Report

Norman Disney & Young

ESD & SECTION J

Norwest Private Hospital Expansion
Johnstaff

CONFIDENTIAL

Revision: 3 – Concept Design Stage
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DIRECTOR GENERAL'S REQUIREMENTS

This report has been prepared to accompany an Environmental Impact Statement prepared under Schedule 2 of the Environmental Planning and Assessment Regulation for an application for State Significant Development [SSD 13_6074]. This report specifically addresses the following relevant matters associated with the Director General's Environmental Assessment Requirements issued under Section 78A(8A) of the Environmental Planning and Assessment Act 1979.

The Director General's requirements include, at 7 (5) Ecologically Sustainable Development, the requirement to detail how ESD principles (as defined in clause 7(4) of schedule 2 of the Environmental Planning and Assessment Regulation 2000) will be incorporated in the design, construction and ongoing operation phases of the development.

Clause 7(4) of schedule 2 of the Environmental Planning and Assessment Regulation 2000 states:

7 Content of environmental impact statement

(4) The principles of ecologically sustainable development are as follows:

(a) the "precautionary principle" , namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

(ii) an assessment of the risk-weighted consequences of various options,

(b) "inter-generational equity" , namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,

(c) "conservation of biological diversity and ecological integrity" , namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,

(d) "improved valuation, pricing and incentive mechanisms" , namely, that environmental factors should be included in the valuation of assets and services, such as:

(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

The principles of ecologically sustainable development will be addressed as follows:

Precautionary principle: the Norwest Private Hospital is an existing building. The extension consists of a new wing over an existing car park. As such, there is not considered to be a risk of serious or irreversible damage to the natural environment arising from the proposed extension. There are no sensitive environmental receptors in the immediate vicinity of the proposed extension. The risk of pollution to land, air or water will be managed through the design and construction process to control the risk of pollution incidents, and implement appropriate on-site procedures to prevent environmental degradation, such as spill kits, bunds, silt fences and erosion controls.

Future generations: the Norwest Private Hospital extension will not degrade to the health, diversity and productivity of the environment, so it does not reduce the environmental amenity available to future generations. It does not contain any significant environmental or cultural heritage features requiring protection for future generations.

Biological diversity and ecological integrity: the Norwest Private Hospital is not a site of high biological diversity or ecological significance. There are no known threatened species or ecological communities on the site. The site does not contain any protected areas and there are no conservation agreements in place in relation to the site. The site does not adjoin a wetland or other high conservation value area. The current site is previously developed, and does not contain remnant vegetation. The project site is currently hardscape, and the extent of the built area will not be extended beyond the current development footprint. No clearing of vegetation will occur as part of the project works. As such, the proposed development does not pose a risk to the conservation of biological diversity or ecological integrity. The site is in close proximity to Refalo Reserve and Bella Vista Farm Park.

Polluter pays: Any generation of pollution will be managed in accordance with the polluter pays principle. Air, water and noise pollution will be minimised during construction. Construction and site waste will be recycled where possible and the cost of disposal will be paid through the appointed waste contractor, and only licensed waste facilities will be used. The site will not be a scheduled premises under the Protection of the Environment Operations Act 1997 (NSW), so it will not require a pollution licence. Water pollution controls will be implemented on site. The risk of air pollution will controlled. The main risk of air is associated with site dust. Dust suppression measures will implemented on dry days where there is a risk of wind blown dust. No fires, smoke or offensive odours will be generated from the site works. Noise from site activity will be monitored to avoid noise pollution. Potentially harmful chemicals (including paints, solvents, cleaning agents and fuel) will be stored on site in a secure compound to avoid risk of pollution. Site activities will not impact on local water quality. No discharges to local waterways will be permitted. Discharges to sewer or stormwater systems will be controlled and only permitted in accordance with relevant laws. Sediment and erosion control measures will be implemented as required.

Full life cycle of costs of providing goods and services: The lifecycle cost of key elements of the project will be considered as part of the design and operation of the Norwest Hospital Extension. For example, the decision whether to install an air cooled or water cooled chiller plant will balance the capital cost versus the operating cost of the refrigeration equipment. Durable finishes and fittings will be selected to minimise the need for premature replacement due to damage or wear and tear. A maintenance regime will be implemented that seeks to maximise the commercial life of key plant and equipment, and minimise operating costs.

Cost effective environmental measures: The project has a target of carrying out a Green Star evaluation of the design, to achieve the equivalent of a 4 star rating, using a self-assessment process. As part of the development of the Green Star scorecard, environmental opportunities will be identified and cost effective environmental measures will be implemented. The Green Star scorecard for the project provides further detail, and is attached as Appendix A to this Report.

Minimising consumption of resources, water and energy: the sustainability measures that are planned to be implemented at the Norwest Private Hospital Extension are listed in the next section of this report.

SUSTAINABILITY TARGETS & GREEN STAR

The key sustainability performance indicator for the project is to use the Green Star scorecard and specification documents to demonstrate the project will perform to the equivalent of a Green Star 4 Star design rating.

Design Features

Energy consumption

- Double glazing that exceeds the BCA Part J2 requirements by greater than 15%.
- External shading louvers to reduce solar heat gains
- CO_2 sensors to adjust outside air rate: set point of 800 ppm for a 50% increase above AS1668.2
- Lighting will be zoned, and controlled by motion sensors or daylight sensors where appropriate, to avoid wasted energy associated with lighting a space when it is unoccupied or sufficient daylight is present.
- Naturally ventilated car park (reduces energy consumption associated with fans)
- Solar thermal panels to provide domestic hot water (with gas boosters)

Indoor Environmental Quality

- Increased outside air rates: 50% above AS1668.2
- Volatile Organic Compound (VOC) sensors to be provided and linked to BMS
- Daylight and views optimised: 30% of beds to have a daylight factor (DF) of 3; 30% of other areas to achieve DF 2.5.
- Improved thermal comfort conditions: temperature between 20 to 24 deg C; Relative Humidity between 40% to 60%; air velocity not more than 0.2m/s; HVAC zone control for internal and perimeter with no zone exceeding 100m^2 with a thermostat in each zone.
- Low VOC paints, sealants, adhesives and finishes.
- Low Formaldehyde engineered wood products (e.g. plywood, chipboard)
- Internal blinds for glare control
- High frequency ballasts on fluorescent lighting to eliminate flicker
- Lighting levels to comply with AS 1680.2.5-1997
- Maintenance access hatches for routine cleaning of HVAC ductwork
- Outside air intakes located away from potential sources of air pollution
- Active humidity control in the operating theatres

Water consumption & water sensitive design

- Water meters to monitor water consumption
- Water efficient toilets & urinals
- Water efficient taps and showers
- Air cooled chiller minimises water consumption (no cooling tower)

Resource consumption

- Energy sub-metering will be installed to monitor electricity consumption
- Waste management during construction: at least 80% of waste to be recycled.
- Waste storage area for segregated collection of recyclable material

Transport

- Bicycle parking racks, showers, changing area and lockers.

Process actions

- Commissioning in accordance with best practice guidelines.
- Production of Design Intent Report, Operation & Maintenance Manual, and training for building management staff.
- 12 months building tuning after practical completion, including re-commissioning
- Building contractor to implement an ISO14001 accredited Environmental Management System
- Building contractor to develop an Environmental Management Plan for the project

NCC SECTION J

The NCC (BCA) Section J Report will be developed as part of the detailed design phase of the project, including insulation, glazing performance and building sealing. The project is targeting a 20% improvement above BCA Section J thermal performance requirements to improve the energy performance of the building.

APPENDIX 1: GREEN STAR SCORECARD

Norwest Private Hospital Extension - Green Star Scorecard - Updated 30 Oct 2013 v4								
Category	Credit No.	Points Available	Targeted Points	Weighted Score	Requirements & Approach to Compliance	Discipline Responsible	Actions	Example Specification Wording
				46.60				
Weighting Factor		9%						
Green Star Accredited Professional	Man-1	2	2	1.06	A Green Star AP is required to attend at least 50% of project meetings and 75% of services meetings. Minutes must be kept as documentation.	NDY GSAP		
Commissioning Clauses	Man-2	2	2	1.06	Specification to require commissioning in accordance to CIBSE Commissioning Codes. Design Intent Report, O&M Manual to be compiled from design team and contractor.	Mech Eng & Elec Eng Hydraulic Eng Building Contractor	Include Green Star wording in Mech Spec	In relation to all systems within the building including: Air distribution systems; Boilers; Automatic controls; Lighting; Refrigeration systems; and Water Distribution Systems, the Contractor shall ensure that comprehensive pre-commissioning, commissioning and quality monitoring is undertaken by the appropriate Contractors and trades on site in exact accordance with ASHRAE Guideline 1-1996 or (all the relevant) CIBSE Commissioning Codes as appropriate and relevant. All Contractors are required to ensure that comprehensive pre-commissioning, commissioning and quality monitoring is undertaken by the appropriate Contractors and trades on site in exact accordance with the following Commissioning Codes: □ Mechanical Services – ASHRAE Guidelines 1 or CIBSE Commissioning Code A, B, C, M, R and W □ Electrical Services – CIBSE Commissioning Code C, L, M □ Hydraulic Services – CIBSE Commissioning Code B, C, M and W □ All other Services – CIBSE Commissioning Code M Each relevant Sub-Contractor shall ensure that the following information is contained within the Operation and Maintenance manuals to describe the design intent of the building and ensure that it is transferred to the building owner/manager regarding: □ Design intent of the system installed □ As installed details – with a complete set of drawings and O&M Manual □ Commissioning reports □ Evidence of training of building management staff in the operation and maintenance of all building services This shall be in accordance with the Green Star requirements of Man-2 Commissioning Clauses. The Contractor shall liaise with the building management staff and Sub-Contractors to ensure training of the building management staff is undertaken. Records must be kept to demonstrate the date, time, place, names and position of all people who attended and the content covered. Sufficient training shall be provided to ensure that building managers or staff members have all the information and understanding needed to operate and maintain the commissioned features and systems of the building. As a minimum this training is to include the following content: □ Information from the design intent report (prepared previously by the Engineer); □ Review of controls set up, programming, alarms and troubleshooting; □ Operations and Maintenance manuals; □ Building operation (start up, normal operation, unoccupied operation, seasonal changeover, shutdown); □ Interactions between systems; □ Measures that can be taken to optimise energy and water efficiency; □ Occupational Health and Safety issues; □ Maintenance requirements and sourcing replacements; and □ Occupant satisfaction feedback.
Building Tuning	Man-3	1	1	0.53	Requires 12 month building tuning after practical completion, including monthly monitoring and quarterly report to building owner. Full recommissioning 12 months after practical completion with a Building Tuning Report provided to the building owner.	Mech Eng & Elec Eng Hydraulic Eng Building Contractor	Include Green Star wording in Mech Spec	Contractors required to provide 12 months of building tuning after practical completion. Monthly monitoring and quarterly reporting to the building owner required. Full re-commissioning and a building tuning report is required at the end of the 12 month period. The Contractor must coordinate building tuning with the building owner, and ensure that a previously agreed representative of the design team has been invited to attend. Tuning shall be undertaken to ensure the following: □ Verify that all systems are performing at their optimum efficiency during all climatic variations for the occupied building; □ Provide an opportunity for the system to be tuned to optimise time schedules to best match occupant needs and system performance; and □ Align the systems operation to the attributes of the built space it serves. The credit applies to all commissionable systems, including (but not limited to): □ Air distribution systems including AHUs, fan coil units □ Boilers and any trigeneration/cogeneration systems (where present) □ Automatic controls, including control set points □ Lighting and lighting control systems □ Refrigeration systems including chillers, cooling tower and, chilled beams where present □ Mechanical water distribution systems □ Hydraulic distribution and treatment systems including any rainwater harvesting, black water and greywater treatment systems As part of the commissioning process, a quarterly review report and final Building Tuning Report outlining the outcomes of the process shall be delivered to the building owner and be made available to the design team. The report shall contain: □ A review of energy consumption of all metered systems and components; □ A review of system trends tracking all system performance and indicate if the systems are operating in accordance with the design (i.e. space temperature), plant operating hours; □ Confirmation of periodic adjustments and recommissioning undertaken to ensure all systems operate in accordance with the design; and □ Details of the final recommissioning of all systems undertaken after 12 months of operation. The contractor shall: □ Ensure system reviews and operational checks are carried out under a range of operating conditions (both external and internal) with varying loads applied to the systems. □ Adjust and commission the systems as required to ensure optimise operation under all conditions experienced and matched to the occupant needs and use. The design team member shall review current performance, provide feedback to the contractor and building owner, and agree the next stage actions with the subcontractor.

Norwest Private Hospital Extension - Green Star Scorecard - Updated 30 Oct 2013 v4								
Category	Credit No.	Points Available	Targeted Points	Weighted Score	Requirements & Approach to Compliance	Discipline Responsible	Actions	Example Specification Wording
Independent Commissioning Agent	Man-4	1	**0**	**0.00**	Not pursued.	NA	Nil	NA
Building Guides	Man-5	1	**1**	**0.53**	Building Users Guide and Building Maintenance Guide to be drafted with input from design team.	Building contractor	Produce Building User Guide and Building Maintenance Guide	The Contractor shall ensure that an instructive & concise Building User Guide (with simplified system diagrams) including information relevant for building users, occupants and tenant representatives is produced, in accordance with the Green Star requirements covering as a minimum the following: - Energy & Environmental Strategy; - Monitoring & Targeting; - Building Services Overview; - Transport Facilities; - Materials & Waste Policy; and - Expansion/Refurb/Tenancy considerations/requirements.
Environmental Management	Man-6	2	**2**	**1.06**	Building contractor to hold current and valid ISO14001 (Environmental Management System) accreditation that will be maintained prior to and throughout the project. Contractor to develop and implement a comprehensive project-specific Environmental Management Plan (EMP) for the works, in accordance with Section 4 of the NSW Environmental Management System guidelines. Sub-contractors are required to adhere to ISO14001 requirements.	Building contractor	Contractor to have an ISO14001 accredited EMS and develop a project-specific Environmental Management Plan (EMP).	The Contractor shall ensure that all Sub-Contractors receive a copy of this EMP & instruct all Sub-Contractors to implement it. Prior to commencing demolition or construction works, the Contractor must provide the following to the Building Owner/Manager: □ The Main Contractor's ISO14001 certification; □ Confirmation of Sub-Contractor's adherence to the ISO 14001 requirements; □ Comprehensive project-specific EMP for the site in accordance with Section 4 of the NSW Environment Management System guidelines (1998-2007); and □ A compliance matrix to show how each section of the guidelines will be fulfilled. The Main Contractor and all Sub-Contractors are required to provide the documentation requirements listed within the EMP.
Waste Management	Man-7	2	**2**	**1.06**	Requires extracts of the Contract between owner & waste contractor stating that at least **80%** of waste (by mass) will be recycled/reused. Building contractor to develop Waste Management Plan.	Building contractor Waste contractor	Building contractor to develop Waste Management Plan, waste records and report quarterly to building owner. Waste contract to stipulate at least 80% of waste to be recycled.	Contractor to implement a Waste Management Plan, retain waste records and submit quarterly reports to the building owner. Building contractor to commit contractually to achieve 80% of waste (by mass) recycled or reused. The Contractor shall provide and implement a comprehensive Waste Management Plan and demonstrate that 80% of construction and demolition waste by weight is reused and/or recycled. The Main Contractor shall retain waste record and report quarterly to the building owner. All Sub-Contractors shall implement the waste management plan to ensure that the waste reuse/recycling target was achieved onsite. The provision of waste skips or bins at the waste storage area must be made for each of the following materials: □ Cardboard □ Timber □ Metal □ Soft Plastic □ Polystyrene □ Insulation □ Concrete □ Glass □ Bricks Combined skips may be provided, however evidence is required to demonstrate that the waste Contractor will separate the materials off-site. All waste from site (demolition and construction waste) must be included in the calculation. Soil or contaminated waste does not need to be included within the calculation.
Building Management System	Man-9	1	**1**	**0.53**	Specify and install a BMS to monitor and report energy and water consumption, as well as monitor and control building services systems.	Mech Eng & Elec Eng	Include wording in Elec Spec	BMS shall be able to monitor the following systems, where present: - Energy consumption from all sub-meters, which must provide at the whole building and individual meter level: instantaneous data and historic records. - Water consumption from all sub-meters, which must provide at the whole building and individual meter level: instantaneous data and historic records. - Air Conditioning - Lighting - Energy generation - Regular maintenance The BMS must also control the following systems (where present): - Air conditioning, including on/off, time schedules, temperature set points, fan/pump speed. - Lighting, including on/off and time schedules. - Allow maintenance sub-contractors to schedule and record maintenance activities BMS logs of tenancy water and energy usage must be made available to tenants (e.g. by web access)

Norwest Private Hospital Extension - Green Star Scorecard - Updated 30 Oct 2013 v4								
Category	**Credit No.**	**Points Available**	**Targeted Points**	**Weighted Score**	**Requirements & Approach to Compliance**	**Discipline Responsible**	**Actions**	**Example Specification Wording**
Maintainability	Man-11	1	**1**	**0.53**	Future maintenance staff or facility manager to review & submit design review at preliminary & final stage of design. Must consider access, ongoing maintenance and cleaning of building services & building features.	Facilities Manager	FM to carry out 2 design reviews, and approve access for maintenance, maintainability of systems, ability to replace plant if required, cleaning.	
Construction Indoor Air Quality Plan	Man-12	3	**3**	**1.59**	Contractor and sub-contractor to implement Construction Indoor Air Quality Plan, during construction and pre-occupancy phases. Clean ductwork prior to occupancy.	Mech Eng & Contractor	Include in Mech spec	Contractor to develop a Construction Indoor Air Quality (IAQ) Plan and implement it during the construction and pre-occupancy phases of the building works. The IAQ plan must: - meet or exceed the recommended control measures of the SMACNA IAQ Guidelines for Occupied Buildings Under Construction 2008, Chapters 3 & 4. - Include infection control practices found in the Australasian Health Facility Guidelines, Part D: Infection Prevention and Control, Section 900 - Protect HVAC systems to prevent contamination (e.g. plastic seals on ductwork and plenums, absorptive materials to be stored wrapped in plastic to prevent moisture damage, exhaust fumes from VOCs before installing absorptive materials, e.g. insulation, filters, carpets, and other woven, fibrous or porous materials) - Reduce the capacity of building materials to absorb the emissions from significant sources of contaminants - Include a requirement to replace all filtration media with F6/F7 (MERV 13) filters prior to occupancy IAQ plan must include a requirement for all ductwork to be clean in accordance with the NADCA ACR 2006 Standard prior to occupancy, e.g. measures to ensure ductwork to remain free of moisture and debris until occupation.
Sustainable Procurement Guide	Man-13	1	**1**	**0.53**	Develop a Sustainable Procurement Guide in accordance with APCC's ANZ Government Framework for Sustainable Procurement. The procurement as a minimum cover electrical medical equipment, electrical lab equipment, clothes washers and dishwashers. The policy must identify energy and water efficiency as selection criteria for new equipment.	PM	Client to develop a sustainable procurement guide.	
	TOTAL	**17**	**16**	**8.47**				
CATEGORY SCORE			**94%**					
TED CATEGORY SCORE		**9**		**8.47**				
Weighting Factor		**20%**						
Ventilation Rates	IEQ-1	4	**0**	**0.00**	Not targeted. 2 points requires a 50% improvement over AS1668.2 in 95% of all spaces. 3rd point requires a 100% improvement 4th point requires a 150% improvement Design team notes that these are expensive points. Increasing outside air rate increases the size of mechanical plant substantially.	Mech Eng	Mech Spec	The Contractor shall ensure that the minimum outside air rates provide at least a 50% improvement on the requirements of AS 1668.2-1991 for 24 hours a day, for no less than 95% of the NLA.
Air Change Effectiveness	IEQ-2	2	**0**	**0.00**	CFD is not being carried out.	NA	Nil	NA
CO2 Monitoring & Control and VOC Monitoring	IEQ-3	1	**1**	**0.67**	CO2 sensors to be provided at every return air path with monitoring and adjustment of OA to each level covering at least 95% of the NLA. At least one CO2 sensor per return duct on each floor shall be provided. Set point of 800ppm for a 50% increase in outside air above AS1668.2 VOC sensor to be provided with continuous monitoring at every return air path connected to BMS and alarmed at 0.5mg/m_3 level.	Mech Eng	Mech spec	The Contractor shall ensure that a carbon dioxide monitoring system is provided that facilitates continuous monitoring and adjustment of outside air ventilation rates to each level, to ensure independent control of ventilation rates and achieve outside air requirements. At least one CO2 sensor per return duct on each floor shall be provided. CO2 sensors are to be linked to the BMS to ensure continuous adjustment of the outside air rates. The Contractor shall ensure that a VOC monitoring system is provided that is linked to the BMS, has a minimum of one sensor per return duct, facilitates continuous monitoring of VOC pollutants and can detect and provide an alarm when VOC pollutants reach 0.5mg/m3 level. The VOC monitor is to provide for monitoring and alarm for VOC pollutants and should not be linked to the adjustment of outside air rates.

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Category	Credit No.	Points Available	Targeted Points	Weighted Score	Requirements & Approach to Compliance	Discipline Responsible	Actions	Example Specification Wording
Daylight	IEQ-4	3	**1**	**0.67**	Daylight modelling or calculations required in order to achieve this point. One point is awarded where 30% of the bedded patient areas achieve a measured DF of 3% or DI of 300 lux and 30% of all other areas achieve DF of 2.5% or DI of 250 lux. Two points for 60% of bedded areas at 3% DF and 60% of other areas at DF 2.5%.	Architect & ESD	Daylight calculations.	
Thermal Comfort	IEQ-5	2	**1**	**0.67**	First point: HVAC requirements: 1. Dry Bulb Temperature in space is controlled to 20°C to 24°C; 2. The HVAC system has separate internal and perimeter zones with independent temperature control which meet the following maximum zone size requirements: 85m2 perimeter zone, 120m2 internal zone for 95% of NLA. 3. Each HVAC zone contains its own temperature sensor(s). Building Fabric Performance - Building fabric to comply with BCA Part J1 - Double glazing to 100% of east, west and north facades - glazing exceeds the BCA Part J2 requirements by greater than 15%. 2nd point requires thermal comfort modelling.	Mech Eng & Architect	Mech Eng to Comply with Deemed to Satisfy HVAC design criteria. Arch to meet Building Fabric Performance Criteria.	
Hazardous Materials	IEQ-6	NA	**NA**	**NA**	NA because no hazardous materials on site. To achieve this point: requires a hazardous materials survey to have been carried out, and asbestos, lead or PCBs to be found, and removed in accordance with best practice standards.	NA	Nil	NA
Internal Noise Levels	IEQ-7	1	**1**	**0.67**	Noise modelling by an acoustic consultant is required to verify this point. Internal noise levels from building services must meet the recommended design sound levels in Table 1 of AS 2107:2000 for 95% of the project's occupied floor area (excludes plant rooms, storage areas, lifts, toilets, waste areas, etc).	Acoustic Eng	Provide Acoustic report Mech spec to include green star wording	Contractor to ensure that Internal noise levels from building services must meet the recommended design sound levels in Table 1 of AS 2107:2000 for 95% of the project's occupied floor area (excludes plant rooms, storage areas, lifts, toilets, waste areas, etc).
Volatile Organic Compounds	IEQ-8	5	**5**	**3.33**	All design team - Arch, Mech, Elec & Hyd is required to list paints, sealants, adhesives and their VOC limits within the specification. 1st point for low VOC paints 2nd point for low VOC adhesives and sealants 3rd point for low VOC floor coverings 4th point for low VOC Wall and ceiling coverings 5th point for low VOC mattresses - all mattresses to meet GreenGuard emission criteria for bedding GGPS.EC.003.R1	Architect & Mech Eng & Hydraulic Eng & Building contractor No paints, sealants or adhesives in Elec Eng scope.	VOC clauses to be included in all specs. Sub-contractors to comply with VOC limits	Contractor to ensure that all paints, sealants, adhesives, carpets, flooring and wall and ceiling coverings meet the benchmarks for low Volatile Organic Compound (VOC) in accordance with Green Star Healthcare v1 IEQ credit 8 Tables 8.1, 8.2, 8.3, 8.4 and 8.5. The Contractor is required to undertake a final audit at the end of construction works to ensure that correct paints, sealants, adhesives, carpets and flooring have been installed. The relevant VOC limits are: (Note Units listed below are in grams of VOC per Litre of product unless otherwise stated) Paints (Table IEQ 8.1) Walls and ceilings - interior gloss 75 Walls and ceilings - interior semi gloss 16 Walls and ceilings - interior low sheen 16 Walls and ceilings - interior flat washable 16 Ceilings - interior flat 14 Trim - gloss, semi gloss, satin, varnishes and wood stains 75 Timber and binding primers 30 Latex primer for galvanized iron and zincalume 60 Interior latex undercoat 65 Interior sealer 65 One and two pack performance coatings for floors 140 Any solvent-based coatings whose purpose is not covered in table 200

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Category	Credit No.	Points Available	Targeted Points	Weighted Score	Requirements & Approach to Compliance	Discipline Responsible	Actions	Example Specification Wording
								Adhesives and Sealants (Table IEQ 8.2): Indoor carpet adhesive 50 Carpet pad adhesive 50 Wood flooring and Laminate adhesive 100 Rubber flooring adhesive 60 Sub-floor adhesive 50 Ceramic tile adhesive 65 Cove base adhesive 50 Dry Wall & Panel adhesive 50 Multipurpose construction adhesive 70 Structural glazing adhesive 100 Architectural sealants 250 Flooring products (Table IEQ 8.3): Total VOC Limit 0.5mg/m2 per hour 4-PC (4-Phenylcyclohexene) 0.05mg/m2 per hour Wall and ceiling coverings (Table IEQ 8.4): TVOC at 3 days 5mg/m2 per hour TVOC at 28 days 0.5mg/m2 per hour Mattresses (Table IEQ 8.5): Formaldehyde 0.0135ppm (0.0165 mg/m3) Total VOC 0.22 mg/m Contractors and Sub-Contractors are required to obtain approval from the design team before substituting for materials that does not meet the criteria above.
Formaldehyde Minimisation	IEQ-9	1	**1**	**0.67**	Engineered / composite wood products (e.g. plywood, MDF) are required to be low or zero formaldehyde.	Architect & Building Contractor	Contractor require sub-contractors to comply with Formaldehyde limits	Contractor to ensure that all engineered wood products (including particle board, plywood, veneer, MDF, and wood panels) have low or zero formaldehyde emissions certified in accordance with NATA or ISO17025. Test protocol and emission limits are: AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood < 1.0 mg/L AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16 < 1.5 mg/L AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16 < 1.0 mg/L JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460 < 1.0 mg/L JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460 < 1.0 mg/L JIS A1901 (not applicable to Plywood) < 1.0 mg/L ASTM D5116 <0.1 (+/- 0.0005) mg/m²hr (may also be represented as mg/m²/hr) ISO 16000 part 9, 10 and 11 (also known as EN 13419) <0.1 (+/- 0.0005) mg/m²hr (may also be represented as mg/m²/hr) ASTM D6007 0.12 mg/m³ ASTM E1333 0.12 mg/m³ EN 717-1 (also known as DIN EN 717-1) 0.12 mg/m³ EN 717-2 (also known as DIN EN 717-2) 3.5 mg/m²hr (may also be represented as mg/m²/hr). Contractors and Sub-Contractors are required to obtain approval from the design team before substituting for timber that does not meet the criteria above.
Mould Prevention	IEQ-10	1	**0**	**0.00**	Requires the ventilation system to actively control humidity to <60% in space, <80% in ductwork. Active humidity control will be provided in the operating theatres, but not elsewhere. Humidity control is not required for the remainder of spaces.	Mech Eng	Advise if RH control is proposed.	
Daylight Glare Control	IEQ -11	1	**1**	**0.67**	Manual blinds and external shading devices. Internal blinds installed on all external glazing which - Eliminate 95% of all direct sun penetration; - Have a visual light transmittance (VLT) of less than 10%; and - Can be controlled by all affected occupants within each floor or area.	Architect	Arch Spec	The Contractor shall ensure that fixed external shading devices provide shading from direct sun 1.5m in from the centre of the glazing for 80% of the occupancy hours, OR internal blinds or screens are installed on all external facades glazing as a base building provision and meet the following criteria: - Eliminate 95% of all direct sun penetration; - Have a visual light transmittance (VLT) of less than 10%; and - Can be controlled by all affected occupants within each floor or area.
High Frequency Ballasts	IEQ-12	1	**1**	**0.67**	High frequency ballast required to be installed in fluorescent luminaires for over 95% of the area.	Elec Eng	Elec spec	The Contractor shall ensure that all fluorescent fittings are installed with high frequency ballasts. Manufacturer details shall be provided and detailed on the as-built drawings.
Electric Lighting Levels	IEQ-13	1	**1**	**0.67**	Electric lighting levels to comply with AS 1680.2.5-1997 - Interior lighting - Hospital and medical tasks.	Elec Eng	Elec spec	Lighting levels to be installed in accordance with AS 1680, and will not be greater than 25% above the minimum lighting levels recommended in table F1 of AS 1680.2.5-1997.
External Views	IEQ-14	2	**1**	**0.67**	One point is awarded where over 50% of the area has a direct line of sight to the outdoors. Two points for 80%. Note the calculation excludes areas that require the exclusion of daylight (e.g. operating theatres)	Architect	Calculations showing % area with views out	

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Individual Thermal Comfort Control	IEQ-15	2	0	0.00	Requires individual user control to be provided at occupied areas (workspace or bed). 1 point=50% of in-patient accommodation and admin area, 2 points=80%. Not targeted.	Mech Eng	Design to include thermal comfort control Mech Spec	
Exhaust Riser	IEQ-16	NA	NA	NA	Requires dedicated exhaust risers for print/ photocopy areas. No high volume print rooms - therefore NA	NA	Nil	NA
Air Distribution System	IEQ-17	1	1	0.67	Adequate maintenance access to all new and existing ductwork to both sides of all moisture and debris-generating components. Good access arrangements for ductwork cleaning. Refer to National Air Duct Cleaners Association ACR 2006 Standard.	Mech Eng	Mech Design - access hatches. Mech spec	All new and existing ductwork to have adequate maintenance access provided to both sides of all moisture- and debris- generating components including cooling coils, heating coils, humidifiers and filters AND Construction management processes will be implemented to ensure that all new ductwork remains free of moisture and debris until construction AND Existing ductwork is clean, or has been cleaned in accordance with the National Air Duct Cleaners Association ACR 2006 Standard after all major fit out works and prior to occupancy.
Outdoor Pollutant Control	IEQ-18	1	1	0.67	Mechanical design to ensure that the entry of outdoor pollutants through the ventilation system is minimised by: Outdoor air intakes are located such that the shortest distance from the intake to any specific potential outdoor contaminant source is in accordance with ASHRAE Standard 62.1-2007 Section 5 Table 5-1; and Outdoor air intakes are designed in accordance with ASHRAE Standard 62.1-2007 Section 5.6	Mech Eng	Mech design Mech spec	Contractor to ensure that louver selections and/or rain hoods control rain entrainment and outdoor air intake screening devices are installed in accordance with ASHRAE Standard 62.1-2007 Section 5.6.5 'Bird Screens'.
Places of Respite	IEQ-19	1	0	0.00	Not likely to be achievable given current space constraints. To achieve this point, 2 designated places are to be provided that allow building users a physical connection to natural environment. The combined area of all places of respite must be at least 5% of occupied floor area, with a minimum size of 25m2 per garden area. Each area must be designed to be universally accessible, well lit, well ventilated, non-smoking, located to avoid noise, odour and air pollution. All staff must have access to at least one place of respite that it designated 'staff only'. At least 75% of all patients and visitors must have access to at least one place of respite. A minimum of 30% of the area of each place of respite must be soft landscaping. Seating areas for both ambulatory and wheelchair users must be provided, with a minimum of one seating space per 7.5m2 and one wheelchair space for every 5 seating spaces. Outside places of respite must have shading for 50% of its area, and have adequate screening from prevailing winds.	Architect	Identify any amenity areas that could be used to satisfy this credit. Possibly in existing building?	
	TOTAL	30	16	10.67				
	CATEGORY SCORE	100%	53%					
	WEIGHTED SCORE	20		10.67				
Weighting Factor		24%						
Conditional Requirement	Ene-	Conditional Requirement.	Yes					
Green House Gas Emissions	Ene-1	20	4	3.31	Subject to modelling and the outcomes of Electricity kWhrs, Gas MJ and Diesel L. Energy target is 20% reduction (4 Points).	NDY ESD	Energy Model	

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Energy Sub-metering	Ene-2	1	1	0.83	Requires Separate Light and Separate Power metering for primary functional areas (per floor) - in-patient accommodation, operation theatres, office/admin spaces, laboratories. Confirm provision of adequate sub-metering.	Elec Eng	Elec spec	The Contractor shall ensure that electrical sub-meters are installed to ensure lighting and general power consumption are separately monitored for each primary functional area on each floor for: - in-patient accommodation and operation theatres; - office/administration space; and - laboratories. Where one of these areas is less than 200m2 it may be grouped with an adjacent functional area providing the area being metered does not exceed 1000m2. Sub-meters must be connected to the BMS. Whenever the equipment (such as lifts), individually or collectively carry an energy use greater than 100kVA, they must be sub metered. If they individually usage is under 100kVA, they can be sub metered as a group. Supplementary equipment can be installed on the same metered circuit as the substantive energy equipment, but must not contribute greater than 10kVA. As-built drawings shall demonstrate compliance. One site energy generation systems must be sub-metered. Separate metering of usage over 100kVA may include: □ Car parks □ Chillers □ Air Handling fans □ Lifts □ Common area light □ Common area power □ Any other items that are rated at 100kVA or greater.
Peak Energy Demand Reduction	Ene-3	2	0	0.00	1 point for 15% peak energy demand reduction, 2 points for 30%. Can be achieved through onsite cogen, renewable energy systems (e.g. PV) with storage, chilled water storage/phase change materials, electrical energy storage systems or potentially through use of dedicated offsite district systems. Solar thermal hot water system to be provided.	Not targeted	Nil	NA
Lighting Zoning	Ene-4	2	2	1.66	All individual or enclosed spaces to be individually switched. Size of individually switched lighting zones must not exceed 100m^2 for 95% of the NLA and switching must be clearly labelled and easily accessible by building occupants. 2nd point for automated lighting control system, such as occupant detection and daylight dimming for 95% of occupied areas.	Elec Eng	Elec spec	The Contractor shall ensure that all individual or enclosed spaces have individual switches and the size of individually switched lighting zones does not exceed 100m2 for 95% of the occupied area and switching is clearly labelled and clearly labelled and easily accessible by building occupants. Switching must be located as follows: □ Within the 100m2 zone and at every entry (two or three-way switches may need to be provided) to the floor or tenancy (whichever is smaller); OR □ At the entry point to the tenancy or floor (whichever is smaller) if the area controlled by the switching does not exceed 500m2. Automated lighting controls (e.g. presence detection or daylight dimming) must be provided to over 95% of all occupied areas.
Car Park Ventilation	Ene-6	3	3	2.48	Points for car park with natural ventilation, passive supply or exhaust. Car park has 100% natural ventilation.	Architect & Mech Eng	Nil	
Efficient External Lighting	Ene-9	1	1	0.83	All external lit spaces must have a light source efficacy of 50 lumens/watt. 95% of outdoor spaces must meet or exceed the min requirements of AS1158 for illuminance levels. 95% of external lights must be connected to daylight sensors.	Elec Eng	Elec spec	All external lit spaces must have a light source efficacy of at least 65 lumens/watt. Outdoor spaces must meet or exceed the minimum requirements of AS1158 for illuminance levels. All external lights must be connected to daylight sensor controls to ensure they do not operate during daylight hours.
	TOTAL	29	11	9.10				
	CATEGORY SCORE	100%	38%					
	WEIGHTED SCORE	24		9.10				
Weighting Factor		7%						
Provision of Car Parking	Tra-1	2	0	0.00	This requires the number of car parking spaces to be limited to no more than the minimum local planning allowance or 50% less than the maximum allowance.	Not targeted	Nil	NA

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Category	**Credit No.**	**Points Available**	**Targeted Points**	**Weighted Score**	**Requirements & Approach to Compliance**	**Discipline Responsible**	**Actions**	**Example Specification Wording**
Fuel Efficient Transport	Tra-2	1	**1**	**0.58**	Encourage the use of fuel efficient vehicles by providing: - a minimum of 10% of car parking spaces will be reserved for small cars. - a further 15% of parking spaces will be reserved mopeds/motorcycles, car-sharing vehicles, hybrid or electric vehicles - a minimum of 80% of these reserved spaces will be 'preferred parking', i.e. located near the car park entrance.	Architect & Building Contractor	Allocate reserved parking spaces	
Cyclist Facilities	Tra-3	3	**2**	**1.17**	1 point for providing bicycle racks for 5% of staff; plus 1 shower for every 10 cycle spaces; plus male and female change rooms with 1 locker for every bicycle parking space. 566 total staff, so 29 cycle spaces required + 3 showers & change areas + 29 lockers. 1 additional point for visitor cyclist racks (1 bicycle space per 30 beds) within 50 m of a major public entrance. There are 50 new inpatient beds, so 2 Visitor Bicycle parking spaces must be provided. These can be outside, but must be in an accessible location, signposted and close to, or adjacent to, a major public entrance to the building. Note requirements of DGR 9, which requires compliance with policies including the Planning Guidelines for Walking and Cycling. Existing Hospital o Hospital Staff – 313 o Hospital Patients – 216 o Medical Suite Doctors & Staff – 79 o Medical Suite Patients – Approx. 50 o Visiting Medical Officers - 120 visiting (50 max. at any one time) **Total existing staff: 313+79+50 = 442** **Total existing patients: 216+50 = 266** Proposed Extension: o Hospital Staff (inc. OT staff (36), support staff (15) & other staff(37)) – 88 o Hospital Patients – 50 o Medical Suite Doctors & Staff – 21	Architect	Total staff= 566 Total patients= 326 5% of staff= 28.3. GS requires: 29 undercover staff bicycle racks + 3 showers, with adjacent change areas, plus 29 lockers located in close proximity to the showers & change rooms. Confirm location of 2 covered visitor bicycle parking spaces within 50m of a main entrance.	
Commuting Public Transport	Tra-4	5	**2**	**1.17**	Points awarded based on availability of public transport facilities. Score limited by distance to transport nodes. Bus Stops located on Norbrik Drive and Old Windsor Road (Bus 715 to Castle Hill and Baulkham Hills), and the Norbrik T-Way (602, 607X, 617X, 740, T63, T64, T65, T66) - max walking distance 600m via underpass.	Client	Advise if any additional bus stops are planned.	
Transport Design and Planning	Tra-6	1	**1**	**0.58**	At least one dedicated pedestrian route must be provided on and off the site and a Travel Plan, Site Specific Transport Assessment & report on Sustainable Transport Initiatives must be developed.	Architect Client	Include pedestrian route Develop Travel Plan & Transport Assessment Report	
	TOTAL	**12**	**6**	**3.50**				
CATEGORY SCORE		**100%**	**50%**					
WEIGHTED SCORE		**7**		**3.50**				
Weighting Factor		**12%**						

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Occupant Amenity Water	Wat-1	5	**2**	**2.00**	Toilets to be selected to have at least 4 star WELS rating and 5 star urinals. Showers to be selected to have at least 3 star WELS rating (6 litres/minute). Wat 1 Hospital tapware is generally 4 or 5 star. No Rainwater tank.	Architect Hydraulic Eng	Arch Spec	Contractor to ensure potable water consumption for sanitary uses to be best practice through the provision of WELS rated fittings and fixtures. Toilets to be WELS 4 Star (Dual flush - 3 L half / 4.5 L full flush) Urinals to be WELS 4 Star (Sensor activated, 1.5 L per flush) Taps to be WELS 5 Star (flow rate of 4.5 L/m to 5 L/m) Showers to be WELS 3 Star (flow rate of 4.5 L/m to 9 L/m) No changes to specified hydraulic fittings are allowed without approval and compliance with Green Star requirements for this project.
Water Meters	Wat-2	1	**1**	**1.00**	Water meters to be installed System for monitoring water consumption via BMS.	Hydraulic Eng	Hydraulic Spec	Water sub-meters shall be installed on all major water uses in the building. This includes (but is not limited to) bathrooms, showers, cooling towers, irrigation & wash down systems, recycled water and rainwater collection systems and hot water services. All meters shall be linked to a BMS (Building Management System) to provide a leak detection system.
Landscape Irrigation	Wat-3	NA	**NA**	**NA**	Not applicable. Landscaping is less than 1% of the project site area.	NA	Nil	NA
Heat Rejection Water	Wat-4	4	**4**	**4.00**	4 points available if no water based heat rejection systems are provided. Air cooled chillers proposed.	Mech Eng	Advise if water cooled or air cooled chillers are specified. Advise if condenser water is to be used for medical consulting rooms.	
Fire System Water Consumption	Wat-5	1	**0**	**0.00**	Requires water storage tanks to be provided sufficient to store a minimum of 80% of routine fire protection system test water and maintenance drain downs for reuse onsite, and each floor to be fitted with a sprinkler system with isolation valves or shut-off points for floor-by-floor testing. Not proposed to recycle fire sprinkler test water.	Hydraulic Eng	Confirm if this point can be achieved.	
Potable Water Use for Equipment	Wat-6	1	**0**	**0.00**	1 point awarded if 95% of water requirement for once-through cooling sourced from non-potable water OR use other cooling system (that does not require water).	Client PM	Advise if medical or lab equipment will be used that requires chilled water cooling.	
	TOTAL	**12**	**7**	**7.00**				
CATEGORY SCORE		**100%**	**58%**					
WEIGHTED SCORE		**12**		**7.00**				
Weighting Factor		**17%**						
Recycling Waste Storage	Mat-1	1	**1**	**0.59**	Waste storage area to be provided, sufficient to store both general and recyclable waste.	Architect	Arch Spec	The contractor shall ensure that the dedicated storage area (provided for the separation, collection and recycling of office consumables with good access for all building occupants) is provided in accordance with the 'Policy for waste minimisation in new developments' by the City of Sydney 2005. The storage area shall be located within: - 20m from the base of the lift core serving all floors; - 20m of the exit used for recycling pick-up; OR - 3m of the shortest route connecting the lift core serving all floors and the exit used for recycling pick-up. It shall be shown that the access requirements are in accordance with Section A (points A-12 through A-17) and Section C (points C6 and C7) of the "Policy for Waste Minimisation in New Developments", or a letter from a commercial building recycling company that states the storage area and loading area facilitate easy access for the collection. The storage area shall allow for recycling of, as a minimum, paper, glass, plastics, metals and organic (compost) materials.

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Building Re Use	Mat-2	6	**2**	**1.17**	Facade is new. Two points for reusing 30% of existing major structure. Existing slabs to be reused. Car park and basement.	Structural Eng	Confirm if 30% of existing structure will be reused.	
Recycled Content & Reused Products and Materials	Mat-3	2	**2**	**1.17**	2 points if products with over 50% recycled content (or reused materials) are used, which add up to 2% of project contract value. Materials that can be counted toward Mat 3 include: □ Bricks □ Doors □ Windows □ Cladding □ Pre-cast concrete panels □ Sanitary fixtures and fittings □ Lighting fixtures and fittings	Architect & Building Contractor	Arch Spec	The Contractor shall ensure that at least 2% of the project's total value is represented by products with a post consumer recycled content of greater than 50%, or by reused products/materials. Products that can be considered include bricks, windows, cladding, flooring and doors. Reused PVC products can be counted. Materials that are addressed in other Green Star credits cannot be counted, including steel, concrete, PVC and timber. Hoardings, overhead protection systems, formwork, temporary electrical and plumbing equipment can not be counted. Non-fixed appliances, stationery and other consumables cannot be counted. Evidence of the recycled content or reuse or products/materials must be kept, such as purchase receipts of the items purchased, and if reused, details of the previous location of the item. Documents Required: schedules listing recycled and reused products and materials used within the project.
Concrete	Mat-4	3	**1**	**0.59**	1 point for portland cement content reduced by 30% 2 points for reducing by 40% 3rd point for using 40% recycled aggregate and 25% manufactured sand or alternative.	Structural Eng & Building Contractor	Structural spec	The contractor shall ensure that the Portland cement content in all concrete used in the project has been reduced by 30%, measured by mass across all concrete used in the project compared to the reference case.
Steel	Mat-5	2	**1**	**0.59**	1 point: At least 60% of all reinforcing steel must be produced using energy-reducing processes in its manufacture (measured by average mass by steel maker annually) - i.e. Polymer Injection Technology. 2nd point: At least 15% (by mass) of all reinforcing steel is assembled using off site optimal fabrication techniques. Struct Eng: Targeting 1st point. 2nd point: Unlikely to be 15% off site manufactured.	Structural Eng & Building Contractor	Confirm if steel contractor uses PIT. Confirm if over 15% of rebar will be off site prefab.	The Contractor must ensure that at least 95% of all reinforcing bar and mesh meets or exceeds 500MPa strength grade, and at least 60% of all reinforcing bar and mesh is produced using energy-reducing processes in its manufacture (measured by average mass by steel maker annually); AND At least 95% of all reinforcing steel meets or exceeds 500MPa strength grade, and at least 15% (by mass) of all reinforcing steel is assembled using off site optimal fabrication techniques detailed in Table 2 of the Green Star Steel Credit.
PVC Minimisation	Mat-6	2	**0**	**0.00**	Two points if at least 90% of the common uses of PVC products (flooring, cable and conduit) in buildings (by cost) meet the Best Practice Guidelines for PVC in the built environment. E.g. storm water pipes, gas pipes, sewer pipes, hot and cold water pipes and air conditioning pipe work, conduit and associated fittings (e.g. electrical and communications conduit), wire and cable insulation (e.g. mains, sub-mains, sub circuit, telephone, data, security and fire alarm cabling), vinyl flooring or carpet containing PVC backing, and resilient wall covering products must be independently verified as complying with the Best Practice Guidelines for PVC in the Built Environment Elec cabling with no PVC or Best Practise PVC can be more expensive, and limit cable size choice. Therefore not targeted.	Not targeted	Not targeted.	Contractor to ensure that at least 60% of pipes (e.g. storm water pipes, gas pipes, sewer pipes, hot and cold water pipes and air conditioning pipe work), conduit and associated fittings (e.g. electrical and communications conduit), wire and cable insulation (e.g. mains, sub-mains, sub circuit, telephone, data, security and fire alarm cabling), vinyl flooring or carpet containing PVC backing, and resilient wall covering products are independently verified as complying with the Best Practice Guidelines for PVC in the Built Environment, i.e. by 1) the manufacturer or supplier's ISO14001 accredited Environmental Management System including compliance with the Best Practice Guidelines for PVC in the Built Environment or 2) Product declaration supplied by the Manufacturer or Supplier that the Best Practice Guidelines for PVC in the Built Environment have been met for a specific product or 3) Product Certification by an independent accreditation program that integrates the relevant criteria from the Best Practice Guidelines for PVC in the Built Environment. The Best Practice Guidelines for PVC in the Built Environment includes the following requirements for PVC Resin: PVC Resin shall be sourced from manufacturing plants or processes that practice the following emissions-related indicators: - Air and Water: vinyl chloride monomer emissions from PVC manufacturing (both to air and water) shall not exceed 43g/tonne of product produced (measured on an annual basis). - Products: vinyl chloride monomer emissions from raw PVC resin shall not exceed 1ppm when delivered to the end processor.
Timber	Mat-7	1	**1**	**0.59**	95% of all timber products including formwork and composites must be FSC, reused or post-consumer.	Architect	Arch spec	Contractor to ensure that over 95% of all timber products including formwork and composites are FSC certified, reused or post-consumer recycled content.

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Design for Disassembly	Mat-8	1	**0**	**0.00**	Mat-8 requires wording to be included in specifications for products intended for disassembly, stating that: □ Connections must allow for disassembly (e.g. screws, clips or bolts not rivets or welds), □ Materials and elements to be recovered must be marked with a permanent label indicating the material properties, date of manufacture and potential for re-use, and □ A Disassembly Plan must be produced e.g. as part of the O&M manual illustrating how to disassemble each product.	Architect & Structural Eng	Arch Spec Structural spec	Contractor to ensure that for 50% (by area) of structural framing and facade cladding systems are designed for disassembly, OR 95% of the total facade is designed for disassembly. Design for disassembly includes: - Connections must allow for disassembly (e.g. screws, clips or bolts not rivets or welds), - Materials and elements to be recovered must be marked with a permanent label indicating the material properties, date of manufacture and potential for re-use, and - A Disassembly Plan must be produced e.g. as part of the O&M manual illustrating how to disassemble each product. Elements to be recovered must be clearly marked, or have a label permanently attached, showing their inherent properties and date of manufacture to enable reuse.
De-materialisation	Mat-9	1	**0**	**0.00**	Significant reduction in ductwork, cladding, structure, piping is required. Not targeted.	NA	Nil	NA
Flooring	Mat-11	3	**0**	**0.00**	Three points for using flooring calculator to demonstrate reduced environmental impacts. Requires GreenTag / GECA certified products Usually vinyl. To be investigated if GECA or GreenTag certified.	Client	Establish if Flooring is GECA or GreenTag certified.	Contractor to ensure carpets, carpet tiles, floor tiles and other flooring products are GECA certified flooring products, or comply with one of the other Green Star Mat-11 requirements for selection of flooring with reduced environmental impacts.
Joinery	Mat-12	1	**0**	**0.00**	To achieve this each wall and partition component must achieve a score of at least 50% within the Joinery calculator. Requires GreenTag or GECA certified joinery.	Not targeted	Nil	NA
Loose Furniture	Mat-13	4	**0**	**0.00**	Requires chairs, tables and storage units to be GECA or GreenTag certified. Procurement contracts with existing suppliers in place. Check if these are GECA or GreenTag certified.	Client	Hospital to advise if GreenTag or GECA certified furniture will be used.	New loose furniture (e.g. chairs, tables and storage cabinets) to be GECA certified, or comply with the other Green Star Mat-13 credit requirements for selection of loose furniture that has a reduced environmental impact. New HealthScope procurement guidelines include requirement for GreenTag Certified furniture.
Ceilings, Walls and Partitions	Mat-14	2	**0**	**0.00**	Requires GECA or GreenTag certified ceiling tiles, walls and partitions.	Not targeted	Nil	NA
	TOTAL	**29**	**8**	**4.69**				
CATEGORY SCORE		**100%**	**28%**					
WEIGHTED SCORE		**17**		**4.69**				
Weighting Factor		**8%**						
Conditional Requirement	Eco	Conditional Requirement	**Yes**					
Topsoil	Eco-1	NA	**NA**	**NA**	Deemed "Not Applicable" if no topsoil is impacted by construction.	NA	Nil	Contractor to ensure that all productive topsoil impacted by the construction works is to be separated and protected from degradation, erosion, or mixing with fill or waste. There is to be no net change in the volume of topsoil on the site. 95% of topsoil (by volume) is to retain its productivity. Inherently non-productive topsoil does not need to be separated and protected.
Reuse of Land	Eco-2	1	**1**	**1.14**	At the time of purchase, 75% of the site was previously built on, pervious or impervious surfaces (e.g. paved or unpaved car park).	Client	Nil	
Reclaimed Contaminated Land	Eco-3	2	**0**	**0.00**	Depending on hazardous material survey or whether site was contaminated.	PM	Advise outcome of any haz mat survey	
Ecological Value of Site	Eco-4	4	**1**	**1.14**	No net reduction in ecological value of site	ESD	Use GS Ecology calculator.	
	TOTAL	**7**	**2**	**2.29**				
CATEGORY SCORE		**100%**	**29%**					
WEIGHTED SCORE		**8**		**2.29**				
Weighting Factor		**3%**						
Refrigerant ODP	Emi-1	1	**1**	**0.18**	All equipment to have no CFC or HCFC refrigerants. Refrigerant to be used is R134a, which has Zero ODP.	Mech Eng	Mech spec	Contractor to ensure all HVAC refrigerants have an Ozone Depleting Potential (ODP) of zero. The Contractor shall ensure that 100% of all HVAC refrigerants by volume have an ODP of zero. It shall be demonstrated that this is achieved by providing manufacturers documentation and technical data at handover.

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Refrigerant GWP	Emi-2	2	**0**	**0.00**	Not targeted			
Refrigerant Leaks	Emi-3	2	**0**	**0.00**	1st point requires chillers to be located in reasonably airtight enclosure for the purposes of leak detection and waterproofing. 2nd point for refrigerant recovery system with automatic pump down Not targeted - chillers are outside.	Mech Eng	Nil	The contractor shall ensure that the systems containing refrigerants are contained in a moderately air tight enclosure and a refrigerant leak detection system is installed covering high-risk parts of the plant (evaporator or condenser coils are omitted from this).
Insulant ODP	Emi-4	1	**1**	**0.18**	Specifications to require thermal insulation to have zero ODP in manufacture and composition.	Architect & Mech Eng & Hydraulic Eng	Mech, hyd, arch spec	All thermal insulants installed shall avoid the use of ozone depleting substances in both manufacture and composition. Before ordering insulation products the Contractor must confirm with the supplier that the product does not use ozone depleting substances in both manufacture and composition. Insulation products must be 'Zero ODP', with datasheets that confirm same.
Watercourse Pollution	Emi-5	3	**0**	**0.00**	2 points: If all stormwater discharged from site is treated to reduce by X% against the typical urban annual load: - TSS 80% reduction - Gross pollutants 80% reduction - Nitrogen 45% reduction - Phosphorus 60% reduction - Hydrocarbons 90% reduction - Oils 90% reduction Existing GPT is unlikely to get 2 points.	Hydraulic Eng	Advise if stormwater treatment systems will be installed. If so, do they meet the Green Star criteria?	
Discharge to Sewer	Emi-6	5	**1**	**0.18**	1 point available from reduced flush toilets and urinals	Architect & Hydraulic Eng	Confirm toilet and urinal flush volumes	
Light Pollution	Emi-7	1	**1**	**0.18**	External lighting design must be in accordance with AS 4282 Control of the Obtrusive Effects of Outdoor Lighting. Lighting in outdoor spaces must not exceed AS1158 for illuminance levels.	Elec Eng	Elec spec	Contractor to ensure that lighting is not directed at any point in the sky, with all external lights having cowls to prevent upward light spill.
Legionella	Emi-8	1	**1**	**0.18**	Awarded if no water-based heat rejection systems serving the building. Air cooled chiller proposed.	Mech Eng		
Trade Waste Pollution	Emi-9	1	**0**	**0.00**	Requires trade waste pre-treatment equipment to be installed on-site to remove trade waste pollutants at source.	Hydraulic Eng	Advise if trade waste treatment systems are proposed.	
	TOTAL	**17**	**5**	**0.88**				
CATEGORY SCORE		**100%**	**29%**					
WEIGHTED SCORE		**3**		**0.88**				
		100		**46.60**				
Innovative Strategies and Technologies	Inn-1	5 points in total for Inn-1,2&3	**0**	**0.00**				
Exceeding Green Star Benchmarks	Inn-2		**0**	**0.00**				
Exceeding Green Star Scope	Inn-3		**0**	**0.00**				
	Total	**5**	**0**	**0.00**				
		105		**46.60**	**4 Star Equivalent**			