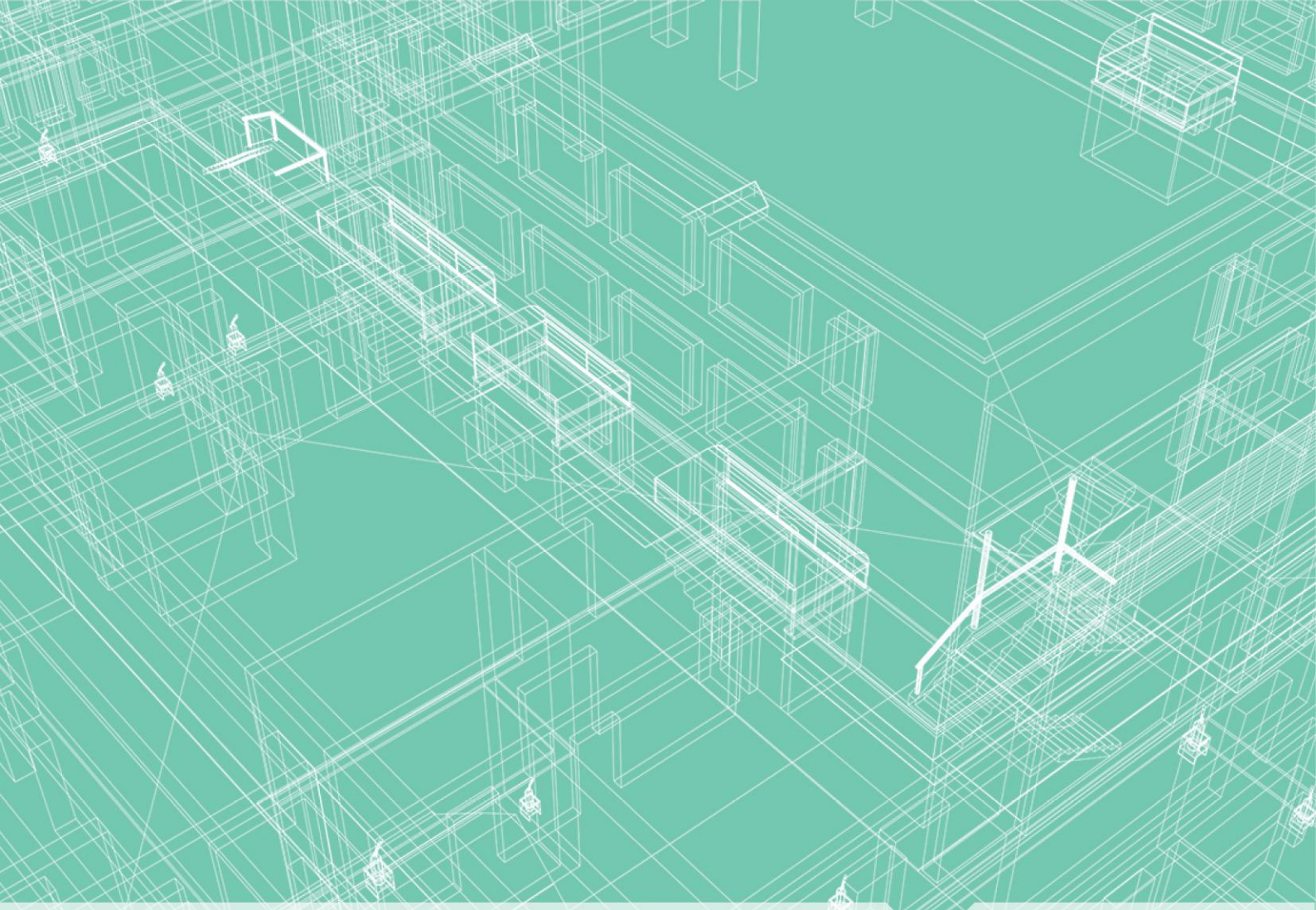


NET ZERO STATEMENT

NEW PRIMARY SCHOOL AT WILTON JUNCTION

MULTIDISCIPLINARY SERVICES

JHA

JHASERVICES.COM

This report is prepared for the nominated recipient only and relates to the specific scope of work and agreement between JHA and the client (the recipient). It is not to be used or relied upon by any third party for any purpose.

DOCUMENT CONTROL SHEET

Project Number	220295
Project Name	New Primary School at Wilton Junction
Description	Net Zero Statement
Key Contact	Lachlan Brown

Prepared By

Company	JHA
Address	Level 20, 2 Market Street, Sydney NSW 2000
Phone	61-2-9437 1000
Email	Gary.Tang@jhaengineers.com.au
Website	www.jhaservices.com
Author	Felisa Garcia, Tarun Thottungal
Checked	Gary Tang
Authorised	Mark Ritchie

Revision History

Issued to	Revision	Date
SINSW	DRAFT	31/01/2025
SINSW	DRAFT 2	18/02/2025
SINSW	DRAFT 3	25/02/2025
SINSW	Rev A	11/03/2025

EXECUTIVE SUMMARY

This Net Zero Statement has been prepared by JHA and the Design team for the proposed primary school located at 200 Fairway Drive, Wilton NSW 2571. The purpose of the Net Zero Statement is to demonstrate that there are no fossil fuels used on-site and there are long-term effects on the environment in accordance with the *Guidelines for Division 5.1 assessments* (the Guidelines) by the Department of Planning, Housing and Infrastructure (DPHI) as well as the *Addendum Division 5.1 guidelines for schools*.

This Statement has been developed through ongoing design and collaboration with the client and design team, with engineering design input from the mechanical, electrical and hydraulic engineers. The project has considered aspects of energy efficiency, building envelope/fabric, building systems and renewable energy with details included within. The activitiy is designed to operate without the use of on-site fossil fuels.

The following Net Zero Statement Checklist has been included below for ease of referencing.

Net Zero Statement Checklist	Evidence
Cover Letter	
Project details and overview	Refer to Section 1 Introduction.
Is the development fossil fuel-free or requires a transition strategy?	The project is fossil fuel free.
Certified and signed by a mechanical or electrical engineer	Refer to Section 2.
On-Site Fossil Fuel Usage	
Evidence of fossil fuel-free operations.	Refer to Section 3.
Energy Efficiency	
Passive design features – building orientation, natural ventilation, insulation, glazing performance etc.	Refer to Section 4.
Technical design features – energy efficient HVAC and lighting systems, smart controls and occupancy sensors etc.	Refer to Section 4.
Renewable Energy Generation	
Solar panels	Refer to Section 3.3.4 and Section 4.2.4.
Estimated Energy Consumption	
Estimated fossil fuel consumption per year	Not Applicable.
Estimated electricity consumption per year	Refer to Section 5.
Total estimated energy consumption per year kWh/y/m2 of GFA	Refer to Section 5.
Estimated GHG emissions for energy use	
Estimated direct (scope 1) GHG emissions per year	Refer to Section 5.
Estimated indirect (scope 2 and 3) GHG emissions per year	Refer to Section 5.
Total estimated GHG emissions per year	Refer to Section 5.

CONTENTS

EXECUTIVE SUMMARY 3

1. INTRODUCTION 5

1.1 PROPONENT 5

1.2 PURPOSE OF THE REPORT 5

1.3 SITE DESCRIPTION 6

1.4 PROPOSED ACTIVITY DESCRIPTION 6

1.5 8

1.6 STAKEHOLDERS CONSULTATION 8

1.7 REFERENCE DOCUMENTS AND STANDARDS 9

2. CERTIFICATION OF EVIDENCE 10

3. PROPOSED SYSTEMS AND EQUIPMENT 11

3.1 MECHANICAL SERVICES 11

3.2 HYDRAULICS SERVICES 13

3.3 ELECTRICAL SERVICES 13

3.4 FOSSIL FUEL FREE SITE 16

4. ENERGY EFFICIENCY DESIGN FEATURES 17

4.1 SUSTAINABLE DESIGN FRAMEWORK 17

4.2 ENERGY EFFICIENCY INITIATIVES 17

5. ESTIMATED ENERGY CONSUMPTION AND EMISSIONS 20

6. CONCLUSION 21

6.1 MITIGATION MEASURES 21

6.2 EVALUATION OF ENVIRONMENTAL IMPACTS 21

1. INTRODUCTION

This Net Zero Statement has been prepared to support a Review of Environmental Factors (REF) for the NSW Department of Education (DoE) for the construction and operation of the new primary school at Wilton Junction (the activity).

The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) as "development permitted without consent" on land carried out by or on behalf of a public authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37A of the T&I SEPP.

This document has been prepared in accordance with the Guidelines for Division 5.1 assessments (the Guidelines) by the Department of Planning, Housing and Infrastructure (DPHI) as well as the *Addendum Division 5.1 guidelines for schools*. The purpose of this report is to ensure the activity is designed to operate without the use of on-site fossil fuels and there are no long-term effects on the environment.

1.1 PROPONENT

The NSW Department of Education (DoE) is the proponent and determining authority pursuant to Section 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.2 PURPOSE OF THE REPORT

The report examines and addresses item (h2) in Table A1 Environmental factors for hospital and school activities from the Addendum Division 5.1 Guidelines for Schools by DPHI, which is taken from Section 171(2) of the EP&A Regulation.

This is addressed by preparing a Net Zero Statement. A Summary of the relevant section is provided in the table below.

Regulation/Guidelines Section	Requirement	Response	Report Section
Guidelines for Division 5.1 assessments	Considering environmental Factor: h) long-term effects on the environment (h2) meet industry recognised building sustainability and environmental performance standards, integrate environmental design, minimise greenhouse gas emissions, minimise energy and water consumption (recycled water) and material resources, renewable energy generation and storage, fossil fuel-free, sustainable travel choices, manage, reuse, recycle and safely dispose of waste Supporting Document: Net Zero Statement	The project incorporates the Educational Facilities Standards and Guidelines (EFSG) and the Green Star Design Building v1 (5 Star rating) to keep the impacts on the environment low. The project is designed to operate without the use of on-site fossil fuels. Hence there are no long-term effects on the environment.	See Sections 4, 5 & 6

1.3 SITE DESCRIPTION

The current street address is 200 Fairway Drive, Wilton, 2571, NSW. The site forms part of the northern portion of Lot 1063 in Deposited Plan 1289197) that was previously subdivided by Landcom. The site is approximately 3.4ha hectares in size and is located within Wilton Junction which is part of the North Wilton Precinct.

As a result of precinct wide rezonings, the surrounding locality is transitioning from a semi-rural residential area to a highly urbanised area with new low to medium density residential development with supporting services. North Wilton Precinct is approximately 85km south-west of the Sydney CBD, 30km north-west of Wollongong and 30km southwest of Campbelltown-Macarthur Strategic Centre. The precinct is located on the interchange with the Hume Highway, which connects the Southern Highlands with the Sydney metropolitan region to the northeast and Canberra to the south-west.

The proposed school site does not currently have road access, however, Landcom is expected to deliver the road network and surrounding public domain network in accordance with DA/2022/1279/1. Proposed Road 14 located on the eastern boundary of the site will ultimately provide future access to the site. The site contains several patches of remnant native vegetation particularly within the northern portion of the site. The central part of the site has been predominantly cleared and consists of grassland. An aerial photograph of the site is provided below.

Aerial photo of the site; (Source: Urbis)

1.4 PROPOSED ACTIVITY DESCRIPTION

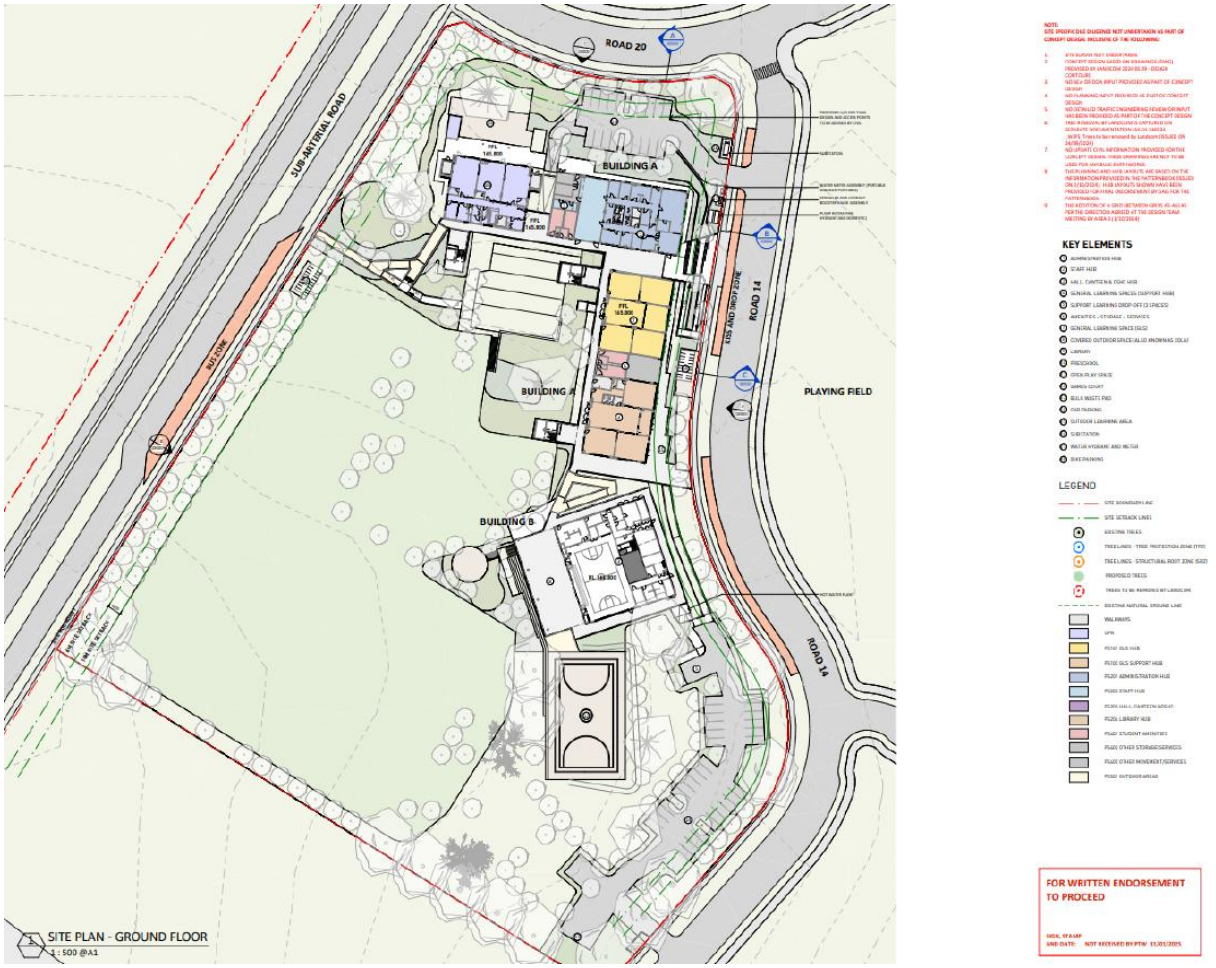
The proposed activity is for the construction and operation of a new primary school at Wilton Junction which will accommodate up to 552 students and 35 staff. Additionally, the proposal includes an integrated pre-school which will capacity for up to 60 students and 7 staff. In total, the new school will support up to 612 students and 42 staff.

The new school includes general and support learning spaces, a library, administrative areas and a staff hub. Core facilities include a standalone school hall and canteen, two carparks and a sports court.

Specifically, this proposal includes the following:

- Construction of a 3-storey learning hub which includes:
  - 24x General Learning Spaces
  - 3 x Support Learning Spaces
  - Staff hub including administrative areas and library.
  - Integrated public pre-school.

- Standalone hall and COLA with outside of school hours care (OSHC).
- Associated landscaping including sports court and separate outdoor play space for the preschool.
- Associated site utilities and services including installation of new 1500 kVA padmount substation and a new main switchboard.
- Main car park to the south of the site with 33 car spaces (including one accessible space).
- Separate car park for pre-school located to the north of the school with 18 spaces (including one accessible space).
- Main school pedestrian entrance proposed off Road 14.
- Earthworks



Proposed Site Plan – Staging; (Source: PTW)

1.5

1.6 STAKEHOLDERS CONSULTATION

As a part of the Climate Change Risk Assessment process, the stakeholders consulted are listed below.

Stakeholder	Role
SINSW Jeremy Stott, Huss Mohsin, Christine Durrant, Adrian Ng, Luke Zajac	Client
AREA3 Mable Chew, Mathew Klumper, Rachel Danusaputra	Project Management
PTW Diane Jones, Katarina Vrdoljak, Marisa Sidoti	Architect
Urbis Christopher Croucamp	
BG&E Paul Sancandi, Stephen Hazlewood, Vahid Shamsaeifar, Mahmound Garmal	Structural & Civil
Acor Consultants Rhys Edwards, Mariella Vasquez	Hydraulic
JHA Consulting Engineers Mark Ritchie, Sam Daher, Hadi Jalgha, Sean Matthews, Gary Tang, Laura Golembowski, Brenton Burrows, Borris Skapik, George Petropoulos, Ferial Sam & Alex Frew	Electrical, Mechanical, Acoustic, ESD, Level 3, VT & AV
Stantec Volker Buhl	Transport
Genus Advisory Matthew Mead, Eraj Shrestha	Cost Management
McIntosh Glenn McIntosh	Landscape

1.7 REFERENCE DOCUMENTS AND STANDARDS

This Net Zero Statement has been prepared in accordance with the following documents and standards:

- Environmental Planning and Assessment Act 1979 (EP&A Act)
- State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP TI)
- Guidelines for Division 5.1 assessments (the Guidelines) by the Department of Planning, Housing and Infrastructure (DPHI)
- Addendum Division 5.1 Guidelines for Schools by DPHI
- National Construction Code (NCC) Section J Energy Efficiency
- Principles of the Educational Facilities Standards and Guidelines (EFSG)

2. CERTIFICATION OF EVIDENCE

Details of the person who has certified the evidence and information provided in this report are below.

Full Name of Mechanical or Electrical Engineer:	Sam Daher (Project Mechanical Engineer)
Signature:	
Qualifications:	B.Eng. Mechanical Engineering, 2013, Notre Dames University Lebanon Master of Project Management, 2014, University of Sydney
Address:	JHA Level 20, 2 Market Street, SYDNEY NSW 2000
Business Telephone No:	(02) 9437 1000
Name of Employer:	JHA

3. PROPOSED SYSTEMS AND EQUIPMENT

3.1 MECHANICAL SERVICES

The mechanical system is designed to operate without the use of on-site fossil fuels.

The air conditioning system will be designed for all spaces intended with a continued occupancy rate to be provided with cooling/heating throughout the year.

The air conditioning is proposed to be provided with a variable refrigerant flow/volume (VRF/VRV) energy recovery polyvalent heat pump air conditioning system for space cooling and heating. The VRF/VRV system consists of two heat exchangers, providing simultaneous heating and cooling to multiple indoor units. Three pipe (Heat Recovery) systems allow for either heating or cooling in the different indoor zones.

The comms room and MSB room shall be served by dedicated split A/C systems designed to operate on cooling only and on a 24/7 operation schedule.

Air diffusion design for the air conditioning and ventilation systems ensures a proper combination of temperature and air movement within the occupied space. The design intent is to provide supply air to the rooms through the strategic placement of the grilles, wall-mounted units and cassette units to achieve uniform air distribution and condition within the space.

Energy recovery ventilators (ERV) will be provided to all air conditioning systems to precondition the outside airflow before being supplied to the zones through the fan coil units. The ERVs shall be air-to-air type heat exchangers with outside air intake from weatherproof louvres located on the building perimeter façade or via roof cowls and cross-flowed with return air from the zones being served. Installation of the ERV shall be concealed within the ceiling space with the outside air and return air to be connected to the unit with a rigid duct.

3.1.1 HVAC SYSTEM

Proposed Air Conditioning System

Teaching Spaces and Support Learning Units

A mixed-mode solution in line with EFSG requirements is proposed. This involves two modes for ventilation and air space temperature control. When outside conditions are suitable, spaces will be naturally ventilated via operable windows which in addition to providing fresh air will also provide a level of natural cooling for internal temperature control. When conditions are not suitable, VRV/VRF concealed fan coil units will provide cooling/heating and mechanical outside air ventilation to the spaces.

CO2 monitoring/control is proposed. When CO2 levels are above the EFSG threshold, an indicator light will illuminate. To reduce the CO2 concentration, when in natural ventilation mode, occupants can open the windows for increased outside air. If the system is operating in mechanical air conditioning mode, the mechanical outside air flow rate will automatically increase until the CO2 levels drop.

Each learning space will be provided with a wall-mounted control. The air conditioning shall be activated/deactivated manually from the control panel. Once activated the system will run until deactivated or stop automatically after a maximum period of 2 hours.

All condenser units are proposed to be located in a dedicated plant area on the ground level (exact location TBC).

Canteen Room

The canteen room is air-conditioned via a ducted concealed unit. The room temperature control will be via the AC unit's proprietary wall-mounted controller.

Admin Areas

The admin building is air-conditioned via ceiling ducted AC units and ceiling cassette AC units. The rooms are naturally ventilated or provided with mechanical ventilation for internal rooms with energy recovery units to pre-condition the outside air as required.

Comms Rooms

The comms room shall be provided with a dedicated cooling only split type air conditioning system. Split-type air conditioning systems consist of two parts: an indoor unit, which contains the evaporator component, and an outdoor unit which houses the compressor and condenser components. Cooling mode only units shall be selected for this application.

The two units are connected by an insulated refrigerant pipework. Split systems are quiet, easy to install and have a smaller outdoor unit footprint.

The comms room indoor unit will be a wall mounted type unit, due to the configuration of the comms room to provide the most optimal coverage of air conditioning coverage for the equipment. The side discharge condenser unit shall be located within the same plant enclosure area as the heat recovery condensers for ease of access during future maintenance and repair works.

Location of Plantroom Spaces

The condenser units will be installed on the top floor of each of the buildings. The refrigerant pipework will reticulate via dedicated fire rated risers to connect to fan coil units on each level.

Hall Area

The hall and stage areas are proposed to be naturally ventilated via motorised louvres with a free area to comply with NCC and Green Star requirements and assisted by roof ventilators fitted with electric dampers to provide effective summer ventilation. Dampers shall be controlled via a wall mounted switch located in the office area to allow staff to close the ventilators in winter.

The hall is proposed to be provided with heating via electric radiant heaters hung from the roof's structure.

Ventilation

Admin Spaces, Offices, Staff Rooms, Corridors, and Seminar Rooms

These spaces are proposed to be mechanically ventilated with mechanical outdoor air to AS1668.2 and Green Star requirements.

Amenities, Toilets, Change Rooms, Laundry and Cleaner's Store Ventilation

Exhaust from the toilets and accessible toilets are proposed to be drawn through a roof mounted exhaust cowl on the roof or façade weatherproof louvre and in-line fan located in the ceiling space. Make-up air is via undercut doors/door grilles or transfer air ducts drawing air directly from adjacent space. The toilet exhaust fan shall be interlocked with light switches and motion detectors to operate for 10 min (adjustable) run on timers.

Store Exhaust Ventilation

Storerooms are proposed to be naturally ventilated via operable windows/doors to achieve NCC and Green Star requirements. Otherwise, if natural ventilation is not possible, it is proposed to be provided with a mechanical ventilation system with ceiling mounted exhaust grille and in-line fan located inside the ceiling space, with discharge at a high level through the roof cowl or façade weatherproof louvre. Make-up air shall be via undercut doors/grilles, transfer ducts to adjacent spaces or weatherproof louvres if located along the building perimeter. The store exhaust fans shall be set to operate on a time schedule to be agreed with the school.

Kitchen Exhaust Ventilation

The canteen and staff kitchen areas shall be provided with a residential type exhaust system consisting of exhaust grille, in-line fan located inside the ceiling space and exhaust discharge at a high level through the roof cowl. The kitchen exhaust system shall operate via a wall mounted on/off switch.

Make-up air shall be provided with mechanical ventilation from an energy recovery unit (ERV) and discharged directly into the space via a ceiling grille. This would require an interlock between the ERV unit and the kitchen exhaust fan.

ERV units will also be serving adjacent fan coil units, and the fan coil unit O/A demands would take priority over the kitchen relief. When ERV is operating but the kitchen exhaust is off, relief air shall be via undercut door/grilles or transfer ducts to circulation areas.

If the kitchen exhaust fan is turned off with the wall switch and adjacent FCUs are still operating, the ERV shall not trip off.

Client to advise and confirm the school's usage scenario for the kitchens and the need for the ventilation designed to a commercial type kitchen setup.

Lift Shaft

The lift shaft is proposed to be served via a mechanical exhaust ventilation system that consists of a roof mounted fan, duct, low level make-up air weatherproof louvre located at low level and temperature sensor control. The fan shall operate only when the temperature inside the lift shaft exceeds a pre-determined set temperature. The fan and duct are proposed to be located on the roof.

Print Room

The print room is proposed to be served via a mechanical exhaust ventilation system that consists of an in-line fan, duct, extraction ceiling grille and weatherproof louvre. The fan shall operate on a time schedule to suit the school's operation hours.

3.2 HYDRAULICS SERVICES

The hydraulics system is designed to operate without the use of on-site fossil fuels. Refer to external consultant's reports.

3.3 ELECTRICAL SERVICES

The electrical system is designed to operate without the use of on-site fossil fuels.

Wilton is within the Endeavour Energy (EE) electrical distribution network. The new primary school, being a green field project, has no current connection to the Endeavour Energy network. There are currently overhead 66kV transmission assets reticulating through the very north of the site and proposed underground 11kV feeders available to the south, external to the school site.

3.3.1 EXISTING TELECOMMUNICATIONS SERVICES

Telecommunications Incoming Services

195A Fairway Drive, Wilton (DP1293737) is proposed to be connected to NBN into the new campus distributor. JHA understands that Schools Infrastructure NSW is coordinating with telecommunication authorities to allow an NBN connection to be provided to this site. JHA will allow for type P5 lead in pits within the school boundary to allow the NBN fibre cabling to route to the school's Main Communications Room.

As the site is greenfield, there are no existing utilities within the proposed site and a Telstra NBN connection will need to be routed from the closest practicable point.

3.3.2 PROPOSED TELECOMMUNICATIONS SERVICES

Telecommunications Early Enabling Works

A new site main communications room is proposed to be built for the new activity. The new site main communications room location has taken consideration of potential future activity. The site main communications room is located adjacent to the UPS building (departs from typical EFSG requirements requiring MCR to be housed within the library).

Building Communications rooms shall be designed and located such that all routes to data outlets are within the EFSG requirements.

Campus Distributor / Building Distributor

Campus Distributor

A new campus distributor (4-off communications racks) will be installed in the new site main communications room. The campus distributor shall be served via a new fibre lead-in cable.

The main communication room shall be sized to house 3 cabinets and a spare cabinet for future expansion as per the EFSG. The arrangement of cabinets and equipment is to be based on the EFSG typical spatial and equipment layout.

The campus distributor shall then feed all other building distributors throughout the new primary school via the school backbone fibre.

Building Distributor

To comply with SINSW Structured Cabling System Specification, the multi-level building requires a minimum 1-off building communications room per level. The building communications room shall be located centrally with a 70m radius cabling length requirement.

The building communications room shall be sized to house 1 cabinet if the BCR supplies less than 160 data outlets and 2 cabinets if the BCR supplies more than 160 data outlets as per the EFSG, based on the arrangement and size of the cabinet, the proposed size of the building communications room is: 3m (W) x 2.8m (D).

3.3.3 EV CHARGING

To meet NCC2022 compliance, provisions are required to be made to provide power to at least 20% of car parking spaces within the new car park. Given the masterplan design has allowed for 61 parking spaces associated with the primary school and 18 spaces associated with the UPK, this means that provision for 13 EV chargers to the primary school carpark and 4 chargers to the UPS carpark will need to be allowed for to meet NCC requirements. The below shows the NCC requirements.

(2) Electrical distribution boards dedicated to serving electric vehicle charging in a *carpark* must—

(a) be fitted with a charging control system with the ability to manage and schedule charging of electric vehicles in response to total building demand; and

(b) when associated with a Class 2 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 12 kWh from 11:00 pm to 7:00 am daily; and

(c) when associated with a Class 5 to 9 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 12 kWh from 9:00 am to 5:00 pm daily; and

(d) when associated with a Class 3 building, have capacity for each circuit to support an electric vehicle charger able to deliver a minimum of 48 kWh from 11:00 pm to 7:00 am daily; and

(e) be sized to support the future installation of a 7 kW (32 A) type 2 electric vehicle charger in —

(i) 100% of the car parking spaces associated with a Class 2 building; or

(ii) 10% of car parking spaces associated with a Class 5 or 6 building; or

(iii) 20% of car parking spaces associated with a Class 3, 7b, 8 or 9 building; and

3.3.4 ONSITE RENEWABLE ENERGY

Based on EFSG DG66 (Photovoltaic Solar Power requirements), a 35-core school is to be installed with a 70kW solar system (approximately 144-off 500w panels). JHA notes that the weight of the solar panels will have an impact on structural and architectural master planning, as solar panel weights, locations (preferably facing north) and supporting equipment (inverters) must be catered for such an installation. It is expected that the solar installation will be located on the roof of the Block A building. JHA also note that an additional ~12 panels of solar will be installed in order to achieve Green Star requirements and offset the mechanical heating loads within the hall.

66.3.1 System Size

For a new school provide the system size as tabled below:

Primary School	Secondary School	SSP
Up to 7 core - 10 kW system	Up to 4 stream - 70 kW system	No hydrotherapy pool - 20 kW system
14 core - 25 kW system	7 stream - 90 kW system	Hydrotherapy pool onsite - 45 kW system
21 core - 40 kW system	9 stream and above - 99 kW system	
28 core - 60 kW system		
35 core- 70 kW system		

3.3.5 MAXIMUM DEMAND CAPACITY (CURRENT DESIGN)

JHA have assessed the project floor yield, area, proposed use and carried out a maximum demand calculation to assess its impact on current infrastructure onsite.

The proposed new building will include admin/staff area, hall, general learning space, labs, library, and Air-Conditioning to most internal spaces.

Based on past/recent projects of similar sites, and taking into consideration of the above, below is the anticipated maximum demand for the site.

Table: Preliminary Maximum Demand (Based on 2.5 Masterplan)

Maximum Demand Calculations

JHA

DOC BY :	DW
JOB No :	220295
DATE:	17/09/2024

Name	kVA	Amps / Phase
Internal Load (New Buildings)	842.69	1172.35
New EV Charger Load (17-off)	100.63	140.00
15% spare capacity required by EFSG	141.50	196.85
Overall Maximum Demand	**1084.81**	**1,509.2A**

This allowance is based on:

- Estimated mechanical loads (AS3000 only table C3. With full air-conditioning system in all student spaces – including Admin and the Hall (Future AC provision only);
- Power Provisions to EFSG specifications
- EV requirements as per NCC 2022
- Comms room sizing to ESFG requirements.
- Knowledge and experience of similar sites.

Based on estimated load allowances and assumed air-conditioned areas, we estimate the site maximum demand will be in the order of 1509.2 Amps/Phase.

3.3.6 SUBSTATION AND MAIN SWITCHBOARD

Establishment of New Padmount Substation and New Main Switchboard

In consideration of the potential maximum demand load calculated for the new primary school in Lot 102, DP1293737, a new 1500 kVA padmount substation and a new main switchboard are proposed to be installed on site.

Proposed Endeavour Energy Infrastructure	Approx. Firm Amp Rating	Approx. Firm kVA Rating
1500kVA Padmount Substation	2,165A	1.5 MVA
Total Capacity	**2,165A**	**1.5 MVA**
Required Capacity		**~1.1 MVA**
Spare Capacity		**~0.4 MVA**

Substations are a standard fixed size from Endeavour Energy and are only available in discrete step sizes. These discrete step sizes are quite large, which yields the spare capacity noted above.

The new 1500kVA Padmount Substation that is proposed for the new school site is to have a 3,200A circuit breaker installed to supply the site, derated by the authority to 2,200A, to provide a maximum of 2,165A supply to the site. The proposed Main Switchboard SPD is advised to be set at a minimum of 1600 Amps to allow for grading with the upstream Endeavour Energy substation circuit breaker.

HV Connection Arrangements

To provide electrical supply connections to the proposed padmount substation on site, it is proposed that the existing Endeavour Energy underground HV feeders located to the south of the site be extended. The HV feeder WT1252 supplied by the Wilton Zone substation will be extended from existing substation 96430 to loop the proposed substation. This arrangement is subject to suitable spare capacity in the existing 11kV HV feeder and Endeavour Energy design acceptance.

A point of LV backup connection is to be provided between the proposed substation and the existing LV network supplied, if required by Endeavour Energy.

Should Endeavour Energy determine new HV feeder infrastructure is required to be installed at the site for the indicated load demands (due to a lack of capacity within the HV feeders as proposed above), this will likely be from the existing Zone Substation within the vicinity (~5 km away) and will likely involve large trenching works. This arrangement will be avoided where possible.

A formal application will be submitted to Endeavour Energy to determine the available capacity in the existing HV network and to confirm the viability of the proposed substation infrastructure for the site.

New Padmount Substation

The design team has considered several options for substation arrangements and has determined the new Endeavour Energy infrastructure will be required in the form of a new padmount substation as per the below typical arrangement.

The location of the substation is proposed at the northeast corner of the site adjacent to the site boundary and the proposed carpark.

3.4 FOSSIL FUEL FREE SITE

Based on the information provided, the proposed activities is 100% fossil fuel-free. Currently, there are no on-site mechanical, electrical or hydraulic equipment present on the site.

The activity has provided evidence that no use of on-site fossil fuels after the occupation and use of the site commence.

4. ENERGY EFFICIENCY DESIGN FEATURES

4.1 SUSTAINABLE DESIGN FRAMEWORK

The sustainable design framework applied to this activity will ensure that best practice ESD design initiatives covering energy, water and transport considerations have been incorporated into the design. The ESD initiatives have been compiled based on the following construction codes and rating tools:

- National Construction Code (NCC) 2022 Section J – Energy Efficiency;
- Green Star Buildings v1
- Principles of the Educational Facilities Standards and Guidelines (EFSG)

These ESD initiatives and targets are to be incorporated into the design of the project during the detailed design by the design team.

4.1.1 NCC2022 SECTION J ENERGY EFFICIENCY

The objective of NCC Section J is to reduce greenhouse gas emissions in the built environment. The current version of the construction code is NCC2022, which became mandatory on 1 May 2023, is significantly more stringent than the previous version of NCC and as such will deliver more energy-efficient buildings. Section J comprehensively covers all major factors that will impact a building's energy usage, including building fabric, building sealing, air-conditioning & ventilation systems, artificial lighting & power, heated water supply & swimming pool plant and facilities for energy monitoring. For the proposed activities, Section J is applicable to the Class 9b school portions of the activity.

4.1.2 EFSG

The Educational Facilities Standards and Guidelines (EFSG) have been developed by the NSW Department of Education, to assist in the management, planning, design, construction and maintenance of new and refurbished school facilities. The EFSG is to be treated as a reference guide that provides a starting point to allow for a consistent standard of delivery across various types of school.

4.1.3 GREEN STAR

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

The Green Star framework incorporates ESD principles that are categorized into eight categories. Points are awarded across each category for ESD initiatives that are incorporated into the project. The GS buildings documentation is then verified through two rounds of independent assessments by the Green Building Council of Australia (GBCA). This section outlines the pathway for Wilton Junction Public School to achieve a 5-star certified rating under the GS Buildings v1.

4.2 ENERGY EFFICIENCY INITIATIVES

4.2.1 BUILDING ENVELOPE

Intelligent design and material selection ensure that thermal comfort is not entirely achieved by mechanical means. Passive design initiatives such as performance glazing, shading and the use of insulation will reduce demand on mechanical air conditioning systems resulting in a reduction in energy consumption and greenhouse gas emissions.

Building Envelope Performance

The building fabric will be designed to meet or exceed the NCC 2022 Section J requirements for the building envelope. Thermal breaks will be incorporated into walls, floors, and roofs where appropriate to ensure a continuous thermal barrier on the building envelope, reducing the flow of thermal energy between conductive materials.

The indicative results on total construction R-value requirements demonstrating compliance with NCC 2022 Section J are provided below.

Building Fabric & Glazing

The building fabric will be designed to provide a 10% improvement from the NCC 2022 Section J Part J4. The minimum performance requirements obtained under Section J Deemed m-to-Satisfy provision, coupled with 10% additional for the activity (Class 9b) at the proposed location (Climate Zone 6) as per the NCC 2022 Section J - Energy Efficiency are below.

Building Elements	Indicative NCC 2022 Requirements (with 10% improvement)
Envelope Roof/Ceiling	Total R-Value of 3.6 (Downwards, Light Colour Roof Solar absorptance of the upper surface of a roof must be not more than 0.40)
Envelope Walls	Total R-Value of 1.6
Envelope Floors	Total R-Value of 2.2 (Downwards)

Note: The impact of thermal bridging must be considered within the total R-value calculation under NCC2022.

This will necessitate the use of insulation in the walls, floor, and roof for the building fabrics. Insulation reduces heat flow and consequent heat loss in winter and heat gain in summer. This minimises the heating and cooling load demand on the air conditioning systems. Light-coloured roof material with a low solar absorptance (SA) is recommended to be used to isolate more sunlight and reduce summer heat gain. It also has the effect of reducing elevated localised temperatures (the heat island effect) and potentially can improve the efficiency of solar PV panels as they perform more efficiently in reduced temperatures.

Glazing is a major source of unwanted heat gain in the summer and can cause significant heat loss in the winter due to its low insulation performance. It is thus recommended that windows be high-performance glazing systems. Performance glazing substantially reduces heat transmission. This particularly reduces heat loss in winter; therefore, internal heat gain from equipment, lighting and people are better contained. Also, performance glazing absorbs the infrared portion of sunlight and reduces the amount of heat transferred into the conditioned space. This will correspond to a reduction of both heating and cooling loads.

The building will be designed to comply with NCC 2022 Section J Energy Efficiency and Green Star. The detailed Section J assessment will be carried out during schematic design stage.

4.2.2 SHADING AND DAYLIGHTING

Solar access can enhance indoor environmental quality through access to daylighting and reduce lighting energy consumption. However, excessive solar access and hence, direct solar radiation heat can increase HVAC energy demand and can also cause thermal discomfort. The passive solar heating principle which aims to prevent solar heat gain in the summer and harvest it in the winter for a free source of heating, and the Passive cooling principle which prevents heat from entering the building during the summer months, are strategies that can conveniently take advantage of the site-specific solar access for optimised indoor environmental quality and reduction of HVAC energy demand through the use of tailored shadings.

The proposed building is to be designed to make the best use of the sun by using external high-performance horizontal eave shading to prevent the high summer sun from entering the building whilst allowing the low winter sun to enter the building for passive heating.

These passive design features allow for enriched daylighting and greater access to external views for occupants. Additional daylighting reduces the reliance on artificial light and benefits alertness, mood, and productivity. External views provide a connection to nature and the building and help to create an environment encouraging constructive experience.

4.2.3 NATURAL VENTILATION

Adequate natural air movement makes an important contribution to creating a comfortable indoor environment and reducing the need for mechanical ventilation by carrying accumulated heat out and replacing it with cooler external air. This is important during the summer months where heat build-up within spaces can be quickly removed with the availability of suitable breeze at the site.

The design team proposed to utilise natural ventilation and air circulation through operable windows.

4.2.4 ENERGY EFFICIENCY

Each climate zone under the Building Code has different design and conditioning requirements to minimise energy use for heating and cooling. A good balance of heating and cooling reduction techniques is required to create an energy-efficient activity.

Heating, Cooling and Ventilation Systems

The air-conditioning and ventilation systems shall be designed to comply with and exceed the minimum requirements of NCC 2022 Section J6 requirement.

The occupied spaces will be having high-efficiency air conditioning as required. Air-cooled heat rejection system to be used as this will help minimise the impacts associated with harmful microbes (e.g. Legionella impact).

All bathrooms/toilets, laundries (if any), and general exhaust are to be naturally ventilated where possible, with mechanical ventilation required where necessary. The design will have a sufficient amount of exhaust fans to ensure liveability for the building users.

The control of the air conditioning system shall be designed to minimise energy consumption. Further, high-efficiency equipment for the HVAC system will be selected to assist with the energy conservation of the building.

Ductwork systems will be designed to reduce system pressure losses to reduce fan motor power. This includes the selection of equipment for reduced coil and fittings drops and being generous with ductwork sizes to reduce friction losses.

Lighting

Lighting is to be designed to comply with NCC 2022 Section J7. Also, the Lighting illumination density is to be according to NCC2022 Section J7D3. Fittings incorporating the latest lamp technologies to be installed to minimise energy use and provide efficient artificial lighting systems. The proposed activities shall be illuminated using LED fittings and be controlled via an automatic control system with timer controls, PIR occupancy sensors and microwave occupancy sensors.

Lighting in regularly occupied spaces shall be provided with a daylight sensor (PE Cells) to reduce light output or turn off lights when sufficient daylight is provided within the space. For large spaces, perimeter lighting shall be designated in a separate zone to make maximum use of daylight.

All the external luminaires proposed will be according to AS 4282:1997. This will make sure that the external luminaires do not emit light pollution to the night sky above a given benchmark.

Controls

All HVAC installed shall be controlled by the HVAC group controller. Closed spaces such as storage rooms and cleaners' cupboards are to be provided with a wall switch. For BOH areas (not task-specific areas) PIR sensors are to be provided. Voltage control (dimming) should be provided where appropriate.

Electricity Metering

Electricity metering and sub-metering shall be specified in accordance with Section J and Green Star requirements to monitor and manage electricity consumption in the building. Sub-metering is to be provided to distinct locations (e.g. PV generation)

Photovoltaics

Collecting solar energy has been chosen as a key ESD strategy for the project, with an aspirational goal of reducing the building's energy consumption and greenhouse gas emissions from a renewable source via the provision of a roof-mounted photovoltaic system. The size of the PV system is to be calculated by the electrical consultant.

4.2.5 TRANSPORT

Low-Emission Vehicle Infrastructure

The activity is to provide a dedicated infrastructure to support the uptake of low-emission vehicles by providing dedicated EV parking spaces and bicycle parking facilities. EV parking spaces to provide necessary electrical infrastructure and spatial allocation to support future installation of EV charging. The project to focus on reducing private vehicle use and encouraging walking by implementing an efficient Sustainable Transport Plan.

5. ESTIMATED ENERGY CONSUMPTION AND EMISSIONS

School Infrastructure NSW, as part of the NSW Department of Education, as the tenant and building owner of NSW Public schools, have committed to the following environmental targets:

Electricity Target

- 35kWh / GFA (m2) / year at Public (Primary) Schools and High Schools
- 45kWh / GFA (m2) / year at Schools for Specific Purposes

These targets were not established specifically for compliance with Green Star credits by projects, but general energy management of all NSW Public Schools. They are included in a portfolio wide Environmental Performance Plan and referenced in School Infrastructure NSW's Educational Facilities Standards and Guidelines for projects.

Existing procedures required by the NSW Government Resource Efficiency Policy are used to measure the performance targets through monitoring and analysis of:

- Electricity metering and bills (monthly or quarterly invoices are currently available for all NSW schools through the NSW Government Electricity Contracts 776 & 777).
- Monthly or quarterly reporting of energy consumption communicated to school staff through an online portal.

The following assumptions are considered to calculate the estimated energy consumption and emissions:

- Site Area: 34000 m2
- Gross Floor Area: 7886 m2
- No. of Staff: 35
- No. of ELC Students: 58
- No. of Primary Students: 522

Estimated Energy Consumption and Emission:

Based on the above assumptions and the SINSW electricity targets, the estimated energy consumption and emissions are as below.

- Total Estimated Grid Electricity Consumption: 277,010 kWh/annum
- Total Estimated Gas Energy Consumption: 0 MJ/annum
- Total Estimated Oil Energy Consumption: 0 L/annum
- Total Estimated Energy Intensity: 126.5 MJ/m2
- Scope 1, 2 and 3 Reporting Emissions: 202,217 kgCO2-e/annum
- Scope 1 & 2 Reporting Emissions: 188,367 kgC02-e/annum

6. CONCLUSION

A Net Zero Statement has been prepared for the proposed primary school located at 200 Fairway Drive, Wilton NSW 2571 to demonstrate the activities is designed to operate without the use of on-site fossil fuels and that there are no long-term effects on the environment in accordance with *the Guidelines for Division 5.1 assessments (the Guidelines) by the Department of Planning, Housing and Infrastructure* (DPHI) as well as the *Addendum Division 5.1 guidelines for schools*.

6.1 MITIGATION MEASURES

The following table captures all measures required to be implemented as a result of the Net Zero Statement and the Table from Section 1.2 of this report.

Project Stage	Mitigation Measures	Reason for Mitigation Measure	Section of Report
Design, Construction & Operation	Proposed systems and equipment designed to operate without the use of on-site fossil fuels	To ensure the project is designed to be Net Zero	Section 4
Design, Construction & Operation	As-built system confirms no on-site fossil fuels are used.	To ensure the project is designed to be Net Zero	Sections 5 & 6

6.2 EVALUATION OF ENVIRONMENTAL IMPACTS

With regards to the tables from Sections 1.2 & 6.1, the environmental impact caused by the activity is adequately mitigated through the recommended measures and the activity will not have *'significant impact on the environment'* (refer to Section 5.7 of the EP&A Act). To conclude,

- The extent and nature of potential impacts are low and will not have a significant impact on the locality, community and the environment.
- Potential impacts can be appropriately mitigated or managed to ensure that there is minimal impact on the locality, community and/or the environment.