SUSTAINABLE DEVELOPMENT PLAN

Upgrades to Kingswood Public School
NSW Department of Education

CONFIDENTIAL

Revision: 2.3 – SCHEMATIC | **Issued:** 5 March 2025

Document name: KIPS-NDY-B00M-ZZ-RP-V-0003

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VERIFICATION

REVISION	DATE ISSUED	PREPARED BY	VERIFIED BY	AUTHORISED BY	COMMENT
1.0	31/10/2024	Richard Burton	Justin Peberdy	Jarrad Underwood	Concept Design – Issued for comment
2.0	18/12/2024	Richard Burton	Justin Peberdy	Jarrad Underwood	Schematic Design
2.1	07/01/2025	Richard Burton	Justin Peberdy	Jarrad Underwood	Schematic Design
2.2	12/02/2025	Richard Burton	Justin Peberdy	Jarrad Underwood	Schematic Design
2.3	05/03/2025	Richard Burton	Justin Peberdy	Jarrad Underwood	Schematic Design

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CHANGE LOG

REVISION	VERSION	COMMENT
2.0	Schematic Design	General updates based on design development 5-Star Green Star target removed due to changes to project scope
2.1	Schematic Design	Minor updates to reflect comments received
2.2	Schematic Design	Minor updates to reflect comments received
2.3	Schematic Design	Minor updates to reflect comments received

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1 INTRODUCTION

This Sustainable Development Plan (this is equivalent to an ESD report) has been prepared to support a Review of Environmental Factors (REF) for the NSW Department of Education (DoE) for Kingswood Public School upgrade (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 3.37 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 identify all the sustainability initiatives that are proposed and under consideration for the development.

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 LANDOWNER

The Minister for Education and Early Learning is the landowner.

1.3 BACKGROUND INFORMATION

The project is seeking approval for a Development Without Consent (REF) application under Part 5 of the EP&A Act.

1.4 SITE DESCRIPTION

The project site is located at 46-54 Second Avenue, Kingswood and is legally described as Lot 172 in Deposited Plan (DP) 839785. Kingswood Public School is located on the southern side of Second Avenue.

1.5 PROPOSED ACTIVITY DESCRIPTION

The proposed activity for upgrades to Kingswood Public School includes:

- One (1) new single storey classroom building comprising eight (8) general learning spaces (GLS), two (2) learning commons areas, two (2) multi-purpose spaces and a verandah along the eastern side of the building;
- The construction of a covered walkway that will provide a connection between the proposed classroom building and an existing covered outdoor learning area (COLA) to the north east of the proposed building; and
- Removal of existing portable classroom buildings containing ten (10) classrooms.

1.6 MITIGATION MEASURES

Mitigation measures are detailed within the relevant discipline reports.

1.7 EVALUATION OF ENVIRONMENTAL IMPACTS

Evaluation of Environmental Impacts are detailed through relevant discipline reports.

2 EXECUTIVE SUMMARY

NDY has been engaged by NSW Department of Education (DoE) to develop a Sustainable Development Plan (SDP) for the proposed upgrades to Kingswood Public School.

The principal objective of this report is to address the minimum requirements set out in the following:

- Clause 193 and s171(2) of Division 5 of the Environmental Planning and Assessment Regulation 2021
- SINSW *Sustainable Development Practice Note*
- SINSW Education Facilities Standard and Guideline (EFSG)
- Government Architect NSW (GANSW) Design Guide for Schools and Environmental Design in Schools Manual
- NSW Government Resource Efficiency Policy (GREP 2019)

The project will be designed and delivered in line with the standard NSW DoE sustainability brief, detailed in the NSW DoE Sustainable Development Practice Note, with key scope including:

- SINSW EFSG compliance
- NCC Section J compliance

Through early design input from sustainability professionals, key initiatives incorporated in the proposed activity include:

- Passive design elements, such as high-performance façade, effective shading and natural ventilation to reduce the energy demand of the buildings and improve indoor environment quality for students and staff.
- Energy efficient building systems and on-site renewable energy to reduce greenhouse gas emissions.
- Consideration of the building design's resilience and adaptation to climate change impacts.
- High indoor air quality, acoustic design principles, visual amenity and thermal comfort to support the site functions as training and teaching spaces and private staff areas.
- Best practice waste management principles in operation, and construction and demolition waste diversion from landfill.
- Water efficient fixtures and fittings (high WELS ratings)
- Incorporation of stormwater management systems and water sensitive urban design (WSUD) to minimise peak stormwater flows and pollutants.

The ESD initiatives of the proposed activity will be verified through the ESD schedule to be coordinated with the design team, and verified by SINSW and the D&C Contractors.

3 PROJECT SUMMARY

Refer to 1.5 Proposed Activity Description for a summary of the project activities.

3.1 PURPOSE OF THIS REPORT

The principal objective of this report is to detail the sustainability strategy of the proposed activity, in order to address the minimum requirements set out in the following:

- Clause 193 and s171(2) of Division 5 of the Environmental Planning and Assessment Regulation 2021
- SINSW *Sustainable Development Practice Note*
- SINSW Education Facilities Standard and Guidelines (EFSG)
- Government Architect NSW (GANSW) Design Guide for Schools and Environmental Design in Schools Manual
- NSW Government Resource Efficiency Policy (GREP) 2019

3.2 PROJECT DESCRIPTION

Refer to Figure 1 and Figure 2 for an overview of the design.

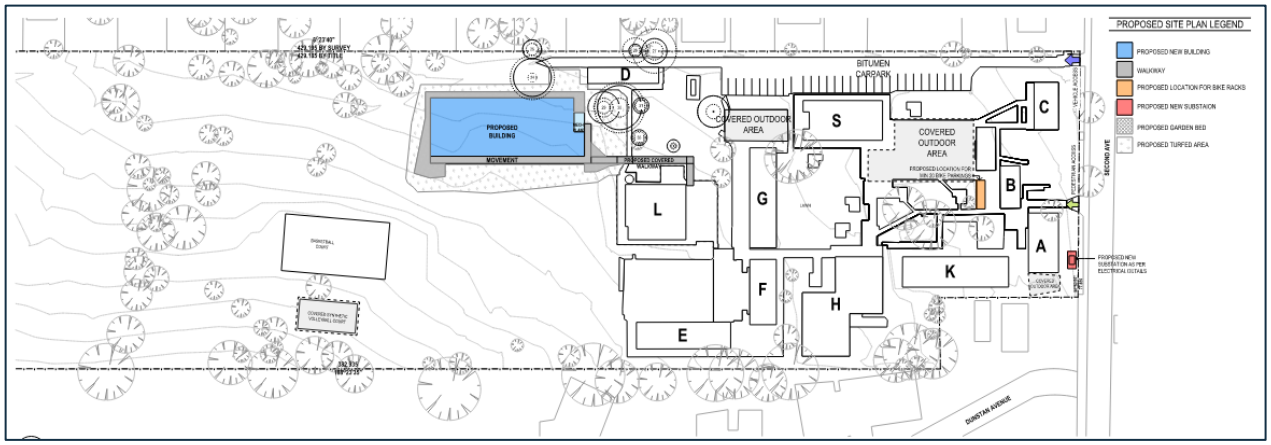

FIGURE 1 – PROPOSED SITE PLAN REVISION 06

FIGURE 2 - AERIAL PHOTORAPH

3.3 INFORMATION SOURCES

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

- Clause 193 of Division 5 of the Environmental Planning and Assessment Regulation 2021
- NSW Department of Education – School Infrastructure documents:
  - Sustainable Development Practice Note
  - Education Facilities Standard and Guidelines (EFSG) – Design Guide
  - GANSW Design Guide for Schools
  - GANSW Environmental Design in Schools Manual
  - DFMA Guidelines
- NSW Government Resource Efficiency Policy (GREP) 2019
- National Construction Code (NCC) 2022 Section J
- Architectural drawings prepared by Fulton Trotter Architects
- Discussions and feedback with the design team.

4 SUSTAINABILITY PRINCIPLES

The following section of the report details how the proposed activity responds to the relevant sustainability principles as defined in Clause 193 and s171(2) of Division 5 of the Environmental Planning and Assessment Regulation 2021.

4.1 THE PRECAUTIONARY PRINCIPLE

The design has been reviewed against holistic sustainability principles to ensure a robust sustainability outcome is delivered. The sustainability initiatives proposed for the new Kingswood Public School activity aims to reduce the environmental impacts typically associated with buildings during the construction and ongoing operation of the building.

Sustainability measures have been incorporated, spanning across the activity's design, construction and operations, based around the core principles of:

- Efficient use of resources (energy, water and materials)
- Enhancing indoor environment quality and occupant comfort
- Minimising ecological impacts.

The head contractor will implement an Environmental Management Plan (EMP) ensuring there will also be a systematic approach to environmental considerations throughout construction.

A climate change risk assessment was conducted in November 2024 to assess the anticipated impacts of climate change and implement design strategies to mitigate these impacts. Refer to Section 7 for details.

4.2 INTER-GENERATIONAL EQUITY

Student and staff health has been considered through the incorporation of indoor environmental quality design features such as daylight and glare analysis for natural lighting, best-practice lighting design, indoor air quality, thermal comfort assessment, acoustic design, and responsible material selection to reduce internal pollutants and resource depletion for future generations.

In relation to cultural diversity, the project will aim to incorporate the NSW Department of Education organisational Reconciliation Action Plan and use it as an opportunity to further embrace the objectives, including:

- Procurement of all materials and labour will be in accordance with the NSW DoE Aboriginal Procurement Policy and NSW DoE Main Works 21 Preliminaries - Section 4.4 'Aboriginal Participation'

Universal design principles will be implemented to provide safe, equitable and dignified access for persons with disabilities. Conservation of Biodiversity and Ecological integrity

The proposed design considers design strategies to minimise the urban heat island effect, such as the use of light-coloured external finishes. High quality access to external views will be considered to increase student engagement with the natural environment.

Construction and operational environmental management systems and plans will be detailed and implemented by the head contractor.

4.3 IMPROVED VALUATION, PRICING, AND INCENTIVE MECHANISMS

Total cost of operation will be reduced through sustainable considerations to reduce energy, water and waste requirements, taking into consideration whole-of-life costing. The project will ensure sustainable principles are extended to include value for money, fit for purpose, long term reliability/resilience and flexibility. Designing with the long-term operation of the building in mind will create further buy-in and cooperation from the operating stakeholders. Strategies to reduce operational waste have been considered such as the development of an operational waste management plan and separation of waste streams.

5 SUSTAINABILITY FRAMEWORKS & LEGISLATION

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

5.1 NCC SECTION J

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 sets out the minimum energy efficiency requirements for all commercial buildings in Australia.

The activity will achieve compliance with NCC 2022 (as required) Section J either through Deemed-to-Satisfy (DTS) Provisions, or a Performance Solution J1V2, J1V3 or similar.

5.2 EDUCATIONAL FACILITY STANDARDS AND GUIDELINES (EFSG)

The Educational Facilities Standards and Guidelines (EFSG) are intended to assist those responsible for the management, planning, design, construction and maintenance of new and refurbished school facilities. The EFSG is a suite of information compiled into Design Guides to aid in the planning, design and use of NSW Department of Education school facilities.

The guides aim to provide functional and durable facilities within a systematic whole of life, value for money framework that takes into account enhancement of learning and teaching, planning and development, sustainability and facilities management.

The activity will achieve compliance with all relevant sustainability items required by the EFSG with no ESD related departures identified at the current stage of design.

5.3 NSW GOVERNMENT RESOURCE EFFICIENCY POLICY (GREP)

The aim of the NSW Government Resource Efficiency Policy (GREP) is to reduce the NSW Government's operating costs and lead by example in increasing the efficiency of its resource use.

The policy intends to drive resource efficiency by NSW Government agencies in four main areas – energy, water, waste and air emissions from government operations. The policy describes measures to achieve set targets and minimum standards.

5.4 GOVERNMENT ARCHITECT NSW ENVIRONMENTAL DESIGN GUIDE FOR SCHOOLS

The Government Architect NSW (GANSW) released an Environmental Design in Schools Manual which illustrates a set of design principles as guidelines to follow for new development and expansion of schools. The design principles from the GANSW Design Guide for Schools include:

- Context, Built Form and Landscape
- Sustainable, Efficient and Durable
- Accessible and Inclusive
- Health & Safety
- Amenity
- Whole of Life, Flexible and Adaptive
- Aesthetics

5.5 ENVIRONMENTAL PLANNING AND ASSESSMENT REGULATION 2021

Environmental Planning and Assessment Regulation 2021 is a planning tool that captures NSW legislation relating to planning.

5.6 SUSTAINABLE DEVELOPMENT PRACTICE NOTE

The SINSW Sustainable Development Practice Note outlines the framework for the integration of sustainable development principles in the planning, design, tender and construction phases for all School Infrastructure projects. This framework is closely aligned to NSW Government policy positions and the United Nations Sustainable Development Goals.

6 SUSTAINABLE DESIGN

The proposed activity aims to go beyond minimum building requirements and provide a progressive sustainability outcome for the community. The sustainability 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 sustainability initiatives will be verified through the SINSW ESD Schedule v9. This verification applies to the new building only.

This section of the report outlines the initiatives incorporated into the proposed activity in line with the EFSG ESD Items. Under each sub-category, the initiatives already incorporated into the design, and additional opportunities identified for further investigation have been outlined. These will be refined through further investigation in design development.

Refer to Appendix 10.1 for the ESD Schedule v9. This verification applies to the new building works only.

The ESD initiatives and associated relevant design details will be incorporated into project contract documentation, noting that relevant details are still under development and will be further developed during later design stages. The head contractor will ultimately be responsible for ensuring compliance with all targeted EFSG ESD items.

6.1 RESPONSIBLE

6.1.1 GENERAL PRINCIPLES

Responsible project activity principles outline design and construction practices which support the development and integration of building performances and responsible construction practices. These practices and processes include;

- Guidance from sustainability professionals
- Responsible construction practices
- Commitments to performance (e.g. reducing building and operational waste).
- Pre-commissioning, commissioning and tuning
- Air tightness testing for building performance verification
- Building information to facilitate operator and user understanding
- Metering and monitoring
- Training of construction personnel for sustainable construction practices

6.1.2 PROPOSED INITIATIVES

The following initiatives are currently included in the preliminary sustainability strategy, in order to ensure that the activity minimises its environmental impact through construction and operational management:

- SINSW Commissioning and Temporary Schools Program reviews process to assist in advising, monitoring, and verifying the commissioning and tuning of the nominated building systems throughout the design, tender, construction, commissioning and tuning phases.
- Provision of building information to facilitate operator and user understanding of all building systems, and their specific operation and maintenance requirements and/or environmental targets
- Environmental targets for the development and a system in place to measure results, for reduction of energy and water consumption.
- Responsible construction practices in place, including development of project-specific best-practice environmental management plan (EMP) and high-quality staff support services. Implementation of a formalized approach to planning, implementing and auditing during construction to ensure conformance with the EMP.
- Specialist waste consultant to be engaged to activity of an operational waste management plan (OWMP). OWMP principles to be incorporated into the design, including separation of waste streams (e.g. paper, cardboard, glass, plastics, toner cartridges, batteries, organics etc.) to facilitate reuse, recycling, composting, and overall waste reduction.
- Public communication and marketing of the project's sustainability targets and outcomes, to accelerate sustainability in the built environment.

- Waste management plans for demolition, construction and operation of the site. Minimum of 90% of construction and demolition waste to be diverted from landfill.
- Implementation of responsibly manufactured products for internal finishes

6.1.3 OPPORTUNITIES

In addition to the initiatives outlined above, the following initiatives are currently being explored:

- Development and implementation of a responsible procurement plan following ISO 20400
- Implementation of responsibly manufactured products including
  - Structural components
  - Building envelope
  - Hydraulic, mechanical and electrical systems

6.2 HEALTHY

6.2.1 GENERAL PRINCIPLES

Healthy, comfortable learning environments are vital for students and staff, particularly when they may require spaces that facilitate focus and engagement for a considerable amount of time. General principles include:

- High indoor air quality
- Acoustic comfort with noise levels suitable to the activities within each space
- Good lighting design and control that is suitable to the space and free from glare
- High levels of daylight amenity and views for visual interest
- Reduce harmful exposure to toxins from building materials and finishes
- Thermal comfort

6.2.2 PROPOSED INITIATIVES

The following initiatives are currently included in the preliminary sustainability strategy:

- Passive design principles have been incorporated in the design, including high-performance building envelope, effective shading and building orientation, and natural ventilation openings to support comfortable and low-energy indoor environment quality.
- Acoustic consultant engaged to advise design to support the building's function as training, teaching and multi-purpose spaces for students, staff and community use.
- Best-practice lighting will be provided to improve lighting comfort via flicker-free, high-quality lighting that accuracy addresses the perception of colour within the space.
- High levels of daylight and external views are provided to regularly occupied learning and administration areas, to support high levels of visual comfort for building occupants. Detailed daylight modelling has been undertaken. Refer to the preliminary daylight modelling assessment undertaken for the project.
- Internal air pollutants have been reduced via selection of materials with low or no volatile organic compound (VOC) levels and low formaldehyde concentrations, verified via on-site testing.
- Effective heating and cooling to improve thermal comfort, in accordance with EFSG guidelines.

6.2.3 OPPORTUNITIES

In addition to the initiatives outlined above, the following initiatives are currently being explored:

- Specialist lighting design to address the quality of light in the space, and provide highlight and contrast
- Incorporation of indoor plants and/or nature-inspired biophilic design elements.
- The development provides planted area (minimum 5% of site area) in which occupants can directly engage with (such as community garden, edible garden or similar), and necessary infrastructure is provided.
- Specialist lighting design to avoid overly uniform solutions and create visual interest

6.3 POSITIVE

6.3.1 GENERAL PRINCIPLES

Through a range of performance measures buildings can; improve their energy efficiency which will reduce Greenhouse Gas emissions from grid-based energy; reduce their potable water demand making them more drought tolerant; and, reduce their embodied carbon through sustainable materials selection. General principles include:

- Selection of materials with low embodied carbon
- Energy efficient buildings
- No fossil fuel use
- Reducing potable water consumption, such as through the use of high efficiency water fixtures, water harvesting systems and reuse, and water-efficient landscape and irrigation design.
- Installation of a solar PV system capable of generating the new energy consumed by the proposed building. Exact sizes to be confirmed in future versions of this report.

6.3.2 PROPOSED INITIATIVES

The following initiatives are currently included in the preliminary sustainability strategy, in order to enhance the energy efficiency of the building. Refer to the Preliminary Energy Modelling Report for detailed energy modelling reporting.

- Highly energy efficient building, exceeding the minimum requirements of the NCC Section J. Energy to be undertaken to demonstrate a reduction in energy consumption in comparison to a NCC DTS compliant reference building, in line with the following targets:
  - Minimum 10% reduction, excluding any contribution from renewable energy (e.g. rooftop solar PV) in line with EFSG Section DG02.03

  Final improvement demonstrated via preliminary energy modelling in schematic design demonstrates that the required reduction in energy consumption can be comfortably achieved. Specific energy efficiency provisions include:

  - Exceeding the minimum building envelope R-values of NCC Section J
  - Improving on the glazing performance requirements of NCC Section J
  - Effective shading devices which reduce solar heat gains to conditioned spaces
  - Energy-efficient lighting (typically LED) will be provided throughout, exceeding lighting power densities of the NCC Section J
  - High efficiency heating, ventilation and air conditioning systems with mixed-mode 'traffic light' controls system to reduce operational energy.
  - All-electric building services
  - New roof mounted 36kW solar photovoltaic (PV) system. The proposed PV system size is subject to change pending further refinement of energy targets and performance during detailed design.
- High-efficiency water fixtures.

6.3.3 OPPORTUNITIES

In addition to the initiatives outlined above, the following initiatives are currently being explored:

- Procurement of carbon offsets to offset residual emissions.
- Procurement of renewable energy, such as GreenPower. We understand that the NSW Government is responsible for procuring electricity across its entire portfolio. The renewable energy contribution target is due to be updated in the near future.
- Offsetting the equivalent carbon emissions of refrigerants.
- Adoption of minimum targets energy efficiency of appliances (air conditioners, TVs, fridges, computers) to make energy efficiency one of the selection requirements. Major appliances to be within one star of the highest available at the time of purchase.
- Lighting controlled by motion and/or daylight sensors to reduce the operation of artificial lighting when it is not required.
- Reduction in embodied carbon of materials, achieved through sustainable concrete and steel selection.

- Inclusion of rainwater tank to reduce potable water consumption, pending water modelling to quantify benefits

6.4 PLACES

6.4.1 GENERAL PRINCIPLES

Under this category people are placed at the forefront of the design to ensure the building supports health movement, provides enjoyable places and contributes the local community and cultural heritage of the site. General principles include:

- Active transport (walking and cycling) is encouraged, and private vehicle use is reduced
- Communal spaces which support occupant and community engagement are developed
- The local community's cultural heritage embedded in the design

6.4.2 PROPOSED INITIATIVES

The following initiatives are currently included in the preliminary sustainability strategy to improve sustainable transport options:

- The project will incorporate bike parking to meet a site wide EFSG bike parking requirement of at least 1 bike park per 20 students. However note that exact parking amounts will be subject to the results of the School Transport Assessment. Details to be refined in future versions of this report.

6.4.3 OPPORTUNITIES

In addition to the initiatives outlined above, the following initiatives are currently being explored:

- Provision of publicly accessible spaces to improve the liveability of the local community, through communal spaces, landscape spaces, community gardens.
- Local heritage of the site reflected through design responses, through meaningful engagement with the local community
- To encourage active and public transport, bicycle parking for staff and students as well as changing facilities for staff to be provided to the development.

6.5 PEOPLE

6.5.1 GENERAL PRINCIPLES

This category recognizes the contributions made by the local workforce which develops the building and aims to ensure sustainable practices support workers during the construction process, for areas including mental health and social inclusion. Additionally, the building design is reviewed for universal design principles for improved accessibility. General principles include:

- The builder supports mental health initiatives and promotes diversity
- The building has Indigenous design aspects, or a Reconciliation Action Plan is developed
- Disadvantaged groups are supported for workforce inclusion
- Universal design principles for people with disabilities are embedded in the design.

6.5.2 PROPOSED INITIATIVES

The following initiatives are currently included in the preliminary sustainability strategy:

- The builder has policies and programs to support construction workers and provides staff support.
- The Head Contractor has procurement practices in place to support disadvantaged groups gain employment opportunities, including:
  - Procurement of all materials and labour will be in accordance with the NSW DoE Aboriginal Procurement Policy and NSW DoE Main Works 21 Preliminaries - Section 4.4 'Aboriginal Participation'
  - A project-specific Aboriginal Participation Plan will be developed to monitor and report on the minimum Aboriginal participation requirements.
  - At least 1.5% of the building's total contract value has been directed to generate employment opportunities for disadvantaged and under-represented groups.

- Inclusive design principles are followed to ensure building users with diverse needs have ease of access and way finding throughout the building.

6.5.3 OPPORTUNITIES

In addition to the initiatives outlined above, the following initiatives are currently being explored:

- Incorporation of Indigenous design elements into the design, addressing each of the principles from the Australian Indigenous Design Charter (AIDC), including engagement with Aboriginal and/or Torres Strait Islander communities.
- Diverse wayfinding including visual, physical, olfactory, and auditory solutions.

6.6 NATURE

6.6.1 GENERAL PRINCIPLES

Impacts to nature are minimised and the biodiversity of the site is fostered through selection of native plant species, this also supports the wellbeing of building and local groups who can maintain a connection with nature through urban green spaces. Waterways are protected through a volume controlled stormwater management strategy. General principles include:

- Protect and enhance ecological and biodiversity value
- Minimise negative impacts, such as lighting pollution and stormwater pollution.

6.6.2 PROPOSED INITIATIVES

The following initiatives are currently included in the preliminary sustainability strategy:

- Specified stormwater pollution reduction targets are met.
- Appropriate lighting design to reduce light pollution, including ensuring an upward Light output Ratio (ULOR) <5% or use of awnings to block light pollution to neighbours and the night sky
- All heat-rejection systems to be waterless to eliminate risk of Legionella (no cooling towers)

6.6.3 OPPORTUNITIES

In addition to the initiatives outlined above, the following initiatives are currently being explored:

- Increased proportion of the site dedicated to external landscaping. Inclusion of critically endangered and/or endangered plant species native to the bioregion.
- Average annual stormwater discharge (ML/yr.) is reduced by 40% across the site.
- Encouragement of species connectivity through the site, and to adjacent sites
- Restoration or protection of biodiversity area beyond the project boundary.

7 CLIMATE CHANGE RESILIENCE

The projected impacts of climate change on the proposed development have been assessed, based on predicted climate change models. A Climate Adaptation Workshop was held with all project stakeholders on 02 Dec 2024. The workshop goals were to:

- Identify and describe risks posed by climate change to the development and rate the consequences and likelihood of each
- Identify and evaluate the potential adaptation actions and/or design strategies to mitigate those risks which are deemed unacceptable.

To facilitate this process, pre-workshop notes were provided to all stakeholders attending the workshop which consisted of the following parts:

- Climate change projections
- Consequence scale for the risk assessment
- Likelihood scale for the risk assessment

A climate change risk assessment undertaken as per AS 5334-2013 requirements. Expected impacts from climate change were identified with reference made to both CSIRO projects for the East Coast (South) sub-cluster and NSW Government's NSW and ACT Regional Climate Modelling (NARCLiM) projections. The results showed the following:

- Extreme temperatures are projected to increase with very high confidence, and substantial increases in temperatures reached on hot days, as well as the frequency of hot days.
- Average temperatures will continue to increase in all seasons (very high confidence)
- Generally, less rainfall is expected in winter (medium confidence), but the intensity of extreme rainfall events is expected to increase (high confidence)
- Time spent in drought is expected to increase (low confidence) over the course of the century.

The design's responsivity to the above impacts will be assessed in accordance with EFSG requirements, at least two of the risks identified will be addressed by specific design responses, suggested risks to be addressed are detailed within the Climate Adaptation Report.

8 NET ZERO AND RESOURCE EFFICIENCY

The proposed activity aims to minimise greenhouse gas emissions, to reflect the NSW government's goal of net zero emission by 2050, and consumption of energy, water and material resources. The key initiatives which have been selected to contribute to these goals are summarised below.

8.1 ENERGY CONSUMPTION AND NET ZERO 2050

The building incorporates the following initiatives into its design:

- Minimum improvement 10% reduction in energy efficiency over minimum NCC compliance
- Passive design including consideration of orientation, thermal mass, shading, and fabric and glazing insulation performance, and colour
- Energy efficient lighting design and control
- Energy efficient heating, ventilation, and air conditioning design and control
- Energy efficient appliances and equipment
- Energy monitoring and whole of building demand management and control
- Renewable energy sources, including solar photovoltaic panels
- 100% electric design to minimise gas use and greenhouse gas emissions
- Commissioning and tuning strategies

8.2 WATER CONSUMPTION

The building incorporates the following initiatives into its design:

- Water efficient fixtures, equipment, and appliances
- Water use monitoring
- Stormwater management
- Commissioning and tuning strategies

8.3 OTHER MATERIALS CONSUMPTION

The building incorporates the following initiatives into its design:

- Reduction in upfront carbon through sustainable material selection, including low embodied carbon materials and high recycled content materials. Including major construction materials – concrete, steel, timber and aluminium.

9 CONCLUSION

This report identifies the sustainability measures being pursued or investigated by the project team, demonstrating how the relevant sustainability requirements have been addressed.

The proposed design for the activity incorporates sustainability measures that have far reaching benefits from the perspective of energy, water and waste reduction; as well as providing good indoor environment quality, thermal comfort and visual comfort. By this means, the proposed activity will have a positive impact on the health and wellbeing of the students and staff occupying the building.

10 APPENDICES

10.1 SINSW ESD SCHEDULE

Refer over.

PROJECT:	Kingswood Public School Upgrad
REVISION	A
AUTHOR	Richard Porter

										SINSW SUSTAINABILITY REVIEW				INDEPENDENT SUSTAINABILITY VERIFICATION								
Sustainability Strategy Priority	**Sustainability initiatives / requirements** Where application, this is an extract only from the relevant EFSG. For full requirements refer to https://efsg.det.nsw.edu.au/	**Project stage**	**Basis for Initiative**	**Crossover with Green Star**	**Recommended evidence to demonstrate compliance**	**Has this been implemented in the project?** Y or N or NA	**Contractor's ESD consultant comments**	**Actual evidence** This evidence needs to show that the requirement from column C has been met	**Responsibility**(identify party responsible to provide evidence)	**Planning check** **Is the evidence proposed accepted?** Y or N	**Design Check** **Is the project compliant?** Y or N	**As Built Check** **Is the project compliant?** Y or N	**SINSW Sustainability comment**	**Independent ESD Review Comments (insert date)**	**D&C Contractors Response (insert date)**	**Independent ESD Review Comments (insert date)**	**D&C Contractors Response (insert date)**	**Independent ESD Review Comments (insert date)**	**Independent ESD Compliance Review**	**Potential impact of departure on Green Star Points: Y, N, N/A.**	**Documentary Evidence provided?**	**Evidence Index (optional)**
Act on climate change	**Improvement over NCC** All new facilities must be designed and built so that energy consumption is predicted to be at least 10% lower than if build to minimum compliance with National Construction Code requirements. Each building's system and façade must comply with the corresponding Section J requirements in the National Construction Code. That is, the building cannot show that their façade, or any system, performs worse than the reference building. The energy consumption reduction must be achieved without including renewable energy generation in the calculation.	Ph 2-5: Architectural Design	DG02.03 GREP	DAB c15E.0 GHG Emissions Reduction - Conditional Requirement	**1.** Energy modelling report / Predictive energy modelling and thermal comfort assessment. Report needs to show at least 10% improvement of building over minimum NCC requirements; and **2.** As-built evidence that model is an accurate representation of the building, e.g. drawings; and **3.** Specifications / calculations supporting modelling inputs, e.g. window energy rating scheme certificates, calculated R-values of walls, roofs, etc. 4. As an alternative to 2 and 3 above, a Statement by energy modeller confirming that the model accurately represents the building.	Y	Energy modelling has confirmed that the school significantly exceeds the requirement to reduce energy consumption by at least 10% vs. a reference building.	Refer to Energy Modelling Assessment	Sustainability													1
Act on climate change	**Passive design** The need for active cooling and heating shall be minimised by employing passive / sustainable design principles listed in DG 55, DG 06.02 and DG 27.12 as well as the GA NSW Environmental Design in Schools Guidelines. This includes: - Window size and shading to prioritise passive cooling in summer and heating in winter - Orientation - Thermal mass - building fabric colour and performance - shading	Ph 2-5: Architectural Design	DG55 DG06.02 DG27.12 GA NSW Environmental Design in Schools	DAB c15 GHG Emissions Reduction	**1.** Thermal modelling report **2.** As built evidence demonstrating measures implemented to reduce need for active cooling / heating **3.** Passive design report by Architect listing all passive design initiatives implemented	Y	Large reductions in energy consumption, as a result of passive design principles, have been incorporated in the design.	Refer to Energy Modelling Assessment	Sustainability													2
Act on climate change	**Energy efficient lighting design and modelling** - LED lighting must be installed - The design of the lighting systems and the selection of fittings is to be undertaken based on a Whole of Life approach, such as diodes and control gear with a long life - Section J part 6 maximum illumination power density provisions must be adhered to, along with all other elements of part 6 - System must support sustainable design principles including reducing energy consumption, such as timed or sensor feedback functionality - Lighting designs should be carried out utilising industry standard lighting design software such as AGI32, Dialux or Relux.	Ph 2-5: Services Design	DG2.3.1 DG63.01 DG63.04 DG63.05 DG63.03.02	DAB c15 GHG Emissions Reduction	**1.** Lighting drawings **2.** Lighting specifications / schedules **3.** Lighting modelling report showing compliant power densities	Y	Assumed to be included in patternbook documentation for standard hubs		Electrical													3
Act on climate change	**Lighting control and switching** - The use of lighting controls will assist in substantially improving energy efficiency on sites, and should be considered for all new lighting systems, in new build or site refurbishments. - Lighting control should be simple to operate and adhere to all requirements of DG 63.06 - Constant Light Output and Daylight Harvesting systems are recommended given their ability to reduce lighting energy whilst maintaining comfortably lit spaces. Consideration should be given to these strategies as stipulated in DG 63.06 - Including daylight sensors in rooms to reduce light output or turn off light when sufficient daylight is provided within the space - When the space is large and perimeter lighting is adjacent to windows, perimeter lighting is on a separate zone to make maximum use of daylight - Local switching should be provided where it is identified that the users can benefit from manual operation of the lighting and other lighting automation technology is considered cost prohibitive. The switching should be clearly marked and robust. Provisions for energy efficient switching in Schools are outlined within DG63 and DG65.	Ph 2-5: Services Design	DG63.06 DG63.07 DG65.03.01	DAB c15 GHG Emissions Reduction DAB c4 Building Information	**1.** Electrical & lighting drawings showing switching groups and automatic controls **2.** Lighting modelling report showing compliant power densities **3.** Lighting operations and maintenance manual	Y	Assumed to be included in patternbook documentation for standard hubs		Electrical													4
Act on climate change	**Energy efficient appliances & equipment** Electrical equipment must be at least 0.5 stars above the market average star rating or comply with high efficiency standards specified in the GREP HVAC system must have timed or sensor feedback functionality for energy conservation Systems shall be designed to minimise energy consumption. System design / equipment selection is to be based on whole of life cost analysis. Specific requirement are outlined in the EFSG	Ph 2-5: Services Design	DG2.3.3 DG55	DAB c15 GHG Emissions Reduction	**1.** Schedule of appliances and equipment with their star ratings or performance standards, signed by head contractor or architect. All appliances and equipment required in the GREP must be listed, incl air conditioning equipment, electric motors, transformers, etc. **2.** As built mechanical drawings / statement from head contractor; **3.** Whole of life cost analysis demonstrating systems were selected based on WOL performance	Y	HVAC controls are based on EFSG requirements, which comply with the noted item		Mechanical													5
Act on climate change	**Heat loss/gain** The design must take steps to control heat loss from the building during cooler winter months and heat gain during the warmer months. Refer to HVAC Design considerations in DGD4.01	Ph 2-5: Services Design	DGD4.01	DAB c15 GHG Emissions Reduction	**1.** Thermal modelling report **2.** As built evidence demonstrating that model is an accurate representation of the building **3.** Specifications/ calculations supporting modelling inputs	Y	The building utilises shading design and improved thermal fabric performance to reduce heat gains and losses, and reduce overall energy consumption.	Refer to Energy Modelling Assessment	Sustainability													6
Act on climate change	**Indoor environment control** - Both the thermal comfort and indoor air quality shall be controlled automatically within specified parameters. - Controls shall be simple and intuitive to use. - A "traffic light" light system (described in DG 55.01 Thermal Comfort and Indoor Air Quality Policy) should be used to inform users of the suitability of outdoor conditions to utilise natural ventilation.	Ph 2-5: Services Design	DG55 DG 55.01 Thermal Comfort and Indoor Air Quality Policy	DAB c15 GHG Emissions Reduction	**1.** As built evidence demonstrating controls have been installed as required. **2.** Commissioning report / statement by head contractor confirming controls have been set as required	Y	Traffic light system is included to all learning spaces as per the EFSG		Mechanical													7
Act on climate change	**Renewable energy** A grid connected solar PV system must be installed in line with DG66 requirements Where feasible, PV systems shall be installed to offset as much of the electricity consumed by the school as is practicable	Ph 2-5: Services Design	DG2.3.4 DG55	DAB c15 GHG Emissions Reduction; DAB c16 Peak Electricity Demand	**1.** As installed drawings of PV system **2.** Energy modelling report showing renewable energy generation	Y	PV system to be installed and sized to offset building consumption	Preliminary Calculations and proposed system size included in concept documentation (Concept Report and Drawings)	Electrical													8
Act on climate change	**Battery Energy Storage System** A battery energy storage system shall only be designed in consultation with SINSW Sustainability sustainability.enquiries@det.nsw.edu.au	Ph 2-5: Services Design	DG66.8.3	DAB c15 GHG Emissions Reduction; DAB c16 Peak Electricity Demand Reduction	As installed drawings of battery storage system	NA		No battery system proposes	Electrical													9
Act on climate change	**Heaters** Electric heating must be preferred over gas heating. Where gas heating is considered, it must be approved by SINSW Sustainability Heating equipment must be designed from a whole-of life perspective and: - Support sustainable design principles including reducing energy consumption and carbon emissions - Be accessible and serviceable - easy to maintain with minimal impact on school use when maintenance is being performed	Ph 2-5: Services Design	DG56	DAB c15 GHG Emissions Reduction	1. If reverse cycle air conditioning is installed, confirmation that gas heaters are not installed, OR **2.** Evidence that the gas heaters installed are energy efficient	Y	No gas heating is included in the mechanical design		Mechanical													10
Act on climate change	**Water heaters** - Hot water and tempered water generation for schools must be carefully considered to ensure that a Whole of Life assessment is undertaken to minimise life cycle costs and carbon emissions - Environmentally friendly options such as solar heating (if vandal resistant) and heat pumps are preferred energy sources to	Ph 2-5: Services Design	DG53.09	DAB c15 GHG Emissions Reduction	1. WOL cost assessment for hot water systems 2. Hydraulic drawings/schematics showing installed DHW systems	Y			Hydraulics													11
Build resilience	**Site investigations for resilienc** The following detailed reports/ surveys/ information should be considered in developing the business case: - Slope, drainage and erosion issues including flood risks (if any) - Geotechnical and soil conditions - Airborne pollutants - Bushfire risks - Appraisal of available services infrastructure - Climate change risk assessment must be undertaken considering at least two different climate change scenarios An environmental risk report will be required for developments proposed within sensitive natural environments or sites subject to natural risks i.e. flood prone sites, bush fire prone	Ph 1: Site Selection and Masterplan	DG03.02	DAB c3 Adaptation and Resilience	**1.** Detailed reports or surveys developed **2.** Environmental risk report **3.** Evidence demonstrating recommendations have been implemented and risks addressed through design responses.	Y	Ongoing consultation with bushfire consultant. Climate Adaptation workshop completed	Contamination and Geotech report	RPInfrastructure													12
Build resilience	**Bushfire protectior** Development applications on bush fire prone land must be accompanied by a Bush Fire Assessment Report demonstrating compliance with the aim and objectives of Planning for Bush Fire Protection and the specific objectives and performance criteria for the land use proposed. Local Authorities and the Rural Fire Service can provide advice on the design of buildings in bush fire prone areas. The Building Code of Australia and AS3959 "Construction of buildings in bushfire-prone areas" set out the requirements for buildings which are within close proximity to a defined bush fire zone. Mandatory landscape management strategies: - Keep the amount of fuel (leaves, twigs, logs, dead grass) in the vicinity of buildings to a minimum. - Ensure trees are located at away from buildings to avoid branches overhanging and leaves collecting on roofs. - Do not plant shrubs against buildings. - The crowns of trees planted on the hazard side of the development should not be contiguous. - Plant fire resistant trees and shrubs on the hazard side of the development to reduce the potential impact of wind, fire intensity, radiant heat, and rate of spread as well as intercepting burning embers. - Avoid combustible fencing materials. - Provide irrigation and garden sprinklers to water areas near the buildings (subject to water authority approval)	Ph 1: Site Selection and Masterplan	DG13.01	DAB c3 Adaptation and Resilience	**1.** Bush fire assessment report **2.** Statement by Architect / fire consultant outlining building strategies implemented in line with BCA and AS3959. **3.** Bush fire management plan outlining management strategies implemented **4.** Landscape plans detailing bush fire management measures implemented	Y	Bushfire letter has been received		RPInfrastructure													13
Build resilience	**Climate change adaptation** Sites and school communities must be able to withstand natural and urban hazards and adaptively respond to climate change over time, especially for projects involving vulnerable communities e.g. climate generating exacerbated flood, storm surge, inundation, heatwaves, bush fires, extreme storm and other weather events. School facilities must be able to withstand natural hazards and adapt to shocks and stresses to avoid social and economic costs of interrupted operation and repairing or replacing damaged assets. To achieve this, increasing resilience to natural hazards must be considered in the business case development so that associated costs are budgeted. An initial assessment of natural hazards and project vulnerability must be carried out, in consultation with resilience experts, to inform the business case and identify hazards where further analysis is required. The assessment must report on at least two different timescales (2050 and 2070) and consider high emissions scenarios consistent with 2C and 4C for each timescale. The Intergovernmental Panel on Climate Change (IPCC) endorsed emissions scenarios should be used to dictate the assessed scenarios Where significant risks are identified in the initial assessment, a comprehensive climate change risk assessment must be undertaken.	Ph 1: Site Selection and Masterplan	DG02.08	DAB c3 Adaptation and Resilience	**1.** Climate risk assessment, and **2.** Climate adaptation plan **3.** Emergency management plan	Y	Climate change risk workshop and report have been completed by NDY with inputs from all design disciplines. All risks and their ratings are identified within the report.	Refer to Climate Change Adaptation Repo	Sustainability													14
Build resilience	**Weather protection** Circulation areas provided between administrative, staff and all student spaces (except Agriculture), should be protected from sun, rain and unfavourable winds.	Ph 2-5: Architectural Design	DG08.05	Not covered in Green Star	As built drawings showing circulation areas are protected as required	Y	All circulation areas have a roof to protect against weather	Refer to Schematic Design drawing	Architect													15

Build resilience	**Urban heat island mitigation - Roof Colour** The roof colour will also have an impact on the thermal performance of the roof, therefore the product's Solar Reflectance Index (SRI) should be considered to mitigate the heat island effect. The product selected must meet the following three-year Solar Reflectance Index (SRI) requirements: For roof pitch < 15, minimum SRI of 64 For roof pitch > 15, minimum SRI of 34 Where a three-year SRI is not available, the following requirements must be met: For roof pitch < 15, minimum SRI of 82 For roof pitch > 15, minimum SRI of 34	Ph 3-4: Product and Material Selection	DG20 Fabric	DAB c25 Heat Island Effect	**1.** Site Plan highlighting all relevant areas as referenced within the area schedule; **2.** Area Schedule listing the areas of each of the relevant site elements and where relevant, the SRI values and referencing plan drawings for the site; and **3.** Supplier Documentation material data sheet for compliant roofing and hardscape materials.	Y	Roof Colour will be SURFMIST SRI 82		Architect										TBC			16
Consume responsibly	**Building User's Guide** Produce a Building User's Guide to enable the client to understand the building systems and operate systems to maximise efficiency. This must: - Clearly and concisely describe the operation of building and its services - Detail a reasonable maintenance program - Advise the user of the most suitable replacements for consumables	Ph 7-9: Construction, Commissioning Post Occupancy and Operation		DAS c4 Building Information	**1.** Building user's guide			D&C contractor responsible														17
Consume responsibly	**Stormwater management** Must aim to minimise the transportation of toxicants to waterways and other offsite environments, and maintain the existing hydrological regimes. Due diligence for flooding must be done early to inform building and landscaping design	Ph 1: Site Selection and Masterplan	DG2.4.3	DAB c26 Stormwater	**1.** Stormwater modelling report showing stormwater pollution and flows. **2.** Civil / Hydraulic drawings showing management measures. **3.** Water sensitive urban design report (if WSUD was used)	Y	Pollutant reductions are targetted through the use of filtration devices. Due diligence completed for		Civil										TBC			18
Consume responsibly	**Drinking water catchment protection** For developments within drinking water catchment areas, a water cycle management study is to be included with the Development Application for Education Facility developments involving: - Agriculture facilities - Biosolids and effluent re-use schemes - Sewerage systems or works (including package sewerage treatment plants) - Stormwater or works involving the disposal of untreated runoff	Ph 1: Site Selection and Masterplan	DGS1.07	GSC c24 Integrated Water Cycle	**1.** Water cycle management study **2.** Evidence that recommendations in the study have been followed / implemented	NA	Project does not fall within drinking water catchment area		RPInfrastructure										TBC			19
Consume responsibly	Where a new school is to be developed a Hazardous materials study is to be conducted, including: - Asbestos Containing Materials (ACM) - Synthetic Mineral Fibres (SMF) - Polychlorinated Biphenyl's (PCB) - Lead Paint - Ozone Depleting Substances Any existing structures and all parts of the site should be examined in order to determine the presence of hazardous materials before the commencement of any renovation or demolition. Inspection should be conducted in accordance with DG4B. Where hazardous materials are found a Hazardous Materials Management Plan should be prepared	Ph 1: Site Selection and Masterplan	DG4B.01	DAB 24.2 Contamination and Hazardous Materials	**1.** Hazardous materials study / site inspection report / survey **2.** Management plans for hazardous materials identified **3.** Remediation strategies implemented **4.** Environmental auditor certificates / clearance certificates	Y	Hazmat survey completed.	PSI	RPInfrastructure										TBC			20
Consume responsibly	**Operational waste** A waste storage area must be included in all new school sites. The provision of space must include source separation including bin stations and appropriate signage of waste and receptacles for multiple waste streams, including: - Organics - Comingled containers - Paper & cardboard - Container deposit scheme - Soft plastic - General waste Designers must refer to AS 4123.7 Mobile waste containers - Colours, markings, and designation requirements for further guidance on bin colour, waste stream and waste type. Safe methods for vehicle access and the transfer of waste must also be considered. For new and refurbished schools, an operational waste management plan (OWMP) must be developed to establish operational waste targets, identify opportunities for reuse and recycling in the operation of the facilities and make adequate provision for the facilities to accommodate for the OWMP. The OWMP must address all requirements from DG 2.7.2	Ph 2: Concept Design - Space planning	DG02.7.1	DAB c8 Operational Waste	Operational waste management plan Operational waste reports showing diversion rates	NA	Existing school, item not relevant												TBC			21
Consume responsibly	**Building flexibility** Position structural members considering the future flexibility of the structure. Avoid ad hoc placing of columns internally, giving preference to uniformity in layout. Design all internal walls as non-load bearing to enable future flexibility.	Ph 2: Concept Design - Space planning	DG21.1.16	Not covered in Green Star	As built drawings or statement by relevant professional	N	Window and ventilation required at edge wall thus no room for shear walls. Shear walls has been fit within cavity to suit layout, has been reviewed and agreed		Structure										TBC			22
Consume responsibly	**Hydraulic services** Hydraulic services should: - Support sustainable design principles including reducing water consumption and waste production. - Appropriately treat any trade waste to ensure minimal environmental impact - Be accessible and serviceable - easy to maintain with minimal impact on school use when maintenance is being performed - Use products with a long life span – many hydraulic services are concealed so durability is essential	Ph 2-5: Services Design	DGS1.01	DAB c18 Potable Water	**1.** Hydraulic report showing sustainability initiatives implemented to reduce potable water consumption **2.** As built drawings showing trade waste arrestors				Hydraulics										TBC			23
Consume responsibly	**Water sub-metering** In addition to the main water meter for the site provide sub meters for the following: - Mixed irrigation systems - Laboratory buildings - Amenities blocks - Canteens - Any other major water use on the site	Ph 2-5: Services Design	DGS3.04	DAB c6.0 Metering	**1.** As built hydraulic drawings				Hydraulics										TBC			24
Consume responsibly	**Rainwater collection** Include roof water harvesting and tank storage in new schools and where practical in existing schools to reduce the demand on drinking water supplies. Tank water can connect to drip irrigation systems for adjacent landscape/gardens with the major preference being for gravity fed supply to minimise ongoing maintenance. The rainwater tanks must be connected to toilets for toilet flushing. If this is not feasible, approval must be granted by SIN	Ph 2-5: Services Design	DGS3.14 DG2.4.2 DGS3.01	DAB c18B.2 Rainwater Reuse	**1.** As built hydraulic drawings showing tank connection to end uses and capacity	NA	Not required on existing schools												TBC			25
Consume responsibly	**Fire system water reuse** Where schools are required to install a sprinkler system for fire safety, it is recommended to install a closed loop system must be installed to capture and reuse fire systems testing and maintenance water, or by using an alternative non-potable water source.	Ph 2-5: Services Design	DG2.4.2	DAB c18B.5 Fire System Test Water	Fire engineering report				Fire										TBC			26
Consume responsibly	**Ground water** Where ground water is available for use for irrigation purposes in drought affected locations, enquiries must be undertaken with the Department of Planning, Industry and Environment to determine the suitability of a ground water system.	Ph 2-5: Services Design	DGS3.03	DAB c18 Potable Water	1. Relevant due diligence report / investigation	NA	Ground water not available for irrigation												TBC			27
Consume responsibly	**Trade waste** Arrestors for acid, grease, plaster and clay of adequate capacity must be installed to treat wastewater from science laboratories, kitchens, art rooms and canteens as required in DGS2.	Ph 2-5: Services Design	DGS2	Not covered in Green Star	**1.** As built drawings showing trade waste arrestors or **2.** Letter by Hydraulic Engineer confirming arrestor have been installed as required	NA	No science labs, kitchens, art rooms, or canteens within scope												TBC			28
Consume responsibly	**Water Fixture efficiency** All products must be rated to AS 6400 to the following minimum WELS ratings: - Tapware to 5 star flow rating requirements - Showers to have 3 star flow rating requirements - Water Closet Pans to 4 star flow rating requirements - Urinals to 5 star flow rating requirements - Flow restrictors can be used to minimise water usage and wastage for staff amenities - Taps with timed flow can be used to minimise water usage and wastage in student amenities. - New and replacement urinals must use manual in lieu of automatic flushing mechanisms. A microwave-activated urinal flushing system may be used as an alternative. In any case, all new water-using appliances must be at least 0.5 stars above the average WELS star rating by product type, except toilets and urinals, which must be purchased at the average WELS star rating. Where WELS rating is not available, use the alternat	Ph 3-4: Product and Material Selection	DGS3.02 DG2.4.1	DAB c18B.1 Potable Water - Sanitary Fixture Efficiency	1. Schedules of materials, fixtures, fittings and equipment with WELS/WaterMark ratings, demonstrating compliance and identifying those with flow restrictors and timed flow.	Y	Will comply as per ETSG requirements. Detailed selections have not yet taken place.												TBC			29
Consume responsibly	**Life cycle assessment (environmental)** Environmental impacts of products and materials has been assessed and inform material selection	Ph 3-4: Product and Material Selection	DG01.03	DAB c19A - Life cycle assessment	Life cycle assessment report	Y	Upfront Carbon assessment has been performed by NDY which identifies the required material substitutions to achieve compliance with Green Star Buildings Upfront Carbon requirements, and identifies the environmental impacts of products and materials.	Refer to Upfront Carbon Assessmer											TBC			30
Consume responsibly	**Whole of life costing (WOL)** Total cost of ownership (TCO) assessment / Analysis of direct and indirect costs and benefits / Life cycle costing analysis When calculating the whole of life cost for the different materials / building elements or systems, the following must be considered: - the total initial capital cost of the system/s – including design, project management, builder and building services works in connections etc. - resources (energy and where applicable water) consumption. - Maintenance. - the replacement of component parts. - disposal costs - ecological sustainable options - durability - vandalism - safety The whole of life cost shall be calculated over the estimated life of the asset/s.	Ph 3-4: Product and Material Selection	DG01 All design guides for selection of materials and building systems	GSC c20 - Return on Investment	Life cycle costing report for relevant system														TBC			31
Consume responsibly	**Sustainable materials** Construction materials must be selected based on the following: - Adequately and economically perform their intended functions, and also have lower adverse environmental impacts throughout their life cycle (refer to DG 3) - Contain reduced or no hazardous substances (e.g. low VOC) to ensure effective indoor environmental quality. Reduce the demand for rare or non-renewable resources. - Have low embodied energy and water. - Are made from or contain recycled materials or can be reused or recycled at the end of their useful	Ph 3-4: Product and Material Selection	DG02.05	DAB c21 Suitainable Products	**1.** Environmental Product Declarations of products / materials used; Product certificates (like GECA, FSC, etc) **2.** Suppliers' declarations confirming recycled contents in products **3.** Bill of quantities	Y	Will be considered in Specification. Current specification based on similar 5 star project. Futher development throughout process.		Architect										TBC			32

Consume responsibly	**Sustainable timbe** - No rainforest timbers, or timbers from high conservation forests, are to be used unless plantation grown. Use only recycled timber, engineered and glued timber composite products, or timber from plantations or from sustainably managed regrowth forests that are FSC, AFS or PEFC certified - All timber used is to be termite (white ant) resistant or treated to be termite resistant to the appropriate hazard	Ph 3-4: Product and Material Selection	DG2.5.1 DG21.05.01	DAB c20.2 Responsible Building Materials - Timber	**1.** Evidence of chain of custody **2.** Bill of quantities	Y			Architect										TBC			33
Consume responsibly	**Built for disassembly** Consider the use of building materials which are able to be disassembled for re-use, in conjunction with considerations for the ease and removal of accommodation over time.	Ph 3-4: Product and Material Selection	DG02.07			NA													TBC			34
Consume responsibly	**Concrete** - Use materials complying with AS based on the Whole of Life approach to materials selection. - Do not use breccia or dolerite in concrete mixes. - Fly ash is a manufacturing by-product that can be used as a cement replacement but should limited to a maximum of 20% by weight of cement content.	Ph 3-4: Product and Material Selection	DG71.02	DAB c198.1	**1.** Structural specifications and drawings **2.** Structural Engineer's report showing % cement replacement	Y	Upfront Carbon assessment has been completed identifying project materials selections as well as impact of appropriate material	NDY Embodied Carbon Assessment	Sustainability										TBC			35
Consume responsibly	**Construction waste** Targets must be established to increase diversion of waste sent to landfill, with a minimum diversion rate target of 90%. Consider opportunities for re-use and recycling of materials in the construction phase	Ph 7-9: Construction, Commissioning Post Occupancy and Operation	DG02.07	DAB c22 Construction and Demolition Waste	Construction waste reports showing percentage (minimum 90%) of waste re-used and recycled (diverted from landfill)		To be confirmed in future phases												TBC			36
Consume responsibly	**Maintainability** All systems and equipment that is installed within a school is to be provided with suitable access to ensure that this equipment is safely and efficiently maintainable. In order to ensure that maintenance is available, on the completion of all buildings, drawings are to be provided showing the completed (As Built) building including all equipment and equipment access arrangements. Any mechanical ventilation system within the building must be designed to provide adequate access for maintenance, to both sides of all moisture and debris-catching components, within the air distribution system. Moisture-producing and debris-catching components include items such as cooling coils, heating coils, fan coil units, humidifiers and filters in the air handling system. The project team should demonstrate that there is a project level review process in place to ensure that the building has been designed as per the EFSG, that any issues identified have been closed out and that the outcomes can be communicated to the relevant facilities/ operations teams Maintenance required and cost of this maintenance are to be considered in assessment of the project's life cycle cost. Operation and Maintenance manuals (O&M Manuals) are to be provided, written in clear, concise English covering the various building elements, assemblies, equipment, service installations and systems incorporated into the Worl	Ph 2-5: Services Design	DG16.10 DG 01.04	DAB c2.1 Services and Maintainability Review DAB c9.1.2 Ventilation System Attributes DAB c4 Building Information	**1.** As built drawings including all equipment access arrangements for maintenance	Y	S&M review to occur during future project phase		RPInfrastructure										TBC			37
Foster connections	**Site investigations for place making / community connections** The following detailed reports/ surveys/ information should be considered in developing the business case: - Local environment/ character - Climate and microclimate - Heritage significance / impact - Appraisal of physical and visual factors affecting site development - Available transport/ road infrastructure servicing the site - Geo-technical and Soil reports will be required for each site to investigate the suitability of the topsoil and anticipated sub-grade materials for horticultural purposes. - Testing for toxic residues must be undertaken in all areas identified as being a possible risk - i.e. filled or dumped gro	Ph 1: Site Selection and Masterplan	DG03.02	GSC c12 Culture, Heritage and Identity DAB 24.2 Contamination and Hazardous Materials	**1.** Relevant reports/surveys developed (these ideally include recommendations for further development stages) **2.** Evidence demonstrating recommendations / best practice solutions have been implemented/addressed.	Y	No heritage considerations were identified. Transport and geotechnical assessments will be completed during future phases.	Heritage Reports	RPInfrastructure										TBC			38
Foster connections	**Ecological conservation** Schools sites must conserve for future generations, the biological diversity of genetic materials, species and ecosystems on that site and consider the surrounding natural environment. An Ecological Assessment Report must be prepared for the site in order to understand the existing conditions and future conservation strategies. The design of the facilities must provide unique and valuable environmental conservation learning opportunities and effective environmental modelling to the wider community. Schools must connect with nature and incorporate biophilic design principles. Open space must allow for exploration, and biodiversity and earth education to enhance the site's outdoor learning potential.	Ph 1: Site Selection and Masterplan	DG02.06	DAB c23 Ecological Value GSC c29 Ecological Value (incl Biodiversity Enhancement)	**1.** Biodiversity or ecological assessment / local flora and fauna survey **2.** Ecological Assessment Report which documents the following: - ecological values (current, future, and past) identified for the site and their protection measures - ecological impacts from light and noise pollution and water quality and their mitigation requirements - existing vegetated areas and biodiversity values being retained how biodiversity has been considered within the project's material supply chain - list of management strategies to protect the integrity of ecological values throughout project planning, construction, and occupancy community and local stakeholder expectations including Aboriginal or Torres Strait Islander groups and environmental groups - Adequate due diligence must be conducted where an area of biodiversity or high ecological value is identified on the site, where at least 50% of this area must be retained. **3.** Biodiversity management plan describing measures for the conservation and protection of threatened species or communities, biodiversity enhancement, tree protection, etc. **4.** Evidence demonstrating measures have been implemented to protect and enhance endangered species / ecological communities identified; to preserve or re-establish native flora; etc.	Y	Flora and Fauna assessment report in progress. Report to be provided in future phases	Biodiversity report. No risks or futher actic	RPInfrastructure										TBC			39
Foster connections	**Productive landscape** Consider including opportunities for development of community garden within the site and relationships with community groups to occur.	Ph 1: Site Selection and Masterplan	DG2.06	GSC c14.2 Local Food Production	Site plan demonstrating location and size of community garden	NA													TBC			40
Foster connections	**Bicycle storage** Provide 1 space for every 20 students to AS2890.3 standard	Ph 2: Concept Design - Space planning	SG552 4.36	DAB c17 Sustainable Transport		Y	Needs to be reviewed as to what is existing. Residual to be added to project scope		Architect										TBC			41
Foster connections	**Community use of facilities** Some school facilities are used out of hours for activities such as weekend church groups, sport events and public meetings. Liaise with the Project Director to gain an understanding of any shared use, or community use arrangements that are being considered for the site. New schools should be designed so that direct access to the open play space, fields , hall and gym can be achieved without the public gaining access to the buildings.	Ph 2: Concept Design - Space planning	DG16.08 Department of Education's Community Use of School Facilities Implementation Procedures	DAB c308 Community Benefits	**1.** Confirmation by the Architect that direct access has been provided to open space and any other facilities that could be shared with the community. **2.** A list of community engagement activities undertaken to develop a community benefits strategy. **3.** Plans clearly outlining how the outcomes from the community benefits strategy have been implemented in the project **4.** Joint-use or lease agreements where already in place	NA													TBC			42
Foster connections	**Open play space** Open play space must be provided for students to access during recess, lunch breaks and for outdoor learning. Open play space can be comprised of - Paved and grassed areas - Rooftops and terraces - Covered outdoor areas The designated open play space must be easily monitored and managed by school staff. Where a joint use agreement can be negotiated with a local council or land owner, the required play space can be located off-site providing the facilities are - In close proximity to the school - Easily accessible - Safe and secure Designs must aim to achieve a minimum of 10m2 per student. Where this figure is not achievable the proposed m2 per student of the	Ph 2: Concept Design - Space planning	DG10.03	Not covered in Green Star	Plan view drawings showing provision of open space				Architect										TBC			43
Foster connections	**Staff room** Staff rooms should adequately accommodate staff work and recreation, and focus on indoor environment quality, enjoyment and interaction through provision of the following: •Daylight • Ventilation • Views • Landscaping/Indoor Plants • Acoustic Comfort	Ph 2: Concept Design - Space planning	EFSG Staff Unit	GSI c Amenity Space	**1.** Extracts from the EFSG requirements for staff rooms **2.** Evidence of staff room delivered accordingly	NA	Staff rooms not included in scope of works												TBC			44
Foster connections	**Reconciliation action plan (RAP)** The project should adopt formalised steps to provide opportunities for Aboriginal and Torres Strait Islander peoples Projects must implement strategies during design, construction and operation that contribute positively towards reconciliation with Australia's first people and address social inequalities within Australia is between Indigenous and non-Indigenous Australians. The project demonstrate a relationship to, and a role in delivering the action items within the Department of Education's RAP. This could include incorporation of Indigenous design strategies and Indigenous designers, celebration of indigenous culture on the site through art or landscape, and procurement from indigenous suppliers and workers. Refer to the GA NSW 'Designing with Country' Discussion paper for guidance and examples. The project must adopt all relevant requirements within the NSW Government's Aboriginal Procurement Policy (January 2021)	Ph 2-5: Architectural Design	Department of Education's Reconciliation Action Plan NSW Government Aboriginal Procurement Policy GANSW 'Designing with Country' discussion paper	DAB c30D Reconciliation Action Plan	**1.** Evidence of the project's relationship with the RAP, e.g. actions implemented in line with RAP, etc.				SINSW										TBC			45
Foster connections	**Security** Safety in Design and Crime Prevention Through Environmental Design (CPTED) principles are to be implemented in project planning stage. Advice on the electronic surveillance systems can be sought early in the design phase. CCTV systems are required in several locations where indicated in the Rooms and Spaces Technical Data table, including: - Secondary clinic - Primary sick bay - Library	Ph 2-5: Services Design	DG14.10 DG05.08 DG05.10	GSC c15 Safe Places	**1.** Crime risk assessment or equivalent **2.** Evidence of designing out crime principles implemented **3.** Security services plans, schedules and forms by School Security Unit (SSU) **4.** SSU specification and evidence of input on project specification	Y	Initial consultation with SINSW SSU team. Outcomes to be determined in detailed design phase	Pending SSU review and inpu	RPInfrastructure										TBC			46
Foster connections	**Digital Infrastructure** New buildings and refurbishments are required to provide a common wireless solution compatible across the school, providing a consistent user experience and support mechanism. This involves the replacement of existing legacy wireless equipment, such as wireless access points and site switches	Ph 2-5: Services Design	DG64.12.02	GSC c22.2 Digital Infrastructure	**1.** Contracts describing the network infrastructure specification and operational requirements	Y	Assumed for now, ICT Audit Pending	Evidence to be detailed during Detailed Desig	Electrical										TBC			47
Foster connections	**Sustainable Transport Planning / Transport Assessment** Transport planning must prioritise the delivery of feasible, connected networks and rectify transport deficiencies. The **School Transport Assessment** process must prioritise critical transport infrastructure to satisfy community expectations and statutory planning obligations. The assessment seeks to address school travel demand efficiently, safely and sustainably by maximising the most active and sustainable transport modes and reducing car parking capital expenditure and car travel demand. The School Travel Plan must be developed to inform the design response, construction traffic management, travel plan and post-occupancy operations to meet daily travel demand to school	Ph 1: Site Selection and Masterplan	Schools Transport Practice Note	DAB c17 Sustainable Transport	**1.** Transport Assessment, which must address: • A review of the school's travel demand; • The establishment of transport modes to promote during construction and post-occupancy; • Identification of transport improvements required to meet school travel demand; • Actions to inform the site design, master plan, Construction Traffic and Pedestrian Management Plan and Travel Plan; • Actions to address road safety concerns; and	Y	Crossley engaged to produce construction traffic and pedestrian management plan. Mitigation measures will be implemented pending outcome of report	Active Transport Plan	RPInfrastructure										TBC			48

Unlock human potential	**Green cleaning** Designs should support the implementation of a Green Cleaning policy for the school, this may include: - Appropriate cleaning areas are to be provided to safely store chemicals and equipment. -Hand washing stations -Use of HEPA filtration in vacuum equipment -Use of materials and surfaces that are easily cleaned.	Ph 7-9: Construction, Commissioning Post Occupancy and Operation	WoG Facilities by	GSP c6 Green Cleaning	**1.** WEB Clean School User Guide **2.** Green Cleaning specifications		To be confirmed during future design phases											TBC			49
Unlock human potential	**Healthy canteen policy** The NSW Healthy School Canteens Strategy applies to all NSW Government schools (primary, secondary and central schools) with a canteen. The school should play a role in encouraging healthy dietary options in an effort to help reduce childhood obesity through food provided in the school canteens. As such, School canteens should be designed to encourage onsite preparation, storage, display and promotion of healthy 'everyday' foods.	Ph 2: Concept Design - Space planning	Department of Education's Healthy Canteen Policy	DAB c.3DD Integrating Healthy Environments	**1.** Research report behind Healthy Canteen Policy **2.** Evidence that policy initiative has been incorporated into the school under assessment.	NA	Canteen not within scope of works											TBC			50
Unlock human potential	**Daylight glare control** Disconforting glare and brightness contrasts must be avoided. Designers must seek to: - Exclude direct sunlight from all learning spaces, libraries, administrative offices and staff studies for the period of 9.00am to 3.30pm including Eastern Daylight Saving Time between 21st September to 21st March (equinoxes). - Exclude direct sunlight from desk level in all learning spaces between 9am and 3:30pm. 'Sun exclusion and glare control can be achieved by the use of elements such as sun shades, eave extensions, tinted glazing, screens, vertical blades and the like'. Glare must only be controlled by blinds as a last resort. Designers must prepare sun diagrams in the design phase as a minimum requirement.	Ph 2-5: Architectural Design	DG12 DG07.01	DAB c12.0 Glare Reduction	**1.** Daylight glare modelling report / sun diagrams showing direct sunlight has been excluded as required. **2.** Drawings supporting inputs of model, showing location of blinds and any other glare control device	Y	provided to all north facing windows. South facing windows should be shaded by the verandah. We note that the statement "glare must only be controlled by blinds as a last resort" conflicts with its		Architect										TBC			51
Unlock human potential	**Acoustic Performance** Design of internal spaces must address the following Acoustic outcomes: **- Internal Noise Levels**: An internal noise level assessment must be carried out for all new buildings to ensure comfortable acoustic conditions for the spaces occupied. The internal noise levels within the space must meet the limits stipulated in Table 11.06.1 of Section 11.06 Acoustic Performance Guidelines or be within the range stipulated in Table 1 of the AS/NZS 2107:2016 standard. The more stringent of the two should be met.	Ph 2-5: Architectural Design	DG 11.06 DG 11.03 DG 11.02	DAB c10 Acoustic comfort	**1.** Report by qualified acoustics consultant demonstrating noise measurements are compliant. **2.** Detailed Drawings indicating sound insulation details and other relevant acoustic design features.	Y			Acoustic										TBC			52
Unlock human potential	**Noise emission (to the environmen** Generally noise emission to the environment from mechanical services noise sources (such as air conditioners) are the subject of a development consent conditions. In NSW the development consent conditions will refer to the Industrial Noise Policy (INP) or Local Council requirement. Where no condition regarding noise sources exists for a school development, noise emission from such sources should be designed to provide, to satisfy the requirements of the Industrial Noise Polic	Ph 2-5: Architectural Design	DG11.04	Not covered in Green Star	1. Report by qualified acoustics consultant	Y			Acoustic										TBC			53
Unlock human potential	**Fly free indoors** Fly screening must be provided in all schools to the doors, windows and other openings in food preparation, biology, and non-washing closet toilet spaces or where specifically nominated in the EFSG. Schools in localities where fly incidence constitutes a health hazard (especially trachoma or other nuisance) will require fly screens to all opening sashes.	Ph 2-5: Architectural Design	DG31.01	Not covered in Green Star	As-built drawings showing fly screening has been provided as required	NA	There are no external windows to the Dash Kitchenette, Hence no flyscreens allowed for.		Architect										TBC			54
Unlock human potential	**Accessibility** -All new facilities must meet current DTS provisions of the NCC and the associated standards. Generally AS 1428.1 is the minimum design standard for access and mobility. However, it is DoE's policy that any enhanced requirements noted in AS 1428.2 be incorporated in any new design. -Additionally, DoE have enhanced circulation requirements as noted in DG / CIRCULATION - Provide hearing augmentation system for areas that have amplification, generally within Gymnasium, libraries, movement studios and Communal Halls, provide a system to assist the aurally challenged to hear music and speech within the main auditorium and on the stage - Provide the International Symbol for Deafness to indicate that an assistive hearing device is installed	Ph 2-5: Architectural Design	DG19.01 DG65.14	DAB 30D Universal design	**1.** Accessibility plan **2.** As-built drawings or other evidence demonstrating that minimum and enhanced accessibility requirements have been provided for walkways, corridors, ramps, etc. **3.** Photographic or other evidence of signage installed	Y	Needs to comply with this anyway		Architect										TBC			55
Unlock human potential	**Access to Views** Building design must ensure that at least 60% of primary occupied spaces have a clear line of sight to high quality internal or external views. The space must be within 8m from the view. High quality views include: External views - vegetation, body of water, sky, or frequent outdoor movement (people, vehicles, animals) Internal views - landscaped area, water features, atrium' Note: Primary Spaces are defined as spaces that where students or staff are expected to work, or remain for an extended period of time, typically longer that 2 hours. This includes classrooms, laboratories, computer labs and office/administration are	Ph 2-5: Architectural Design	DG2.10	DAB c12.2 Views	**1.** Views Calculations and Mark-up this must be done in accordance with the GBCA'*Daylight and Views Hand Calculation Guide*: https://www.gbca.org.au/uploads/79/35919/Green%20Star_Daylight%20and%20Views%20Hand%20Calculation%20Guide%20May%202015%20REV.EA00.pdf)	Y	Calculation of views compliance has been completed and shows that Kingswood demonstrates **83.4%** of nominated area complying with views requirement	Refer to G-007 - EFSG Access to Views Assessment	Sustainability										TBC			56
Unlock human potential	**Access to Daylight** Designers must seek to maximise natural daylight in all learning and administration spaces to improve indoor amenity and create a pleasant environment and reduce energy usage through windows and skylights - Access to high levels of daylight must be ensured for at least 40% of primary occupied spaces per floor. A space is considered to have high levels of daylight if: the space has minimum 160 lux due to daylight during 80% of the nominated hours OR the following requirements are met: No overshadowing – external shading should not impinge on the direct 25 degree line from centre of the window Minimum 40% Visual Light Transmittance (VLT) for building glazing' Note: Primary Spaces are defined as spaces that where students or staff are expected to work, or remain for an extended period of time, typically longer that 2 hours. This includes classrooms, laboratories, computer labs and office/administration areas.	Ph 2-5: Architectural Design	DG2.3.1 DG12	DAB c12 Visual Comfort	**1.** Daylight modelling report demonstrating how natural daylight has been maximised in all habitable spaces; and **2.** As built drawings demonstrating that the model accurately represents the building (i.e. window size and location; skylights installed, etc.); and **3.** Specifications supporting inputs used in modelling (e.g. skylights and glass specs)	Y	Natural daylight access exceeds the required 40% area threshold. Confirmed through sDA modelling	Refer to Daylight Modelling Assessment	Sustainability										TBC			57
Unlock human potential	**Ventilation and Indoor Air Quali** The maximum Co2 concentration must not exceed **1,500ppm** for more than 20 consecutive minutes in each day A ventilation strategy must be developed to ensure that sufficient ventilation is provided to all spaces to meet the requirements of the BCA/NCC and associated standards. Specifically ventilation equipment must be designed from a whole-of-life perspective and support healthy indoor environments, energy efficiency and ease of maintenance. This must also meet requirements for: - Natural ventilation mode and cross ventilation: in line with DG5.01 - Mechanically Assisted cross ventilation: In two storey blocks where cross flow ventilation is not possible to the lower floor, mechanically assisted cross ventilation is to be provided to the lower floor learning spaces nominated in the EFSG, the design must adhere to DG57.18. - Roof ventilator control: in line with DG65.16 - Wind powered roof ventilators: Designed to suit local ambient climatic conditions to ensure correct sizes, locations and numbers as detailed in DG57.14 - Sanitary Spaces sufficient natural ventilation or mechanical ventilation, to disperse odours and /or humidity in line with - Cross ventilation is to be used where possible. - Provide mechanical ventilation to all Disabled Toilets. - Ventilation in storage spaces in line with DG5.05 - Ventilation in permanent learning spaces and libraries in line with DG55 - Outdoor air requirements and control of Indoor CO2 levels - designs must adhere to DG55.02 - Ventilation in printing rooms: The ventilation system is to be designed to serve the whole room and is not intended to provide localised exhaust at equipment. Adhere to ventilation requirements set out in DG57.1	Ph 2-5: Services Design	DG57.01 DG05.04 DG05.05 DG57.16 DG05.01 DG57.18 DG05.02 DG37 DG65.16 Thermal Comfort and Indoor Air Quality – Performance Brief	DAB c15 GHG Emissions Reduction	**1.** Cooling system strategy including WOL analysis **2.** Concept plans **3.** Construction drawings **4.** Trade-based specification **5.** As built drawings, including indication of windows and cross ventilation	N	All items comply with the noted requirements, with the exception of the roof ventilator, which will be noted as a departure, noting that there is no printing room or chemical store rooms within the scope of this project.	To be provided in future versions of this docume	Mechanical										TBC			58
Unlock human potential	**Lighting comfort** - Consider the furniture layouts to determine the orientation of luminaires. Especially when positioning luminaires in Materials Technology spaces to ensure adequate illumination on machines and work surfaces; - avoid potential stroboscopic effects and avoid shadows from ductwork - Mount luminaires as high as possible, but generally no higher than 4000mm AFFL (excluding Gymnasiums and Halls), to improve luminance uniformity and reduce direct glare in the direction of normal view - The standard lamp colour temperature is 4,000°K, except in certain toilet areas where the Design Guide requires the use of blue colours. - The Colour Rendering Index (CRI) for light sources must be minimum 80 or higher - Compliance with the uniformity requirements stipulated in Table 3.2 of the AS/NZS 1680 standard should be demonstrated by the presentation of the output from lighting design software. - The Unified Glare Rating (UGR) must be calculated in accordance with the procedure outlined in Clause 8.3.3 of AS/NZS 1680.1:2006 standard, and the calculated value must not exceed the maximum values specified in Table 8.2 of the standard - The maintained illuminance levels must meet the recommended levels as specified in the AS/NZS 1680 standard., and the maintained illuminance values achieve a uniformity of no less than the values given in Table 3.2 of AS 1680.1:2006, with an assumed standard maintenance factor of 0.8. - To ensure flicker-free lighting, the following luminaire requirements should be considered: LED lighting – electronic drivers with 12-bit or greater resolution - Modelling must provide output that clearly demonstrates that the proposed design is compliant with the standards including but not	Ph 2-5: Services Design	DG63.03	DAB c11 Lighting Comfort DAB c11.1 General Illuminance and Glare Reduction	**1.** Lighting drawings **2.** Architectural drawings **3.** Lighting specifications / schedules 4. Product data sheets **5.** Isolux plot drawings **6.** Lighting modelling report showing compliant uniformity and UGRs	Y	Assumed to be included in patternbook documentation for standard hubs	To be detailed in future revision	Electrical										TBC			59
Unlock human potential	**Thermal comfort** The inclusion of active cooling within school facilities is directed by the Department's Air Cooling policy: 2.1 Schools with a long term average mean maximum January temperature of 33 oC and above: Generally, air conditioning is to be provided to all school buildings. 2.2 Schools with a long term average mean maximum January temperature of below 33oC: Air conditioning is to be installed in all permanent learning spaces and libraries forming part of each projects scope. - Thermal modelling is undertaken to demonstrate that learning spaces and libraries have been designed to achieve a predicted mean vote (PMV) of +/- 1 for 95% of occupied hours	Ph 2-5: Services Design	DG06.03 DG55.01 DG55.02	DAB c14 Thermal Comfort	**1.** Mechanical drawings showing HVAC systems installed, or **2.** Confirmation from sub-contractors that services have been installed and commissioned as required; and **3.** Modelling report showing required PMV is achieved. Modelling report to be done in line with methodology described in Draft thermal comfort and indoor air quality interim performance brief for DG55	Y	Air conditioning is provided to all nominated spaces within the projects scope, and will meet the thermal comfort requirements, subject to future modelling	Refer to Mechanical Concept Repo	Mechanical										TBC			60
Unlock human potential	**Microbial control** As a measure to prevent legionella, heated water to hand basins, showers etc. shall be stored at temperature above 65 C. Thermostatic mixing valves are to be used for tempered water generation at each point of use. Valves need to comply with microbe disinfection requirements - "Code of Practice for Thermostatic Mixing Valves NSW" as approved by the NSW Health Department.	Ph 2-5: Services Design	DG51.09 DG53.11	DAB c28 Microbial Control	1. Letter by hydraulic engineer confirming hot water is stored above 65 deg and that valves comply with code of practice.	Y			Hydraulics										TBC			61
Unlock human potential	**External access lighting** External Access Lighting shall be provided to illuminate building entrances, footpaths, sheltered walkways, roadways and car parks. External Access Lighting must: - Be minimal and designed to prevent glare to pedestrians, nearby residents and to motorists. Evidence of compliance with AS4282, AS/NZS 1158 and other applicable Australian Standards must be provided by the designer. - Be located so as to link various sources of illumination such as street lighting (for carpark and roadways) and internal security lighting (for footpaths, walkways and entrances). - Illuminate building entry doors. -Highlight 'accident-prone' areas such as changes in level, stairs and ramps. - Provide vertical illumination	Ph 2-5: Services Design	DG63.08.01	DAB c27.0 Light Pollution to Neighbouring Bodies	**1.** As built drawings indicating the location of all external luminaires **2.** Letter by lighting designer describing glare prevention measures	Y	External lighting product selections out of NDY scope. Specifications will prescribe for contractor's selections to reduce glare and comply with AS4282 & AS/NZS 1158.	To be detailed in future revision	Electrical										TBC			62

Unlock human potential	**Low VOC-emitting materials** All surface coatings, and other volatile organic compound (VOC) emitting products including adhesives, sealants, carpets, carpet tiles, and carpet underlays, must be made from low-VOC emission materials. - Paints must meet the limits stipulated in the Australian Paint Approval Scheme's (APAS) VOC limits for low VOC paints. -Paints, adhesives and sealants must not exceed the maximum VOC limits stipulated in the Green Star Buildings rating tool. - Carpets must not exceed the total VOC limits stipulated in the Green Star Buildings tool.	Ph 3-4: Product and Material Selection	DG2.5.2	DAB c13 Indoor Pollutants	**1.** Product specifications, certificates, safety datasheets that demonstrate low-VOC contents **2.** Bill of quantities	Y	Will be detailed further in specifications		Architect											TBC			63
Unlock human potential	**Low formaldehyde-emitting materials** Only low formaldehyde-emitting engineered wood products should be used, such as those that meet the Australian Standards for formaldehyde emission limit E1 (NICNAS classification) or lower. The engineered wood products must not exceed the emissions limits stipulated in the Green Star Buildings rating tool. Engineered wood products include particleboard, plywood, Medium Density Fibreboard (MDF), Laminated Veneer Lumber (LVL), High-Pressure Laminate (HPL), Compact Laminate and decorative overlaid wood panels. This requirement excludes formwork.	Ph 3-4: Product and Material Selection	DG2.5.2	DAB c13 Indoor Pollutants	**1.** Product specifications, certificates, safety datasheets that demonstrate low-formaldehyde contents Bill of quantities	Y	Will be detailed further in specifications		Architect											TBC			64
Unlock human potential	**Acoustic post-occupancy evaluatio** Post Occupancy evaluations are often undertaken to assess the performance of recently completed or existing facilities. Where a Post Occupancy Evaluation is to be undertaken it should be conducted by the project team or acoustic engineer and should be undertaken of selected acoustic parameters only. Evaluation must include (as per the above criteria) - Internal noise levels, - Room acoustics, - Noise emission, - Room-to-room acoustics performance The noise measurement and documentation must be provided by a qualified acoustic consultant and in accordance with AS/NZS 2107:2016 Measurements shall be conducted in at least 10% of regularly occupied space	Ph 7-9: Construction, Commissioning, Post Occupancy and Operation	DG11.07	GSP c13 Internal Noise Levels	1. Commitment by SI to conduct acoustic post-occupancy evaluation															TBC			65
Unlock human potential	**Pesticide free environments** Schools must be designed, constructed and maintained, without using chemicals for termite and other pest control. No chemical pesticides and termicide to be used. Preventive treatments to be by physical means and careful design to minimise e	Ph 7-9: Construction, Commissioning, Post Occupancy and Operation	DG2.5.3	Not covered in Green Star	Statement by head contractor that no pesticides or termites have been used.															TBC			66

CONTACT US

AUSTRALIA

ADELAIDE

T: +61 8 8290 6800
E: adelaide@ndy.com

BRISBANE

T: +61 7 3120 6800
E: brisbane@ndy.com

CANBERRA

T: +61 2 6295 1788
E: canberra@ndy.com

GOLD COAST

T: +61 7 5512 1235
E: goldcoast@ndy.com

MELBOURNE

T: +61 3 9862 6800
E: melbourne@ndy.com

PERTH

T: +61 8 9281 6800
E: perth@ndy.com

SYDNEY

T: +61 2 9928 6800
E: sydney@ndy.com

CANADA

VANCOUVER

T: +1 604 734 9338
E: vancouver@ndy.com

NEW ZEALAND

AUCKLAND

T: +64 9 307 6596
E: auckland@ndy.com

WELLINGTON

T: +64 4 471 0151
E: wellingtonadmin@ndy.com

UNITED KINGDOM

LONDON

T: +44 20 7553 9494
E: london@ndy.com

IRELAND

DUBLIN

T: +353 1 264 6995
E: dublin@ndy.com

To find out more about NDY go to **ndy.com** or follow us on LinkedIn