

The Badgerys Creek Industry Park

Net Zero Statement

85 Martin Road, Badgerys Creek

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Olivia Ridgewell
ESR
Level 12, 135 King Street
Sydney NSW 2000



RE: Net Zero Statement for 85 Martin Road, Badgerys Creek

This Net Zero Statement has been prepared to address the relevant requirements under the NSW Sustainable Buildings State Environmental Planning Policies (SB SEPP) Section 3.4, and as defined under Section 35C of the Environmental Planning and Assessment Regulation 2021 (EP&A). It is intended to address the SEPP requirement of achieving net zero operational greenhouse gas emissions by 2035.

In support of the above requirement, the building is being designed to be fossil fuel free by utilising electric systems.

Further details of the estimated greenhouse gas emissions and building design are included in the following sections.

Please note that the services consultant had not been engaged prior to the SSDA submission. The details in this net zero statement will be updated once the services consultant is engaged and the services strategy is confirmed.

E-LAB CONSULTING

Alex Kobler | Director
CPEng (Mechanical) NER



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Document QA and Revisions

ISSUE	DATE	COMMENTS	ENGINEER	REVIEWER
1	07/11/2024	Draft Issue for SSDA	HM	AK
2	06/12/2024	Issue for SSDA	HM	AK
3				



1 INTRODUCTION

1.1 PURPOSE

This Net Zero Statement has been prepared in support of a State Significant Development Application (SSDA) for the proposed new development at 85 Martin Road, Badgerys Creek (SSD-74191717).

This Net Zero Statement has been prepared to address the relevant requirements under the NSW Sustainable Buildings State Environmental Planning Policies (SB SEPP) Section 3.4, and as defined under Section 35C of the Environmental Planning and Assessment Regulation 2021 (EP&A).

The following plan aims to achieve the below objectives:

- Detail how the development will transition to all-electric in the future
- Give evidence of infrastructure and space that has been incorporated into the design to enable the transition
- Describe renewable energy generation infrastructure as part of the development;
- Describe energy reduction initiatives;
- Estimate energy consumption of the development; and
- Estimate GHG emissions for energy use of the development.

1.2 THE PROJECT

The proposed mixed-use development located at 85 Martin Road, Badgerys Creek is comprised of:

- Four warehouses with a total warehouse GLA of 85,325 sqm
- Several satellite offices with a total GLA of 5,570 sqm.
- A car park with 428 car parking spaces.

1.3 SCOPE

This Net Zero Statement has been created to align with the Sustainable Buildings SEPP requirements, which focuses on Scope 1, 2 and 3 emissions. The statement must demonstrate that 100% of the building's energy can be sourced from renewables and all other operational GHG-e from the building can be offset in the future, to allow carbon neutral operations.

1.4 SUMMARY

In summary, the development is designed to operate as a net zero development immediately.

The estimated annual energy consumption for the building is approximately **62 kWh/m²** and the estimated amount of emissions relating to energy use in the building, including direct and indirect emissions is approximately **65 kgCO₂/m² p.a.**

Figure 1 SSDA Masterplan Stage 2 (SBA Architects).

3 ENERGY EFFICIENCY

The development will be employing passive design features to create energy-efficient buildings, while reducing dependence on the electrical grid.

3.1 PASSIVE DESIGN FEATURES

Integrating passive design features into the developments design, we can reduce reliance on the building's mechanical systems by accessing the natural resources available. The development will be utilising the following features to minimise heating and cooling loads:

- A high-performance façade and shading system will reduce the load on the HVAC system. This façade will use the strategically placed eaves, awnings, and landscaping to reduce this load.
- Cross ventilation and high-quality insulation will contribute to the reduction of the heat gain and loss of the buildings.
- Relatively low window to wall ratio which provides control of solar gain through windows
- Consideration of thermal bridging and airtightness to minimise heat loss

3.2 TECHNICAL DESIGN FEATURES

Throughout the development high-performing building systems will be installed to reduce demand to the electrical grid. These systems include:

- High efficiency electric heat pump hot water systems for domestic hot water
- Highly efficient electric VRF plant which operate a higher overall operating efficiency and can provide heating and cooling to the spaces that require it
- Regenerative drives on all lifts. This will reduce energy consumption by up to 75% compared to non-regenerative drives
- High efficiency LED lighting throughout, including in common areas with efficiency controls to meet the requirements of NCC 2022 Section J and BASIX. Controls will include motion sensors, time clocks and zoned switching;
- Natural ventilation of non-occupied and tertiary spaces to minimise energy use
- Energy meters and monitoring systems will be provided to comply with NCC 2022 Section J Part J8 requirements.

4 ENERGY CONSUMPTION AND EMISSIONS CALCULATIONS

4.1 ESTIMATED ENERGY CONSUMPTION

The estimated annual total energy consumption of the development is summarised in the table below.

Table 1: Estimated Annual Energy Consumption

	ENERGY (MJ/Year)
ESTIMATED FOSSIL FUEL CONSUMPTION	3,860
ESTIMATED ELECTRICITY CONSUMPTION	1,217,830
TOTAL ESTIMATED ENERGY CONSUMPTION	1,221,690

4.1.1 ENERGY SOURCES

The development will be fossil fuel-free.

Electricity consumption is to be validated and estimated using performance modelling. This includes up-to-date and verified estimates of the actual energy consumption predicted to be used for the development.

Diesel has been predicted assuming minimal backup electricity power requirements for testing only.

Refrigerants have been estimated, using an estimated charge per apartment, and assuming a 2% loss factor each year. The working refrigerant is R410A.

4.2 ESTIMATED GHG EMISSIONS

The following table summarise the total GHG Emissions for the 85 Martin Road, Badgerys Creek development based on the predicted energy consumption.

Table 2 - Total Greenhouse Gas Emissions breakdown for 2024.

SCOPE	EMISSION SOURCE	GHG EMISSION (t CO ₂ -e)	GHG EMISSIONS %
1	Gas consumption	0	0%
	Diesel	0.27	0%
	Refrigerants	17.6	5%
2	Electricity Consumption	316.7	90%
3	All other sources*	17.6	5%
1,2 & 3	TOTAL	352.2	100%

Refrigerants GHG emissions has been estimated at 5% of the total electricity consumption, this will be updated once we have the refrigerant information in Table 4 below.

*Scope 3 emissions has been estimated at 5% the total of Scope 1 & 2 emissions for this building.

4.2.1 SCOPE 1 EMISSIONS

Table 3 - Estimated Diesel consumption and GHG Emissions

EMISSION SOURCE	DIESEL CONSUMPTION (kL)	GHG EMISSION FACTOR (kg CO ₂ -e /GJ)	EMISSIONS (t CO ₂ -e)
DIESEL CONSUMPTION	0.1	70.2	0.27

The table below provides an overview of the total refrigerants related to the building's services and the associated annual emissions.

Table 4 - Annual Refrigerant GHG Emissions

REFRIGERANT	GWP (kg CO ₂ -e /kg)	TOTAL CHARGE (kg)	EMISSIONS (t CO ₂ -e)
R-410A	1,924	9.1	17.6

*Assuming a 2% leakage factor

*GWP for R-410A sourced from the Department of Climate Change, Energy, the Environment and Water, 2022

4.2.2 SCOPE 2 EMISSIONS

The development's annual electrical consumption and the associated carbon emissions are summarised in the table below.

Table 5 - Electricity consumption and GHG Emissions

EMISSION SOURCE	ELECTRICITY CONSUMPTION (kWh)	GHG EMISSION FACTOR (CO ₂ -e / kWh)	EMISSIONS (t CO ₂ -e)
ELECTRICITY CONSUMPTION	338,286	1.068	316.7

4.2.3 SCOPE 3 EMISSIONS

Scope 3 emissions are all indirect emissions within the supply chain of operating the site that are not fully under the developer's control. This includes *upstream* activities such as energy in goods and services consumed and employee travel and *downstream* activities such as waste, investments and actions that occur from the building.

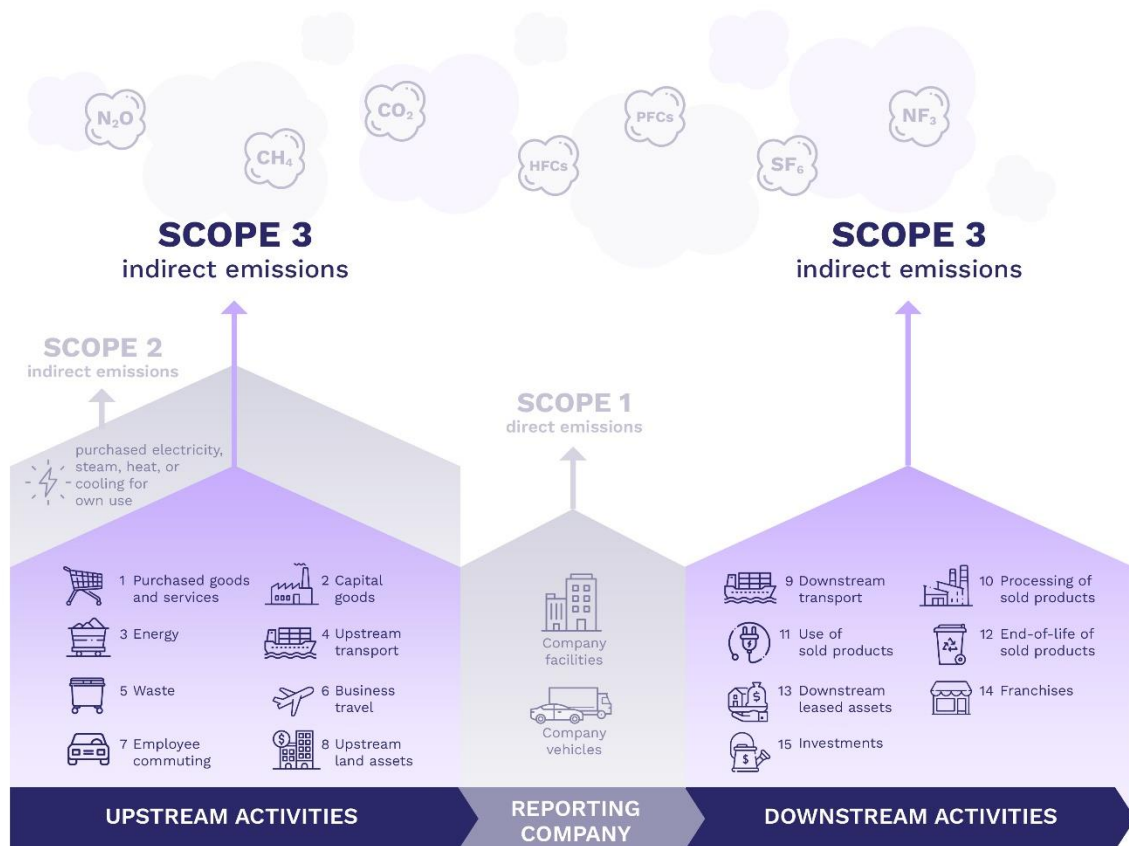


Figure 2. Scope 3 emissions (Source: thinkstep anz)

This area of carbon emissions is the hardest to track as it requires a full assessment of the supply chain. It is typical to not assess the entire process, but only the elements that make up say 95% of the total. The remaining elements that make up the resulting 5% are not a focus as they are a small part of the total.

Typically, Scope 3 emissions are made up of the following:

UPSTREAM SCOPE 3	DOWNSTREAM SCOPE 3
Category 1: Purchased goods and services	Category 9: Downstream transportation and distribution
Category 2: Capital goods	Category 10: Processing of sold products
Category 3: Fuel- and energy-related activities (not included in scope 1 or scope 2)	Category 11: Use of sold products
Category 4: Upstream transportation and distribution	Category 12: End-of-life treatment of sold products
Category 5: Waste generated in operations	Category 13: Downstream leased assets
Category 6: Business travel	Category 14: Franchises
Category 7: Employee commuting	Category 15: Investments
Category 8: Upstream land assets	

