NORTHROP

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13 September 2017

**Graham Jahn AM**
City of Sydney
Town Hall House
456 Kent Street
Sydney NSW 2000

Dear Graham,

**Development Application for Inner Sydney High School (SSD 7610)**

Northrop, as the sustainability consultant working on the Inner Sydney High School development provide the following discussion around the comments provided by City of Sydney.

## Natural Ventilation – ESD

The EFSG design Guide part 5.01 requires that natural ventilation is required to all classrooms for comfort in summer and to maintain a healthy indoor environment. As the DoE has requested that acoustics take preference over this requirement in order to provide quite learning spaces the design team has had to meet the intent of this requirement (to provide energy efficient, comfortable spaces that minimise the buildup of CO2). In order to achieve this the strategy involves the use of a chilled water cooling system with additional outside air in order to ensure that the spaces are comfortable and maintain a healthy indoor environment while meeting the competing EFSG requirements.

It is noted that the EFSG requirements have been designed for a traditional school layout.

## Green Star

Please see the attached Green Star Pathway document, it is noted that the project is targeting the incorporation of over 60 points into the building design, which equates to a 5 Star, Australian Excellence, Sustainability rating under the tool.

## Energy

In regards to the energy efficiency of the project, we are currently targeting 10.4 points under the Green House Gas Emissions Credit which represents a building that achieves a minimum 30% reduction in energy use compared to a code complaint building and a 50% reduction in Greenhouse Gas Emission. The measures to achieve this target include the use of an efficient chilled water HVAC system design with the inclusion of an economy cycle, LED lighting, a rooftop solar power array and good shading of the projects glazed facades.

The decision around the hot water energy source is yet to be finalised however it is expected that this will be a relatively minor load within the building as it will primarily supply science labs and low flow tapware.

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## Water

In regards to the water efficiency of the project, the project team have made efforts to ensure an efficient design, however due to both the limited rooftop area and the desire to use these spaces for outdoor play and recreation the project is limited in the ability to harvest and reuse rainwater.

In order to ensure that the project represents a water efficient design, it has targeted 4 of the 6 credit points available under the prescriptive potable water pathway in Green Star. Through implementing high efficiency fixtures and fittings, a waterless heat rejection system and xeriscape landscaping the project expects to reduce potable water demand significantly compared to a standard practice building of this size and scale.

## Displays

The use of educational displays and signage was to be investigated further to determine if it resulted in educational or action based advantages. City of Sydney's concern is noted and over investment in this area will be avoided.

Should you wish to discuss the above please feel free to contact myself or a member of the design team.

Yours Sincerely

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Attachments

- Most recent project Green Star Pathway Matrix

# Green Star - Design & As Built Scorecard

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | ICHS | | | **Core Points Available** | **4 Star** |
| **Targeted Rating:** | 5 Star - Australian Excellence | | | 97 | 64.2 |
| **CATEGORY / CREDIT** | **AIM OF THE CREDIT / SELECTION** | **CODE** | **CREDIT CRITERIA** | **POINTS AVAILABLE** | **5 Star** |
| **Management** | | | | **14** | |
| **Green Star Accredited Professional** | To recognise the appointment and active involvement of a Green Star Accredited Professional in order to ensure that the rating tool is applied effectively and as intended. | 1.0 | Accredited Professional | 1 | 1 |
| **Commissioning and Tuning** | To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential. | 2.0 | Environmental Performance Targets | - | Complies |
| | | 2.1 | Services and Maintainability Review | 1 | 1 |
| | | 2.2 | Building Commissioning | 1 | 1 |
| | | 2.3 | Building Systems Tuning | 1 | 1 |
| | | 2.4 | Independent Commissioning Agent | 1 | 1 |
| **Adaptation and Resilience** | To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters. | 3.1 | Implementation of a Climate Adaptation Plan | 2 | 2 |
| **Building Information** | To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance. | 4.1 | Building Operations and Maintenance Information | 1 | 1 |
| | | 4.2 | Building User Information | 1 | 1 |
| **Commitment to Performance** | To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way. | 5.1 | Environmental Building Performance | 1 | 1 |
| | | 5.2 | End of Life Waste Performance | 1 | |
| **Metering and Monitoring** | To recognise the implementation of effective energy and water metering and monitoring systems. | 6.0 | Metering | - | Complies |
| | | 6.1 | Monitoring Systems | 1 | 1 |
| **Construction Environmental Management** | To reward projects that use best practice formal environmental management procedures during construction. | 7.0 | Environmental Management Plan | - | Complies |
| | | 7.1 | Formalised Environmental Management System | 1 | 1 |

| | | | | | |
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| **Operational Waste** | Prescriptive Pathway | 8A | Performance Pathway - Specialist Plan | - | |
| | | 8B | Prescriptive Pathway - Facilities | 1 | 1 |
| **Total** | | | | **14** | **13** |

| **Indoor Environment Quality** | | | | **17** | |
|---|---|---|---|---|---|
| **Indoor Air Quality** | To recognise projects that provide high air quality to occupants. | 9.1 | Ventilation System Attributes | 1 | 1 |
| | | 9.2 | Provision of Outdoor Air | 2 | 2 |
| | | 9.3 | Exhaust or Elimination of Pollutants | 1 | 1 |
| **Acoustic Comfort** | To reward projects that provide appropriate and comfortable acoustic conditions for occupants. | 10.1 | Internal Noise Levels | 1 | 1 |
| | | 10.2 | Reverberation | 1 | 1 |
| | | 10.3 | Acoustic Separation | 1 | |
| **Lighting Comfort** | To encourage and recognise well-lit spaces that provide a high degree of comfort to users. | 11.0 | Minimum Lighting Comfort | - | Complies |
| | | 11.1 | General Illuminance and Glare Reduction | 1 | 1 |
| | | 11.2 | Surface Illuminance | 1 | |
| | | 11.3 | Localised Lighting Control | 1 | |
| **Visual Comfort** | To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants. | 12.0 | Glare Reduction | - | Complies |
| | | 12.1 | Daylight | 2 | 1 |
| | | 12.2 | Views | 1 | 1 |
| **Indoor Pollutants** | To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels. | 13.1 | Paints, Adhesives, Sealants and Carpets | 1 | 1 |
| | | 13.2 | Engineered Wood Products | 1 | 1 |
| **Thermal Comfort** | To encourage and recognise projects that achieve high levels of thermal comfort. | 14.1 | Thermal Comfort | 1 | |
| | | 14.2 | Advanced Thermal Comfort | 1 | |
| **Total** | | | | **17** | **11** |

| **Energy** | | | | **22** | |
|---|---|---|---|---|---|
| | | 15A.0 | Conditional Requirement: Prescriptive Pathway | - | |
| | | 15A.1 | Building Envelope | - | |
| | | 15A.2 | Glazing | - | |

| | | | | | |
|---|---|---|---|---|---|
| **Greenhouse Gas Emissions** | E. Modelled Performance Pathway | 15A.3 | Lighting | - | |
| | | 15A.4 | Ventilation and Air-conditioning | - | |
| | | 15A.5 | Domestic Hot Water Systems | - | |
| | | 15A.6 | Building Sealing | - | |
| | | 15A.7 | Accredited Green Power | - | |
| | | 15B.0 | Conditional Requirement: NatHERS Pathway | - | |
| | | 15B.1 | NatHERS Pathway | - | |
| | | 15C.0 | Conditional Requirement: BASIX Pathway | - | |
| | | 15C.1 | BASIX Pathway | - | |
| | | 15D.0 | Conditional Requirement: NABERS Pathway | - | |
| | | 15D.1 | NABERS Energy Commitment Agreement Pathway | - | |
| | | 15E.0 | Conditional Requirement: Reference Building Pathway | - | Complies |
| | | 15E.1 | Comparison to a Reference Building Pathway | 20 | 10.4 |
| **Peak Electricity Demand Reduction** | Performance Pathway | 16A | Prescriptive Pathway - On-site Energy Generation | - | |
| | | 16B | Performance Pathway - Reference Building | 2 | |
| **Total** | | | | **22** | **10.4** |

| **Transport** | | | | **10** | |
|---|---|---|---|---|---|
| **Sustainable Transport** | Prescriptive Pathway | 17A.1 | Performance Pathway | 0 | |
| | | 17B.1 | Access by Public Transport | 3 | 3 |
| | | 17B.2 | Reduced Car Parking Provision | 1 | 1 |
| | | 17B.3 | Low Emission Vehicle Infrastructure | 1 | |
| | | 17B.4 | Active Transport Facilities | 1 | 1 |
| | | 17B.5 | Walkable Neighborhoods | 1 | 1 |
| **Total** | | | | **7** | **6** |

| **Water** | | | | **12** | |
|---|---|---|---|---|---|
| **Potable Water** | Prescriptive Pathway | 18A.1 | Potable Water - Performance Pathway | 0 | |
| | | 18B.1 | Sanitary Fixture Efficiency | 1 | 1 |
| | | 18B.2 | Rainwater Reuse | 1 | |
| | | 18B.3 | Heat Rejection | 2 | 2 |
| | | 18B.4 | Landscape Irrigation | 1 | 1 |
| | | 18B.5 | Fire System Test Water | 1 | |
| **Total** | | | | **6** | **4** |

| **Materials** | | | | **14** | |
|---|---|---|---|---|---|
| **Life Cycle Impacts** | Prescriptive Pathway - Life Cycle Impacts | 19A.1 | Comparative Life Cycle Assessment | 0 | |
| | | 19A.2 | Additional Life Cycle Impact Reporting | 0 | |
| | | 19B.1 | Concrete | 3 | |
| | | 19B.2 | Steel | 1 | |
| | | 19B.3 | Building Reuse | 4 | 4 |
| **Responsible Building Materials** | To reward projects that include materials that are responsibly sourced or have a sustainable supply chain. | 20.1 | Structural and Reinforcing Steel | NA | NA |
| | | 20.2 | Timber Products | 1 | 1 |
| | | 20.3 | Permanent Formwork, Pipes, Flooring, Blinds and Cables | 1 | 1 |
| **Sustainable Products** | To encourage sustainability and transparency in product specification. | 21.1 | Product Transparency and Sustainability | 3 | |
| **Construction and Demolition Waste** | Percentage Benchmark | 22A | Fixed Benchmark | - | |
| | | 22B | Percentage Benchmark | 1 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| **Total** | | | | **12** | **7** |

| **Land Use & Ecology** | | | | **5** | |
|---|---|---|---|---|---|
| **Ecological Value** | To reward projects that improve the ecological value of their site. | 23.0 | Endangered, Threatened or Vulnerable Species | - | Complies |
| | | 23.1 | Ecological Value | 3 | |
| **Sustainable Sites** | To reward projects that choose to develop sites that have limited ecological value, re-use previously developed land and remediate contaminate land. | 24.0 | Conditional Requirement | - | Complies |
| | | 24.1 | Reuse of Land | 1 | 1 |
| | | 24.2 | Contamination and Hazardous Materials | 1 | 1 |
| **Heat Island Effect** | To encourage and recognise projects that reduce the contribution of the project site to the heat island effect. | 25.0 | Heat Island Effect Reduction | 1 | 1 |
| **Total** | | | | **6** | **3** |

| **Emissions** | | | | **5** | |
|---|---|---|---|---|---|
| **Stormwater** | To reward projects that minimise peak stormwater flows and reduce pollutants entering public sewer infrastructure. | 26.1 | Reduced Peak Discharge | 1 | 1 |
| | | 26.2 | Reduced Pollution Targets | 1 | |
| **Light Pollution** | To reward projects that minimise light pollution. | 27.0 | Light Pollution to Neighboring Bodies | - | Complies |
| | | 27.1 | Light Pollution to Night Sky | 1 | 1 |
| **Microbial Control** | To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building systems. | 28.0 | Legionella Impacts from Cooling Systems | 1 | 1 |
| **Refrigerant Impacts** | To encourage operational practices that minimise the environmental impacts of refrigeration equipment. | 29.0 | Refrigerants Impacts | 1 | |
| **Total** | | | | **5** | **3** |

| **Innovation** | | | | **10** | |
|---|---|---|---|---|---|
| **Innovative Technology or Process** | The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world. | 30A | Innovative Technology or Process | | 1 |
| **Market Transformation** | The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world. | 30B | Market Transformation | | 1 |
| **Improving on Green Star Benchmarks** | The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points. | 30C | Improving on Green Star Benchmarks | 10 | |

| | | | | | |
|---|---|---|---|---|---|
| **Innovation Challenge** | Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools. | 30D | Innovation Challenge | | 3 |
| **Global Sustainability** | Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope of this Green Star rating tools. | 30E | Global Sustainability | | |
| **Total** | | | | **10** | **5** |

| **TOTALS** | **AVAILABLE** | |
|---|---|---|
| **CORE POINTS** | **97** | **57.4** |
| **CATEGORY PERCENTAGE SCORE** | | **59.2** |
| **INNOVATION POINTS** | **10** | **5.0** |
| **TOTAL SCORE TARGETED** | | **64.2** |