficiency equipment for maintenance purposes)

The development will achieve compliance with NCC 2022 Section J either through Deemed-to-Satisfy (DTS) Provisions, or a J1V3 Performance Solution.

Muswellbrook Shire Council Local Environment Plan 2009

Overall Sustainability aim of the LEP:

- To promote the principles of ecological sustainable development including energy and water efficient subdivision and housing design.
- any power and water to the site will, where possible, be provided through the use of passive heating and cooling, renewable energy sources and water efficient design,
- measures to remove any threat of serious or irreversible environmental damage,
- the maintenance (or regeneration where necessary) of habitats,
- efficient and minimal energy and water use and waste output,
- mechanisms for monitoring and reviewing the effect of the development on the natural environment,
- maintaining improvements on an on-going basis in accordance with relevant ISO 14000 standards relating to management and quality control.
-

Green Star

Greenstar tool has been referred to in this report as a guide to benchmark the sustainability targets, and a not as formal commitment to certification.

Green Star is a voluntary sustainability rating tool for buildings, tenancies, and communities in Australia. It was launched in 2003 by the Green Building Council of Australia (GBCA), a not-for-profit organisation with the key objective of driving the transition of the Australian property industry towards the design and construction of a more sustainable built environment. Although initially developed specifically for the design and construction of office buildings, the Green Star suite of rating tools has now expanded to cover all habitable buildings and communities across a design, as built and operational performance life cycle.

ESD Initiatives

The proposed development aims to go beyond minimum building requirements and provide a progressive sustainability outcome to comply with the State Environmental Planning Policy under Sustainable Buildings. The ESD principles adopted for the project will contribute to the conservation of resources and future resilience, across the whole life cycle of the project, from construction, through to the operational phase.

The following section identifies ESD opportunities and initiatives for consideration on the project.

Energy & Operational Carbon Emissions

A variety of energy efficiency measures are applicable to the proposed depot building. These energy efficiency measures shall form part of the final design and operation of the spaces. The final strategy will always be a combination of sustainability, operational feasibility, architectural intent, and site-specific appropriateness.

Energy Hierarchy:

The built form shall embrace sustainability principles and will be designed and arranged to maximise the passive performance of the building. The energy strategy for the development follows the Energy Hierarchy to achieve a low carbon building:

- NCC 2022 Section J Compliance: Ensuring compliance with Section J of the NCC 2022 for energy efficiency standards.
- Passive Design: Leveraging building orientation, natural ventilation, and shading to reduce energy demand.
- Energy Efficient Active Systems: Installing efficient HVAC, LED lighting, and BMS to optimise energy use.
- On-site Renewable Energy: Using photovoltaic solar panels to meet part of the building's energy needs.
- Offsets: Addressing remaining emissions through carbon offsets to minimise the building's carbon impact.

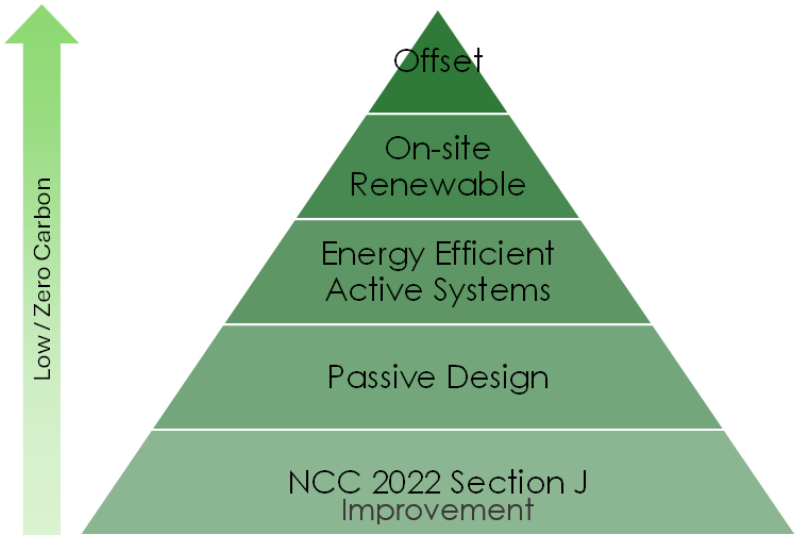
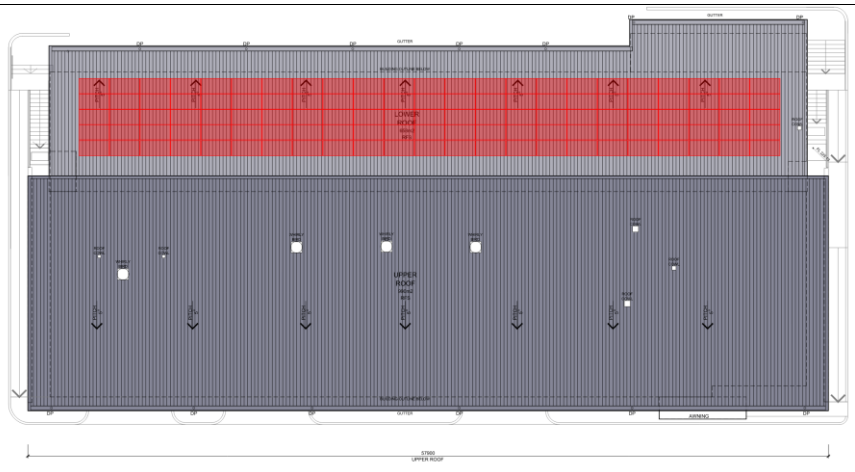


Figure 3 : Energy Hierarchy & design strategy

The objective of the requirements listed under the energy category is to minimise energy consumption and have high efficiency fittings and appliances for the development. On-site renewable energy generation is also encouraged to offset or reduce energy usage.

Initiative	Proposed Design Response
Building envelope	• All exposed floors and ceilings that are part of the thermal envelope must demonstrate a minimum 10% improvement over the minimum Total R value required by NCC 2022. • The wall-glazing construction must demonstrate an area-weighted total system U value, across all facades (NCC Specification J1.5a U value Method 2) at least 10% less than the maximum allowable total system U value for wall glazing constructions as per the requirements of Part J1.5, including compliance with Part J0.5 where applicable; and • Wall-glazing constructions have a combination of solar heat gain coefficients, across all façades (Specification J1.5a Solar admittance – Method 2), must achieve a calculated proposed representative air-conditioning energy value of not more than 90% of the calculated reference representative air-conditioning energy value as per the requirements of Part J1.5; and • Where the wall component is 80% or more of the area of the wall-glazing construction, it must achieve a 10% increase on the minimum total R-value specified in Table J1.5a. A compliant Section J DTS report is included as part of the DA submission.
Heating and Cooling	• Heating and Cooling systems must be within one star of the most efficient equivalent capacity unit available, or Coefficient of Performance (CoP) for heating & Energy Efficiency Ratio (EER) for cooling not less than 85% of the CoP & EER of the most efficient equivalent capacity unit available.
Hot Water Systems	• Water heating systems must be within one star of the best available, or 85% or better than the most efficient equivalent capacity unit.
Gas usage	• No gas connection to be used in the building.
Lighting	• Maximum power density must not be more than 90% of the Maximum Illumination power based on the maximum allowable lighting power densities defined in Table J6.2a of the NCC 2022 Vol 1. • LED lighting to be used throughout. • The lighting in all areas must have flicker-free lighting and the light sources must have a minimum Colour Rendering Index (CRI) of 80
Solar PV and Battery Storage	• Solar PV system to be installed on-site to offset the energy demand of the new building. The recommended PV system provision is based on NCC 2022 Section J J9 to include provision for 20% of the roof area dedicated to solar PV panels. Based on the available roof space facing north, which is the ideal direction for solar panels, the maximum solar PV system size that can be installed is approximately 30kW. The proposed arranged for the solar PV panels is as per the markup –

<table>
<tr><td></td><td> 
Considering the solar PV yield is expected to meet approximately 30% of the maximum energy demand for the building, battery storage is not required.</td></tr>
<tr><td>Efficient Appliances and Equipment</td><td>

Energy Efficient IT Equipment (e.g., monitors) and Appliances (e.g., TVs, fridges, dishwashers) to be within one star of the highest energy star rating of the comparable equipment class.
Minimum Energy Requirements of Appliance & Equipment:
<table>
<tr><th>Equipment Item</th><th>Star Rating</th></tr>
<tr><td>Refrigerators</td><td>2.5</td></tr>
<tr><td>Clothes Dryers (up to 10kg)</td><td>3</td></tr>
<tr><td>Washing Machines</td><td>3.5</td></tr>
<tr><td>Dishwashers</td><td>4</td></tr>
<tr><td>Pool Pumps</td><td>7.5</td></tr>
<tr><td>Fridge/Freezers</td><td>3.5</td></tr>
<tr><td>Freezers</td><td>3</td></tr>
<tr><td>Air to Air Heat Pumps</td><td>4 (≤ 4kW)
3 (≥4kW)</td></tr>
<tr><td>Televisions</td><td>5 (Tier 2 Rating)</td></tr>
</table>

</td></tr>
<tr><td>Report and measure energy usage</td><td>

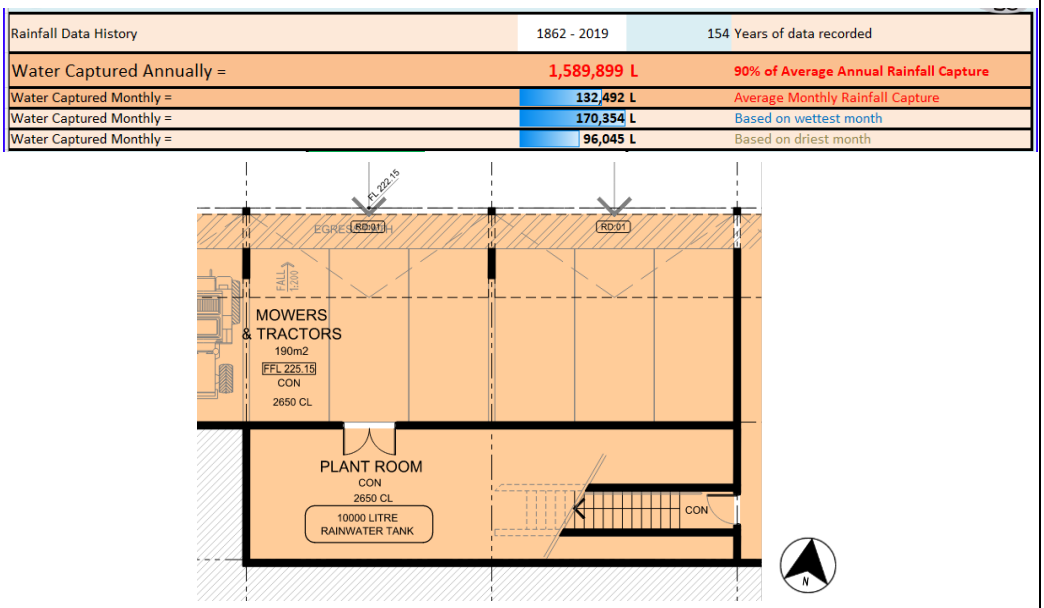
Include electricity metering to allow for consumption measurement and reporting as well as to identify potential system inefficiencies.

</td></tr>
</table>

Water Management

The objective of the requirements listed under the water category is to reduce potable water usage.

Initiative	Proposed Design Response
Efficient water fixtures	• Provision of efficient water fixtures, fittings, and connections. • Bathrooms and kitchens will install fixtures with the following minimum WELS rating: – Kitchen taps – 6 Star – Bathroom taps – 6 Star – Dishwashers – 4 Star – Toilets – 4 Star – Urinals – 4 Star – Showers – 4 Star (>=7.5 but <=9.0 L/s)

Water Efficient Landscaping	Water Efficient Landscaping will be installed
Building systems water use reduction	To Encourage the appropriate use of alternative water sources for cooling and fire testing systems, it is recommended for the cooling systems to not have water-based heat rejection systems. Fire testing systems if fitted with a sprinkler must follow the water saving options.
Rainwater re-use for irrigation	On-site rainwater harvesting & reuse will reduce the site potable water irrigation demand and reduce discharge levels and maintain the overall health & ecological integrity of receiving water bodies. The project has a 10KL rainwater tank located in the basement/lower ground floor. The total roof catchment of 1,685 m² is estimated to capture approximately 70kL of rainwater based on historical rainfall data. 
Landscape design & irrigation	• Landscape design shall focus on the inclusion of local, native, drought tolerant species. • Irrigation system installed should be timed for night-time operation. The implementation of sub-soil landscape irrigation is recommended over sprinklers.
Report on water use	Include water metering to allow for consumption measurement and reporting as well as to identify any potential system leaks and reduce potential water wastage.

Stormwater Management

The objective of the stormwater category is to achieve best practice stormwater quality objectives through reduction of pollutant load.

Initiative	Proposed Design Response
Stormwater Treatment	This project will consider the strategies for stormwater retention and natural filtration. - Surface stormwater will be directed into landscape where practical, to provide passive irrigation, reduced stormwater outflow and moisture retention in the soil - Rainwater from the roof area will be diverted into rainwater tank and being re-used for landscape irrigation

Health & Wellbeing

Consideration of the indoor air quality, general comfort (e.g., lighting, acoustics, thermal) will improve the overall aesthetic, promote a healthier work environment.

Initiative	Proposed Design Response
Access to daylight and views	• Access to natural daylight and quality views are to be maximised as much as possible. Orientation of the office spaces to achieve high levels of natural daylight and glazing to allow visual connection to outdoors. • Reduce glare through a combination of blinds, screens, fixed devices, or other means. • Lighter internal finishes to increase light bounce/reflectance for deeper daylight penetration. Windows must have VLT equal to or greater than 40%.
Enhanced air quality	• Sources of pollutants (printing, photocopying, cooking and vehicle exhaust) compliant with minimum emissions standards and will be exhausted directly to outside. • The Regular occupied floor areas have the outdoor air supply rate at least 50% above the minimum value required by the AS1668.2. • The Landfill Gas Risk Assessment has identified moderate risk ranking for methane requiring gas mitigation measure. The assessment has recommended Reinforced concrete ground-bearing slab or waffle pod slab (protection value of 0.5) or reinforced concrete ground-bearing raft slab with limited-service penetrations AND installation of a passive sub-slab ventilation system (protection value of 1.5 to 2.5 depending on the performance of the ventilation system). • The passive sub-slab ventilation system would act as a break, venting any methane gas prior to methane reaching the building slab.
Mitigation air pollution and odour	• A detailed Air Quality Impact Assessment was carried out to evaluate the potential for odour impacts on the CID building and conversely to ensure the new CID building does not impact on the operation of the landfill and waste management facility. • Recommendations to minimise the potential odour impacts at the CID building include: – Ensure the building design provides adequate air flow and encourages flow in a particular direction away from doorways and intakes. Avoid dead-ends or long narrow spaces perpendicular to the wind where air can lay dormant and stagnate. – Build continuous dense landscaping along the CID boundary between the landfill and composting operations. Tall vegetation will aid in dispersion and dilution for odour sources and also assist to minimise visual impacts and perception of odour sources. – Consider positioning of air conditioning and ventilation intakes away from odorous sources. Have non-opening windows on the odorous side of the building and duct cleaner air into the building from along the south and west of the building and out to the odorous side. If necessary, consider the use of filtration to assist with odour removal.
Lighting Comfort	• Design of lighting system to achieve appropriate and uniform lighting levels in line with AS 1680. • Improved uniformity of lighting based on combination of finishes selection and lighting design.
Acoustic Comfort	For workspaces like admin, meeting room, reception & private office, the following acoustic strategies are considered:

<table>
<tr><td></td><td>

Appropriate Internal ambient noise levels based on good façade design and selection of mechanical equipment.
Double glazing was designed to reduce the external noise levels, consisting of 8mm glass/ 16mm air gap/ 10.8mm laminated glass (Rw43). Refer to Acoustics Report by Northrop.
All windows / doors should be well sealed when closed with quality seals such as Q-LON acoustic seals (or equivalent) along the top and bottom sliders. Special attention should be given to balcony or slider doors to have quality acoustic seals all around them. Any airgap will significantly reduce the acoustic performance or the ability to reduce noise. Mohair seals are not considered to be acoustic seals.
Appropriate Reverberation levels based on right selection of finishes, likely including acoustic treated ceiling and acoustic panels.
Appropriate acoustic separation between rooms by application of high performing acoustic partitions (Rw44 – Rw47).
The following wall and roof construction were considered:

CLD:01 (Rw 47) – 9mm CFC, steel stud frame (0.55mm); cavity width 94mm, stud spacing 600mm, 60mm fibreglass insulation, 10mm plasterboard
CLD:02 (Rw 45) – Colorbond, steel stud frame (0.55mm); cavity width 94mm, stud spacing 600mm, 60mm fibreglass insultation, 2 layers of Fyrcheck plasterboard
Roof (Rw 44) – 0.6mm roof cladding, suspended light steel grid frame; cavity width 200mm, stud spacing 600mm, 75mm Earthwool 11kg/m3 acoustic wall batt, 10mm plasterboard

</td></tr>
<tr><td>Low VOC & formaldehyde Materials</td><td>

Low-VOC paints, sealants, adhesives, carpets, to limit emissions of dangerous volatile components and minimise health impacts of students and staff.
Selection of engineered wood products with low formaldehyde levels in accordance with industry best practice standards.

<table>
<tr><th>Product Category</th><th>Max TVOC content in grams per litre (g/L) of ready-to-use product</th></tr>
<tr><td>Interior wall and ceiling paint, all sheen levels</td><td>16</td></tr>
<tr><td>Trim, varnishes and wood stains</td><td>75</td></tr>
<tr><td>Primers, sealers and prep coats</td><td>65</td></tr>
<tr><td>One and two pack performance coatings for floors</td><td>140</td></tr>
<tr><td>General purpose adhesives & sealants</td><td>50</td></tr>
<tr><td>Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives</td><td>250</td></tr>
<tr><td>Structural glazing adhesive, wood flooring and laminate adhesives and sealants</td><td>100</td></tr>
</table>
</td></tr>
<tr><td>Thermal Comfort</td><td>

Mixed mode system with natural ventilation integration. Consideration of this should be made in the next design phase subject to cost impact on the project.
Conditioned spaces to achieve a predicted mean vote (PMV) of +/- 0.5 for 95% of occupied hours. This equates to 90% of occupant satisfaction.

</td></tr>
</table>

Sustainable Building Materials

The constructions may utilise vast quantities of concrete and steel, which consists of high embodied energy. This category aims to reduce greenhouse gas emissions and reduce indoor air pollutants by encouraging use of appropriate materials. The following material initiatives have been considered:

<table>
<tr><th>Initiative</th><th>Proposed Design Response</th></tr>
<tr><td>Concrete</td><td>The following reduction can be considered during detailed design:
Portland Cement Reduction
Water Reduction
Aggregates Reduction</td></tr>
<tr><td>Timber</td><td>All timber can be responsibly sourced and FSC or PEFC certified</td></tr>
<tr><td>Steel Use</td><td>Reinforcing bar and mesh is produced using energy-reducing processed in its manufacture; and
Consideration of recycled steel use in the tensile metal mesh and façade elements.</td></tr>
<tr><td>PVC Use reduction</td><td>PVC reduction, alternatives and/or best practice PVC in permanent formwork, pipes, and cables where appropriate.</td></tr>
<tr><td>Air Quality (IEQ)</td><td>All paints, sealants, adhesives, carpet and engineered wood will meet the maximum total indoor pollutant emission limits. It will be anti-slip with high durability and low toxic properties.</td></tr>
<tr><td>Light internal finishes</td><td>Lighter internal finishes to increase light bounce/reflectance for deeper daylight penetration</td></tr>
<tr><td>Reducing Whole of Life Environmental Impacts</td><td>• Potential initiatives include Concrete Portland Cement reduction, Steel product with low carbon footprint, use of recycled products, preference for products with Environmental Product Declaration, etc.
• Materials and products which include reused content, environmental product declarations, third party sustainability certifications or product stewardship programs.</td></tr>
<tr><td>Waste Management</td><td>A target of 90% of construction and demolition waste will be diverted from landfill.
• Operational Waste Management Plan (OWMP) to be prepared to establish operational waste targets, identify opportunities for reuse and recycling and make adequate provision of facilitates.
• Report on minimum 3 waste streams by volume and cost.
<table>
<tr><th>Bin Colour</th><th>Waste Stream</th><th>Waste type</th></tr>
<tr><td>Lime Green</td><td>Organics</td><td>Food Organics and Garden Organics</td></tr>
<tr><td>Yellow</td><td>Recycling</td><td>Comingled containers</td></tr>
<tr><td>Blue</td><td>Recycling</td><td>Paper & cardboard</td></tr>
<tr><td>White</td><td>Recycling</td><td>Container Deposit Scheme</td></tr>
<tr><td>Any colour</td><td>Recycling</td><td>Soft Plastic</td></tr>
<tr><td>Red</td><td>General</td><td>General waste</td></tr>
</table></td></tr>
</table>

Resilience & Climate Response

Climate Change in Australia can deter the future amenity and wellbeing of the built and natural environment. Natural disasters such as bushfires, floods or cyclones constitute real threats to buildings in operation, and the long-term effects of climate change are likely to increase the frequency of such

events. It is paramount to future-proof building design and ensure its adaptability and resilience to the long-term implications of climate change.

Initiative	Proposed Design Response
Climate Change Adaptation Plan	• Assessment of project risks associated with the predicted impacts of Climate Change to ensure the project design allows for suitable provisions for the predicted impact of climate change scenarios.

Additional ESD Initiatives

Initiative	Proposed Design Response
Construction waste Management	• At least 70% of construction and demolition waste to be diverted from landfill by recycling and reuse.
Environmental Management	• The EMP will be developed and implemented for the construction stage, including demolition and excavation, to address environmental, worker health and safety and community risk, as per ISO 14001 Standard. See Appendix A for additional details
Site Management	• The site management plan, which details how the site shall be managed through construction and which sets out future operational and maintenance arrangements can be prepared. A construction management plan can be prepared in accordance with information in Appendix A.
Lighting Control	• Automated lighting control systems (e.g., occupant detection and daylight adjustments) must be provided to all areas, with provisions for localised lighting control
External Lighting – Light pollution to night sky	• For Reducing light spill and pollution, the project team must demonstrate that no external luminaire on the project has a ULOR that exceeds 5 %, relative to its mounted orientation • To minimise light pollution, outdoor lights shall comply with AS 4282:1997 Control of the obtrusive effects of outdoor lighting.

Climate Change Resilience

The projected impacts of climate change on the proposed development shall be assessed, based on predicted climate change models. A Climate Adaptation Plan shall be prepared with the project stakeholders to:

- Identify and describe risks posed by climate change to the development and rate the consequences and likelihood of each.

- Identify and evaluate potential adaptation actions and/or design strategies to mitigate those risks which are deemed unacceptable.

To facilitate this process, the following section outlines the climate change projections which will impact the proposed development.

The following section has been based on data presented by the NARCliM's (NSW / ACT Regional Climate Modelling) project which is designed to provide robust projections that span the range of likely future changes in climate.

Temperature Projections

2020-2039 : Mean temperatures are projected to rise by 0.7 °C by 2030. The increases are occurring across the region. All models show there are no declines in mean temperatures across Metropolitan Sydney.

2060-2079 : Mean temperatures are projected to rise by 1.9 °C by 2070. The greatest increases are being seen during summer and spring. All models show there are no declines in mean temperatures across the Metropolitan Region.

Heat Projections

Units are the change in number of days a year maximum temperature > 35˚C

2020-2039 : +3.9 days, mostly to occur in summer.

Hot days are projected to increase across the region by an average of 4 days per year by 2030. The greatest increases are seen in the central part of the region near Penrith during summer and spring, where they are projected to experience an additional 5-10 more days per year. There is little change along the coast.

2060-79 : +10.4 days, mostly to occur in summer but will see more hot days in spring also.

Hot days are projected to increase across the region by an average of 11 days per year by 2070. The greatest increases are seen in the central part of the region from Picton to north of Wiseman's Ferry and out to Katoomba. These regions are projected to have additional 10-20 hot days per year.

Rainfall Projections

2020-2039 : By 2030 there is little change in annual rainfall. Rainfall is projected to increase across the region during autumn with the largest increase seen north of Wiseman's Ferry. Rainfall is variable across the region during the other seasons.

The projected annual rainfall increase for the region is +1.7%

2060-2079 : Annual rainfall is projected to increase further by 2070. Increases are projected across the whole region for summer and autumn. Winter and spring rainfall is more variable, with a slight decrease in rainfall in the Blue Mountains during winter.

The projected annual rainfall increase for the region is +8.9%

Fire Projections

2020-2039 : +0 Changes in number of days a year FFDI > 50

Forest Fire Danger Index (FFDI) is used in NSW to quantify fire weather. The FFDI combines observations of temperature, humidity, and wind speed. Fire weather is classified as severe when the FFDI is above 50. By 2030 severe fire weather is projected to have a slight increase in summer and along the Blue Mountains during spring. Decreases are projected during autumn and across the Sydney Basin in spring. Declines during Autumn are likely due to increases in rainfall. These increases are seen during the peak fire risk season (summer).

2060-79 : +0.6 Changes in number of days a year FFDI > 50

Forest Fire Danger Index (FFDI) is used in NSW to quantify fire weather. The FFDI combines observations of temperature, humidity, and wind speed. Fire weather is classified as severe when the FFDI is above 50. Severe fire weather is projected to increase during summer and spring by 2070. Declines are projected for autumn and winter. These increases are being seen during the peak prescribed burning season (spring) and peak fire risk season (summer).

A climate change risk assessment shall be undertaken as per AS 5334-2013. The identified 'High' or 'Extreme' risks due to climate change impacts should be considered for this project. The results of the assessment are to be summarised in the Climate Change Adaptation Plan report. The design response for high and extreme risks will be then incorporated in the future design phases.

Conclusion

This report addresses the relevant SEPP Sustainable Buildings Policy requirements in relation to ESD design principles as outlined under Chapter 3 of the State Environmental Planning Policy – Sustainable Buildings 2022, in particular the development consent requirements for non- residential development :

- the minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials,
- a reduction in peak demand for electricity, including through the use of energy efficient technology,
- a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,
- the generation and storage of renewable energy,
- the metering and monitoring of energy consumption,
- the minimisation of the consumption of potable water.
- 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.

As the design progresses in the future stages, the feasibility of the proposed ESD initiatives will be continually investigated and verified through industry best practice benchmarking tools.

Appendix A - Environmental & Site Management Plan

Environmental Management Plan

An Environmental Management plan will be developed and implemented for the construction stage, including demolition and excavation, to address environmental, worker health and safety and community risks. The EMP is a project specific plan and developed using State and Federal Guidelines and standards. The main contractor will implement an Environmental Management System certified to the ISO 14001 standard to ensure the objectives of the EMP are met.

This plan will include details such as:

- Protection works necessary to road and other infrastructure
- Remediation of any damage to road and. other infrastructure
- Containment of dust, dirt and mud within the site and the method and frequency of clean up procedures in the event of build-up of matter outside the site
- On site facilities for vehicle washing
- Methods for management of noise and general nuisance
- Waste reduction to achieve 70% by mass reduction of construction and demolition waste
- Stormwater treatment and management plan
- Parking facilities for construction workers
- Noise and Vibration Controls – Machinery should not be operated if maintenance would correct its noise characteristic. All activities should comply with the EPA noise control guideline 12. Demolition works time is to be controlled.
- Dust Control – Contaminated water does not enter the storm water system from the land. Temporary fencing is covered with shade cloth where it is utilised. Disposal of contaminated site material must comply with the requirements of the Environment Protection Authority and the Environment Protection Act 1970.

During construction, the Builder will be required to comply with the following:

- Any stormwater discharged into the stormwater drainage system must meet with EPA guidelines
- Stormwater drainage system protection measures must be installed so that no litter, sediments and pollution (e.g., solid waste, sediment, sand, soil, clay or stones) from the site enter the stormwater drainage system
- Vehicle borne material must not accumulate on the roads abutting the site
- The cleaning of machinery and equipment must take place on site and not on adjacent footpaths or roads
- Litter (including items such as cement bags, food packaging and plastic strapping) must be disposed of responsibly
- Site operations must accord with EPA noise control guidelines

Site Management Plan

The site management plan, which details how the site shall be managed through construction and which sets out future operational and maintenance arrangements, shall be prepared by the builder and included within the construction management plan. This plan shall outline construction measures to prevent litter, sediments and pollution entering stormwater systems

During the demolition and construction phases, a project-specific site waste management plan (WMP) can be developed and implemented while complying with the Environment Protection Act 2017. This may include recycling areas, bins, plans of protection measures, disposal procedures and emergency plans and contingency plans.

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