



REPORT

Sustainable Development Plan

Upgrade to Dundas Public School
Department of Education

CONFIDENTIAL

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CHANGE LOG

REVISION	VERSION	COMMENT
2.0	Schematic Design	General updates to reflect design development
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 PREAMBLE

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 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 Milton 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 activity.

1.5 SITE DESCRIPTION

Refer to Section 3 for details.

1.6 PROPOSED ACTIVITY DESCRIPTION

Refer to Section 3 for details.

1.7 MITIGATION MEASURES

It is noted that Sustainability (ESD) does not produce designs, we simply coordinate and input our requirements into the designs of other disciplines (i.e. sustainability items are expressed through the architectural, mechanical, electrical etc. design). Mitigation measures are detailed within the relevant discipline reports.

1.8 EVALUATION OF ENVIRONMENTAL IMPACTS

It is noted that Sustainability (ESD) does not produce designs, we simply coordinate and input our requirements into the designs of other disciplines (i.e. sustainability items are expressed through the architectural, mechanical, electrical etc. design). Evaluation of Environmental Impacts are detailed through relevant discipline reports.

2 EXECUTIVE SUMMARY

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

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

- Clause 193 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 SINSW sustainability brief, detailed in the SINSW Sustainable Development Practice Note, with key scope including:

- SINSW EFSG compliance
- NCC Section J compliance

Mitigation Measures

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

- 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
- Specialist waste consultant to be engaged to develop an operational waste management plan (OWMP). OWMP principles to be incorporated into the design in future project stages, 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.
- Waste management plans for demolition, construction and operation of the site. Minimum of 90% of construction and demolition waste to be diverted from landfill.
- 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 to be undertaken in future project stages. Refer to 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.
- 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 DfS 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 will be demonstrated via energy modelling in schematic design. Specific energy efficiency provisions will 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 solar photovoltaic (PV) system. It is noted that the Dundas Primary School works includes provision for a solar PV array, exact sizing to be confirmed in future versions of this report.
- High-efficiency water fixtures.
 - Reduction in embodied carbon of materials, achieved through sustainable concrete and steel selection.
 - 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 at least 0.5 stars above the average rating at the time of purchase.
 - To encourage active and public transport, bicycle parking for staff and students to be provided to the activity.
 - 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.
 - Specified stormwater pollution reduction targets are met.
 - Appropriate lighting design to reduce light pollution of external lights, including compliance with AS4282, AS/NZS 1158
 - All heat-rejection systems to be waterless to eliminate risk of Legionella (no cooling towers)

3 PROJECT SUMMARY

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 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 SITE DESCRIPTION

DPS is located at 85 Kissing Point Road, Dundas. The school site is bound by Kissing Point Road to the north and Calder Road to the south. Kenworthy Street is located parallel to the site to the east as is Saint Andrews Street to the west. The site has an area of 1.99 ha and comprises 1 allotment legally known as Lot 3 DP 610.

The site currently comprises an existing co-education primary (K-6) public school with 9 permanent buildings, 6 demountable structures (1 demountable includes 2 classrooms), interconnected covered walkways, play areas, on-grade parking, sports court and green spaces with mature trees.

Majority of the buildings are 1 storey with only one 2-storey building being Building A (Admin/staff hub and amenities building). Buildings are clustered to the north of the site, with the southern part comprising of a large play area/informal sports oval and a sports court.



FIGURE 1: AERIAL IMAGE OF THE SITE

The school is located within climate zone 6 – mild temperate conditions, which is associated with:

- High diurnal ranges inland and four distinct seasons
- Summer and Winter that can exceed human comfort range, while spring and autumn are ideal for human comfort
- Mild to cool winters with low humidity
- Hot to very hot summers, with moderate humidity

3.3 PROPOSED ACTIVITY DESCRIPTION

The proposed activity involves upgrades to the existing DPS, including the following:

- Creation of 6 new teaching spaces and 2 learning commons in a single-story building
- Installation of covered walkways connecting the new building to the existing school network
- Landscaping and external works around the new building and eastern entry
- Upgrades to site infrastructure and services to support the new building.

The intent of the activity is to increase the number of permanent teaching spaces (PTS) from 9 to 15 and students from 331 to 391.

Refer to Figure 2 - Schematic Site Plan for an overview of the proposed activity.

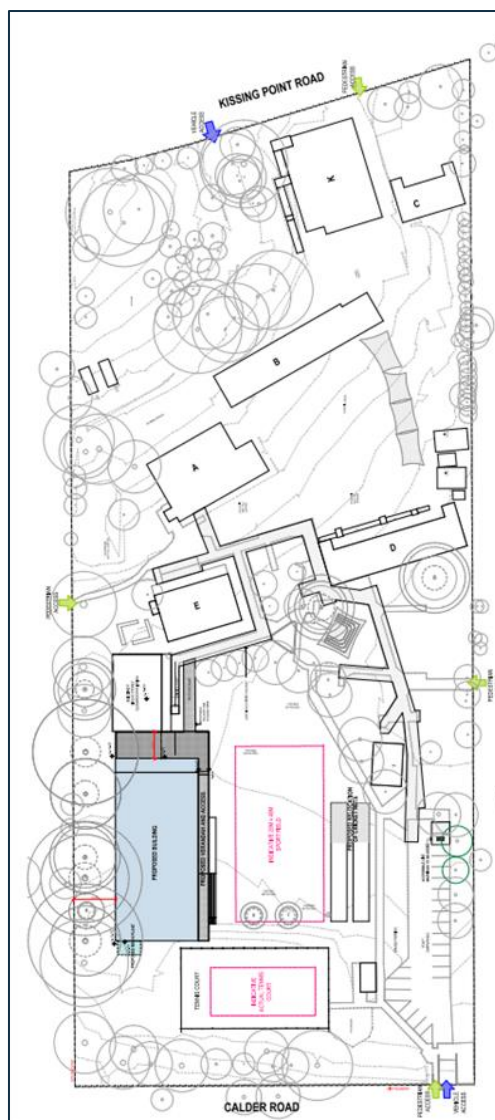


FIGURE 2 - SCHEMATIC SITE PLAN

3.4 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 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 Dundas Primary 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 project'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 has been undertaken 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'
- A project-specific Aboriginal Participation Plan will be developed to monitor and report on the minimum Aboriginal participation requirements.

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 activity 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.

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 activity 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 requirements. 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 outlining specific initiatives incorporated for the project.

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 development principles outline design and construction practices which support the activity 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
- Building information to facilitate operator and user understanding
- Metering and monitoring

6.1.2 PROPOSED INITIATIVES

The following initiatives are currently included in the preliminary sustainability strategy, in order to ensure that the project 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
- Specialist waste consultant to be engaged to develop an operational waste management plan (OWMP). OWMP principles to be incorporated into the design in future project stages, 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.
- Waste management plans for demolition, construction and operation of the site. Minimum of 90% of construction and demolition waste to be diverted from landfill.

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 to be undertaken in future project stages. Refer to 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.

6.3 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 direct fossil fuel use on site (natural gas or diesel)
- Offsetting of residual carbon emissions
- 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.

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 will be demonstrated via energy modelling in schematic design. Specific energy efficiency provisions will 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 solar photovoltaic (PV) system. It is noted that the Dundas Primary School works includes provision for a solar PV array, exact sizing to be confirmed in future versions of this report.
- High-efficiency water fixtures.
- Reduction in embodied carbon of materials, achieved through sustainable concrete and steel selection.
- 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 at least 0.5 stars above the average rating at the time of purchase.

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:

- To encourage active and public transport, bicycle parking for staff and students to be provided to the activity.

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.

6.6 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 of external lights, including compliance with AS4282, AS/NZS 1158
- All heat-rejection systems to be waterless to eliminate risk of Legionella (no cooling towers)

7 CLIMATE CHANGE RESILIENCE

The projected impacts of climate change on the proposed activity has been assessed, based on predicted climate change models. A Climate Adaptation Workshop was held with all project stakeholders on 08 Nov 2024. The workshop goals were to:

- Identify and describe risks posed by climate change to the activity 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 and EFSG requirements. Expected impacts from climate change will be 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:

- Greater than 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
- Water sensitive urban design
- Stormwater management, and groundwater and drinking water catchment protection
- 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.

Mitigation Measures

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

- 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
- Specialist waste consultant to be engaged to develop an operational waste management plan (OWMP). OWMP principles to be incorporated into the design in future project stages, 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.
- Waste management plans for demolition, construction and operation of the site. Minimum of 90% of construction and demolition waste to be diverted from landfill.
- 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 to be undertaken in future project stages. Refer to 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 EFG guidelines.
- 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 EFG Section DG02.03
- Final improvement will be demonstrated via energy modelling in schematic design. Specific energy efficiency provisions will 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 solar photovoltaic (PV) system. It is noted that the Dundas Primary School works includes provision for a solar PV array, exact sizing to be confirmed in future versions of this report.
- High-efficiency water fixtures.
- Reduction in embodied carbon of materials, achieved through sustainable concrete and steel selection.

- 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 at least 0.5 stars above the average rating at the time of purchase.
- To encourage active and public transport, bicycle parking for staff and students to be provided to the activity.
- 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.
- Specified stormwater pollution reduction targets are met.
- Appropriate lighting design to reduce light pollution of external lights, including compliance with AS4282, AS/NZS 1158
- All heat-rejection systems to be waterless to eliminate risk of Legionella (no cooling towers)

10 APPENDICES

10.1 SINSW ESD SCHEDULE

PROJECT: REVISION AUTHOR		SINSW SUSTAINABILITY REVIEW															INDEPENDENT SUSTAINABILITY VERIFICATION				Potential Impact of Report on Green Star Points: Y, N, N/A	Documentar y Evidence provided?	Evidence Index (optional)
Sustainability Strategy Priority		Sustainability Initiatives / requirements Where applicable, this is an extract only from the relevant ESDG. For full requirements refer to https://efsg.dcd.nsw.edu.au/		Project stage	Baseline for Initiative	Consistent with Green Star	Recommended evidence to demonstrate compliance	Has this been implemented in the project? Y or N or N/A?	Contractor's ESD compliance comments	Actual evidence The 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 prepared 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		
Act on climate change	Energy consumption	Implementation over NEC All new facilities must be designed and built so that energy consumption is predicted to be at least 10% lower than if built to minimum compliance with National Construction Code requirements.	Each building's system and layout must comply with the corresponding Section 1 requirements in the National Construction Code that is, the building cannot show that their layout, 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	DD22.03 GSEP	DA8-155 G GHS Emissions Reduction Compliance Requirement	1. Energy modelling report / Predictive energy modelling and thermal comfort assessment. Report needs to show at least 10% improvement of building over minimum NEC 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, thermal mass, etc. 4. As an alternative to 2 and 3 above, a Statement by energy modeller confirming that the model accurately represents the building.	Y	Refer to Energy Modelling Assessment	Sustainability											TBC		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 DA8 155, DA 160.02 and DA8 171.2 as well as the GSA 1000 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 - Glazing	Ph 2-5 Architectural Design	DD25 DD26.02 DD27.12	DA8-155 GHS Emissions Reduction Compliance Requirement	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	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 system and the selection of fittings is to be undertaken based on a Whole of Life approach, such as durability and control gear with a long life Section 1 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 smart or sensor feedback controllability Lighting designs should be carried out utilising industry standard lighting design software such as AG32, Dialux or Relux.	System must support sustainable design principles including reducing energy consumption, such as smart or sensor feedback controllability Lighting designs should be carried out utilising industry standard lighting design software such as AG32, Dialux or Relux.	Ph 2-5 Design	DD22.3.1 DD23.02 DD23.04 DD23.06 DD26.02.02	DA8-155 GHS Emissions Reduction	1. Lighting drawings 2. Lighting specifications / schedules 3. Lighting modelling report showing compliant power densities	Y	Assumed to be included in performance documentation for standard built	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 DA8 63.06 Consistent Light Output and Daylight Harvesting systems are recommended given their ability to reduce lighting energy whilst maintaining visibility in spaces. Consideration should be given to these strategies as explained in DA8 63.06 Including daylight sensors in rooms to reduce light output or turn off light when sufficient daylight is provided within the space Other than the space large and permeable 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 not prohibitive. The switching should be clearly marked and robust. Provisions for energy efficient switching in Schools are outlined within DD23 and DD26.	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 DA8 63.06 Consistent Light Output and Daylight Harvesting systems are recommended given their ability to reduce lighting energy whilst maintaining visibility in spaces. Consideration should be given to these strategies as explained in DA8 63.06 Including daylight sensors in rooms to reduce light output or turn off light when sufficient daylight is provided within the space Other than the space large and permeable 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 not prohibitive. The switching should be clearly marked and robust. Provisions for energy efficient switching in Schools are outlined within DD23 and DD26.	Ph 2-5 Design	DD26.06 DD26.07 DD26.08.01	DA8-155 GHS Emissions Reduction Compliance Requirement	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 performance documentation for standard built	Electrical													4
Act on climate change	Energy efficient equipment & appliances	Electrical equipment must be at least 5.0 stars above the market average star rating or comply with high efficiency standards specified in the GSEP HVAC system must have fixed or sensor feedback functionality for energy consumption Systems shall be designed to minimise energy consumption. System design / equipment selection is to be based on whole of life approach Detailed assessment are outlined within ESDG	Electrical equipment must be at least 5.0 stars above the market average star rating or comply with high efficiency standards specified in the GSEP HVAC system must have fixed or sensor feedback functionality for energy consumption Systems shall be designed to minimise energy consumption. System design / equipment selection is to be based on whole of life approach Detailed assessment are outlined within ESDG	Ph 2-5 Services Design	DD22.3.3 DD25	DA8-155 GHS Emissions Reduction	1. Technical or appliance are equipment are their star ratings or previous standards, signed by head contractor or architect. All appliances and equipment required in the GSEP must be listed, not 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 WOLC and not just initial cost	Y	HVAC controls are based on BEMS requirements, which comply with the control rule	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 DD24.02	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 DD24.02	Ph 2-5 Services Design	DD26.02	DA8-155 GHS 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	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 system (described in DA8 155.05 Thermal Comfort and Indoor Air Quality Policy) should be used to inform the suitability of outdoor conditions to utilise natural ventilation.	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 system (described in DA8 155.05 Thermal Comfort and Indoor Air Quality Policy) should be used to inform the suitability of outdoor conditions to utilise natural ventilation.	Ph 2-5 Services Design	DD25 DD 15.01 DD25.01	DA8-155 GHS Emissions Reduction Compliance Requirement	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 ESDG	Mechanical													7
Act on climate change	Renewable energy	Grid-connected solar PV system must be installed in line with DD26 requirements Where feasible, PV systems shall be installed to offset as much of the electricity consumed by the school as is practicable	Grid-connected solar PV system must be installed in line with DD26 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 Design	DD22.3.4 DD25	DA8-155 GHS Emissions Reduction Compliance Requirement	1. As installed drawings of PV system 2. Energy modelling report showing renewable energy generation	Y	PV system to be installed and used to offset building consumption	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@nsw.edu.au	A battery energy storage system shall only be designed in consultation with SINSW Sustainability sustainability@nsw.edu.au	Ph 2-5 Services Design	DD26.6.1	DA8-155 GHS Emissions Reduction Compliance Requirement	As installed drawings of battery storage system	Y	As installed drawings of battery storage system	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 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 Bush 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 bushfire management strategies: Keep the amount of fuel (leaves, twigs, logs, dead grass) in the vicinity of buildings to a minimum. Trim bush trees to limit fuel from buildings to avoid branches overhanging and leaves collecting on roofs. Do not plant shrubs against buildings. Plant the resistant trees and shrubs on the hazard side of the development to reduce the potential impact of wind, fire intensity, radiant heat, and risk of spread as well as intercepting burning embers. Avoid combustible fencing materials.	Electric heating must be preferred over gas heating. Where gas heating is considered, it must be approved by SINSW Sustainability 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 Bush 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 bushfire management strategies: Keep the amount of fuel (leaves, twigs, logs, dead grass) in the vicinity of buildings to a minimum. Trim bush trees to limit fuel from buildings to avoid branches overhanging and leaves collecting on roofs. Do not plant shrubs against buildings. Plant the resistant trees and shrubs on the hazard side of the development to reduce the potential impact of wind, fire intensity, radiant heat, and risk of spread as well as intercepting burning embers. Avoid combustible fencing materials.	Ph 2-5 Services Design	DD26	DA8-155 GHS Emissions Reduction	1. If reverse cycle air conditioning is installed, confirmation that gas heaters are not installed, OR 2. Confirmation 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 RESOURCES	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 systems such as solar heating (if viable) and heat pumps are preferred energy sources to conventional systems. The following detailed reports/ surveys/ information should be considered in developing the business case: - Site, drainage and erosion team including flood risks (if any) - Geotechnical and soil conditions - Airborne pollutants - Building risks - Approval 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 separate planning or development controls. See bushfire prone areas.	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 systems such as solar heating (if viable) and heat pumps are preferred energy sources to conventional systems. The following detailed reports/ surveys/ information should be considered in developing the business case: - Site, drainage and erosion team including flood risks (if any) - Geotechnical and soil conditions - Airborne pollutants - Building risks - Approval 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 separate planning or development controls. See bushfire prone areas.	Ph 2-5 Services Design	DD23.09	DA8-155 GHS Emissions Reduction	1. WOLC cost assessment for hot water systems 2. Hydraulic drawings/schematics showing installed DWV systems	Y		Hydraulics													11
Build resilience	Climate change adaptation	Resilient buildings 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 accelerated flood, storm surge, inundation, heatwaves, bush fire, extreme storm and other weather events. School facilities must be able to withstand natural hazards and adapt to climate change over time, especially for projects involving vulnerable communities e.g. climate generating accelerated flood, storm surge, inundation, heatwaves, bush fire, extreme storm and other weather events. The business case development for that associated costs are budgeted. An initial assessment of natural hazards and project vulnerability must be carried out, in consultation with resilience experts, to the business case and identify hazards where further analysis is required.	Resilient buildings 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 accelerated flood, storm surge, inundation, heatwaves, bush fire, extreme storm and other weather events. School facilities must be able to withstand natural hazards and adapt to climate change over time, especially for projects involving vulnerable communities e.g. climate generating accelerated flood, storm surge, inundation, heatwaves, bush fire, extreme storm and other weather events. The business case development for that associated costs are budgeted. An initial assessment of natural hazards and project vulnerability must be carried out, in consultation with resilience experts, to the business case and identify hazards where further analysis is required.	Ph 1-10 Adaptation and Resilience	DD23.02	DA8-155 GHS Emissions Reduction	1. Detailed reports or surveys developed 2. Environmental risk report 3. Evidence demonstrating recommendations have been implemented and risks addressed through design responses.	Y	Climate change risk assessment workshop completed	Hydrogeology													12
Build resilience	Bush fire protection	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 Bush 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 bushfire management strategies: Keep the amount of fuel (leaves, twigs, logs, dead grass) in the vicinity of buildings to a minimum. Trim bush trees to limit fuel from buildings to avoid branches overhanging and leaves collecting on roofs. Do not plant shrubs against buildings. Plant the resistant trees and shrubs on the hazard side of the development to reduce the potential impact of wind, fire intensity, radiant heat, and risk of spread as well as intercepting burning embers. Avoid combustible fencing materials.	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 Bush 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 bushfire management strategies: Keep the amount of fuel (leaves, twigs, logs, dead grass) in the vicinity of buildings to a minimum. Trim bush trees to limit fuel from buildings to avoid branches overhanging and leaves collecting on roofs. Do not plant shrubs against buildings. Plant the resistant trees and shrubs on the hazard side of the development to reduce the potential impact of wind, fire intensity, radiant heat, and risk of spread as well as intercepting burning embers. Avoid combustible fencing materials.	Ph 1-10 Adaptation and Resilience	DD23.02	DA8-155 GHS Emissions Reduction	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	Hydrogeology													13
Build resilience	Climate change adaptation	Resilient buildings 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 accelerated flood, storm surge, inundation, heatwaves, bush fire, extreme storm and other weather events. School facilities must be able to withstand natural hazards and adapt to climate change over time, especially for projects involving vulnerable communities e.g. climate generating accelerated flood, storm surge, inundation, heatwaves, bush fire, extreme storm and other weather events. The business case development for that associated costs are budgeted. An initial assessment of natural hazards and project vulnerability must be carried out, in consultation with resilience experts, to the business case and identify hazards where further analysis is required.	Resilient buildings 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 accelerated flood, storm surge, inundation, heatwaves, bush fire, extreme storm and other weather events. School facilities must be able to withstand natural hazards and adapt to climate change over time, especially for projects involving vulnerable communities e.g. climate generating accelerated flood, storm surge, inundation, heatwaves, bush fire, extreme storm and other weather events. The business case development for that associated costs are budgeted. An initial assessment of natural hazards and project vulnerability must be carried out, in consultation with resilience experts, to the business case and identify hazards where further analysis is required.	Ph 1-10 Adaptation and Resilience	DD23.02	DA8-155 GHS Emissions Reduction	1. Climate risk assessment, and 2. Climate adaptation plan 3. Emergency management plan	Y	Climate change risk assessment workshop completed by N27 with input from all design disciplines. All risks and their ratings are identified within the report	Hydrogeology													14
Build resilience	Weather protection	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.	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 2-5 Architectural Design	DD23.02	DA8-155 GHS Emissions Reduction	As built drawings showing circulation areas are protected as required	Y	All circulation areas have a roof to protect against weather	Architect													15

Build resilience	<p>The roof colour will also have an impact on the thermal performance of the roof, therefore the product's Solar Reflectance Index should be considered to mitigate the heat island effect.</p> <p>The product selected must meet the following three-year Solar Reflectance Index (SRI) requirements:</p> <p>For roof pitch < 15, minimum SRI of 64 For roof pitch > 15, minimum SRI of 64</p> <p>Where a three-year SRI is not available, the following requirements must be met: For roof pitch < 15, minimum SRI of 62 For roof pitch > 15, minimum SRI of 62</p>	Ph 3-4: Product and Material Selection	DO20 Fabric	DAB-125 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 landscape materials.	6	Roof Colour will be Substantiated	Architect													TBC			16
Consume responsibly	<p>Building User's Guide</p> <p>Produce a Building User's Guide to enable the client to understand the building systems and operate systems to maximise efficiency.</p> <p>1. Clearly and concisely describe the operation of building and its services 2. Detail a measurable maintenance program 3. Advise the user of the most suitable replacements for consumables</p>	Ph 7-8: Construction, Commissioning, Post Occupancy and Operation	DAB-14 Building Information		1. Building user's guide	6	Building User's Guide	Architect													TBC			17
Consume responsibly	<p>Stormwater management</p> <p>Must aim to minimise the transportation of pollutants to waterways and other effluent environments, and maintain the existing hydrological regime. Due diligence for flooding must be done early to inform building and landscape design.</p> <p>Drinking water catchment protection</p> <p>For developments within drinking water catchment areas, a water cycle management study is to be included with the Development Application for Education Facility developments including:</p> <ul style="list-style-type: none">Agriculture facilitiesStocks and effluent reuse schemesSewerage systems or works (including package sewerage treatment plants)Stormwater or effluent treatment (including the disposal of untreated effluent)	Ph 1: Site Selection and Assessment	DO2-4.3	DAB-126 Stormwater	1. Stormwater modelling report showing stormwater pollution and flows. 2. Civil / Hydraulic drawings showing management measures. 3. Water sensitive urban design report (if WUSUD was used)	6	Stormwater modelling report showing stormwater pollution and flows. 2. Civil / Hydraulic drawings showing management measures. 3. Water sensitive urban design report (if WUSUD was used)	Architect													TBC			18
Consume responsibly		Ph 1: Site Selection and Assessment	DO21-07	DOC-124 Integrated Water Cycle	1. Water cycle management study 2. Evidence that recommendations in the study have been followed / implemented	6	Water cycle management study	Architect													TBC			19
Consume responsibly	<p>Where a new school is to be developed a Hazardous Materials study is to be conducted, including:</p> <ul style="list-style-type: none">Asbestos Containing Materials (ACM)Synthetic Mineral Fibres (SMF)Polyfluorinated Ethers/Polyfluorinated Ethers (PFPEs)Lead PaintChemical Disinfectants <p>Any existing structures and all parts of the site should be examined in order to determine the presence of hazardous materials by means of any remediation or demolition.</p> <p>Inspection should be conducted in accordance with DG46.</p>	Ph 1: Site Selection and Assessment	DG46-02	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 audit certificates / clearance certificates	6	Hazardous materials study / site inspection report / survey 2. Management plans for hazardous materials identified 3. Remediation strategies implemented 4. Environmental audit certificates / clearance certificates	Architect													TBC			20
Consume responsibly	<p>Operational waste</p> <p>A waste storage area must be included in all new school sites. The provision of space must include source separation including for stations and appropriate storage of waste and recyclables for multiple waste streams, including:</p> <ul style="list-style-type: none">OrganicsCompostable containersPaper & cardboardContainer deposit schemeSoft plasticsGeneral waste <p>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.</p> <p>Safe methods for vehicle access and the transfer of waste must also be considered.</p> <p>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 DO2-7.2</p>	Ph 2: Concept Design - Space Planning	DO202-7.1	DAB-18 Operational Waste	Operational waste management plan Operational waste reports showing diversion rates	6	Operational waste management plan Operational waste reports showing diversion rates	Architect													TBC			21
Consume responsibly	<p>Building flexibility</p> <p>Position structural members considering the future flexibility of the structure. Avoid ad hoc placing of columns internally, giving preference to symmetry in layout. Design all internal walls as non-load bearing to enable future flexibility.</p>	Ph 2: Concept Design - Space planning	DO212-1.16	Not covered in Green Star	As built drawings or statement by relevant professional	6	As built drawings or statement by relevant professional	Architect													TBC			22
Consume responsibly	<p>Hydraulic services</p> <p>Hydraulic services should:</p> <ul style="list-style-type: none">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 performedUse products with a long life span - many hydraulic services are concealed or durability is essential	Ph 2-5: Services Design	DO21-01	DAB-138 Potable Water	1. Hydraulic report showing sustainability initiatives implemented to reduce potable water consumption 2. As built drawings showing trade waste services	6	Hydraulic report showing sustainability initiatives implemented to reduce potable water consumption 2. As built drawings showing trade waste services	Architect													TBC			23
Consume responsibly	<p>Water sub-metering</p> <p>In addition to the water meter for the site provide sub-meters for the following:</p> <ul style="list-style-type: none">Internal irrigation systemsLaboratory buildingsAnnexes/clinicsCanteensAny other major water use on the site	Ph 2-5: Services Design	DO23-04	DAB-150 Metering	1. As built hydraulic drawings	6	As built hydraulic drawings	Architect													TBC			24
Consume responsibly	<p>Rainwater collection</p> <p>Include roof water harvesting and tank storage in new schools and where practical in existing schools to reduce the demand on drinking water supplies.</p> <p>Tank water can connect to drip irrigation systems for adjacent landscape/gardens with the major preference being for gravity for supply to minimise ongoing maintenance.</p> <p>The rainwater tanks must be connected to toilets for toilet flushing. If this is not feasible, approval must be granted by DPE.</p>	Ph 2-5: Services Design	DO23-14 DO2-4.2 DO23-02	DAB-138.2 Rainwater Reuse	1. As built hydraulic drawings showing tank connection to end uses and capacity	6	As built hydraulic drawings showing tank connection to end uses and capacity	Architect													TBC			25
Consume responsibly	<p>Pipe system water reuse</p> <p>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 the systems testing and maintenance water, or by using an alternative non-potable water source.</p>	Ph 2-5: Services Design	DO22-4.2	DAB-138.5 Fire System Test Water	Fire engineering report	6	Fire engineering report	Architect													TBC			26
Consume responsibly	<p>Ground water</p> <p>Where ground water is available for use for irrigation purposes in drought affected locations, enquiries must be undertaken with Department of Planning, Industry and Environment to determine the suitability of a ground water system.</p>	Ph 2-5: Services Design	DO23-03	DAB-139 Potable Water	1. Relevant due diligence report / investigation	6	Relevant due diligence report / investigation	Architect													TBC			27
Consume responsibly	<p>Trade waste</p> <p>Provision for cold, green, plaster and clay of adequate capacity must be installed to treat wastewater from science laboratories, kitchens, art rooms and canteens as required in DO22.</p>	Ph 2-5: Services Design	DO22	Not covered in Green Star	2. Letter by Hydraulic Engineer confirming error has been installed as required	6	Letter by Hydraulic Engineer confirming error has been installed as required	Architect													TBC			28
Consume responsibly	<p>Water fixture efficiency</p> <p>All products must be selected to meet the following minimum WELS ratings:</p> <ul style="list-style-type: none">Toilets to 5 star flow rating requirementsShowers to have 3 star flow rating requirementsWater Closet Pans to 4 star flow rating requirementsUrinals to 5 star flow rating requirementsThese restrictions can be used to minimise water usage and wastage for staff amenitiesTaps with timed flow can be used to minimise water usage and wastage in student amenities.New and replacement units must use manual or low of automatic flushing mechanisms. A microwave activated urinal flushing system may be used as an alternative. <p>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 alternative.</p>	Ph 3-4: Product and Material Selection	DO23-02 DO23-4.3	DAB-138.1 Potable Water - Sanitary Fixture Efficiency	1. Schedule of materials, fixtures, fittings and equipment with WELS/StarMark ratings, demonstrating compliance and identifying those with flow restrictors and timed flow.	6	Schedule of materials, fixtures, fittings and equipment with WELS/StarMark ratings, demonstrating compliance and identifying those with flow restrictors and timed flow.	Architect													TBC			29
Consume responsibly	<p>Life cycle assessment (environmental)</p> <p>Environmental impacts of products and materials has been assessed and inform material selection</p>	Ph 3-4: Product and Material Selection	DO21-03	DAB-139 - Life cycle assessment	Life cycle assessment report	6	Life cycle assessment report	Architect													TBC			30
Consume responsibly	<p>Whole of life costing (WOLC)</p> <p>Total cost of ownership (TCO) assessment / Analysis of direct and indirect costs and benefits / Life cycle costing analysis</p> <p>When calculating the whole of life cost for the different materials / building elements or systems, the following must be considered:</p> <ul style="list-style-type: none">The total initial capital cost of the system(s), including design, project management, tender and building services work in connections etc.Resource (energy and where applicable water) consumption.Maintenance.The replacement of component parts.Disposal costsEcological sustainable optionsDurabilityVariationLife cycle <p>The whole of life cost shall be calculated over the estimated life of the asset/s.</p>	Ph 3-4: Product and Material Selection	DO21-03 DO21-04	DAB-139 - Life cycle assessment	Life cycle costing report for relevant system	6	Life cycle costing report for relevant system	Architect													TBC			31
Consume responsibly	<p>Sustainable materials</p> <p>Construction materials must be selected based on the following:</p> <ul style="list-style-type: none">Adequately and economically perform their intended functions, and also have lower adverse environmental impacts throughout their life cycle (refer to DO-9)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 life.	Ph 3-4: Product and Material Selection	DO21-03	DAB-121 Sustainable Products	1. Environmental Product Declarations of products / materials used, Product Specification (like GBCA, FSC, etc.) 2. Supplier's declaration confirming recycled contents in products 3. Bill of quantities	6	Environmental Product Declarations of products / materials used, Product Specification (like GBCA, FSC, etc.) 2. Supplier's declaration confirming recycled contents in products 3. Bill of quantities	Architect													TBC			32

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