Surface Design

ABN: 19 570 343 498
Suite 11.03, 68 York St
SYDNEY NSW 2000

info@surfacedesign.com.au
P: 02 9249 1401

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Adrian Wuillemin
Project Development Manager, NSW & ACT
John Holland
Level 3
65 Pirrama Road
PYRMONT, NSW 2009

Project Number. 12078.02P

Dear Adrian,

RE: Abercrombie Precinct Redevelopment - Sustainable Design

The Abercrombie Precinct Redevelopment is to be designed to incorporate a number sustainable design initiatives. The extent of these initiatives has deviated from the original proposal detailed by Cundall in the document *Sustainability & ESD Planning Submission Report* dated 2 April 2012, Revision E.

It is our understanding that the University of Sydney in association with John Holland has identified a revised Green Star strategy and Sustainability targets for the project. The revised Green Star target includes self evaluation of the project using the Green Star Education v1 tool with a target of 5 stars within the Green Star Education v1 Design calculator. We refer to the University of Sydney Sustainability Framework document attached to this letter which lists the sustainable design initiatives for the project.

The project team will not be seeking formal certification of the project with the Green Building Council of Australia. The University of Sydney will complete their own reviews of the project design documents for consistency with the Green Star Education v1 tool criteria. It is our understanding that this approach has been proposed and accepted by the University of Sydney as an appropriate Green Star strategy for this development.

Yours faithfully,

Belinda Konopka
Sustainable Design Engineer
Surface Design Consulting Pty Ltd
Ph: (02) 9249 1401

Encl: University of Sydney Sustainability Framework

THE UNIVERSITY OF SYDNEY

1. Place Making & Amenity

1.1	Site design	Priority	Targeted (Y/N)	Deliverable (Describe how you will achieve this credit)
1.1.1	**Orientation**			
	Orient the building to utilise site conditions to optimise the passive design features of its footprint and activate the surrounding public realm.	Mandatory	Y	Orientation allows for substantial natural light to the floor plates without being harsh and directional. The boxes are partly self shading and there is a minimal western face. The courtyards are shaded through orientation for outdoor learning and for public realm use. The ground plain is porous, allowing the public realm to be fully integrated with the building.
1.1.2	**Interface with surrounds**			
	Ensure that the interface between the building and surrounding community will present a welcoming public front, promote compatible uses to minimise conflicts and a clearly defined boundary to create a sense of arrival.	Highly Desirable	Y	The building promotes community engagement with a welcoming park and surroundings. The entry has a café and seating areas around the base and tree to maintain an active front for both students and the community. The sense of arrival is embraced by the wings and centred on the community tree.
1.2.1	**Contextual response**			
	Respond to the site context by considering how the building will interact with the local setting (particularly external to the University) in terms of land use, street pattern, building heights, massing and roof scapes.	Mandatory	Y	The building was conceived as a 'market place' and therefore does not feel like one large institutional building/floor plate, but more in the scale of the surrounding terraces, thus making it more welcoming to the community. The sun shading and facade softens the scale and texture. The historical site lines were used as a palimpsest in the building form to break the scale and introduce the entry points. The historical roads and lots will be referenced on historical signage within the site.
1.2.2	**Characteristics**			
	Identify elements of local distinctiveness (both within the campus and its surrounds where it will interface - physical and visual - with areas external to the University) as possible cues for design of the building.	Recommended	Y	The terracotta façade is a 'memory' of the quadrangle building. The sandstone colours and stratification being a major element of the façade design. The celebration of the 'tree' is also a cultural memory link back to the main tree in the quadrangle. Within the site there is a cultural link to the Joinery Shop and the existing sandstone and brickwork located on site will be reused throughout the landscape where possible.
1.3.3	**Consideration of heritage**			
	New development should respect the scale, sitting, shape and materials of proximate heritage buildings. Indigenous and non-indigenous items of heritage significance (including parks and gardens, axes and movement networks, views and vistas and Aboriginal sites) should be protected and enhanced.	Mandatory	Y	We acknowledge the footings of the 'corner shop' to the east corner of the site, these will be retained and marked as a heritage item. The joinery shop has been reinterpreted into the laneway and will be signed and referenced as a heritage item. The joinery shop bricks and sandstone curbing will be reworked into the site and signed as heritage elements. Historical streetscape and lots will be referenced in the site.
1.4.2	**Vibrant streetscape**			
	Promote opportunities for social interaction through the provision of a mix of uses (services and facilities) and public space to activate the edges and support local businesses. Adopt a consistent and unifying design that responds to the identity of the precinct and includes sheltered areas and seating.	Highly Desirable	Y	All external edges to laneways, streets and outdoor spaces are considered activated spaces with seating, power, some heating to encourage collaboration. The 'boxes' have overhangs with lighting and seating and heating as protective elements. The café will work as a community connection space with large openable panels spilling life out onto the corner of Abercrombie and Codrington.
1.4.3	**Connections**			
	Provide high quality direct pedestrian and cycle connections with adjoining buildings, within the precinct and the movement network beyond the campus.	Mandatory	Y	There is a protected pedestrian link between H69 and the new USBS. Bicycle parking spaces are provided in and around the building with showers for staff to the basement. Upgrades to pedestrian links and laneways are part of the proposal.
1.4.4	**Access to water stations**			
	Include outdoor filtered water stations (with bottle fill facilities) in all new buildings over 2000m2 unless a University filtered water station is in the local vicinity (50m)	Mandatory	Y	Water stations will be included in the design . The maximum will be 2 stations and the location is to be determined with the client.
1.5.1	**Focal points of reference & Permeability**			
	Use points of visual importance within the campus to provide a sense of orientation, such as accentuating landmarks, gateways, focal points and connecting spaces. Ensure recognised routes (including public transport) are strengthened through the design of the building's access points and public spaces	Mandatory	Y	The tree is the crowning focal point to the entry of not only the building but also the campus. The ground floor glass is 'clear' for permeability and creating an active 'on display' learning environment. Street signage and markings that are used throughout the campus will be utilized for orientation.
1.5.2	**Legibility & Signage**			

	Design connections to and improve the existing network of pathways so that they have a clear image, are easy to understand and require minimal signage requirements. Prioritise ease of movement for pedestrians, cycling and those arriving by public transport. Design signage as a group of coordinated elements and locate at entry points, convergence of movement networks and areas of high	Mandatory	Y	The signage will be developed with the university user group and aligned to the design guidelines. Clarity in entry points and paths have been a fundamental part of the design process.
1.6.2	**Lighting**			
	Provide lighting within the building's public realm to support the any designated "24 hour zones" within the precinct and direct movement networks which connect to public transport and to increase safety.	Mandatory	Y	Lighting to the front of the building around the 24hour learning hub is provided in the design for pedestrian movement to and from the front door. Lighting to the perimeter of the building will be considered in tandem with the security measures adopted for the precinct.
1.6.3	**24 hour amenities**			
	Provide a range of 24-hour support amenities including internet access 24 hrs and Wi-Fi access points for outdoor users and seating.	Mandatory	Y	The front wings and external space is considered the 24hour space. The external seating has power and access to Wi-Fi in and outside the learning hub 24 hours.
1.7.1	**Include security staff in design**			
	Consult University security and local police during the building design or refurbishment.	Mandatory	Y	Minimal consultation with these stakeholders has taken place to date and additional consultation opportunities will be provided as required moving forward throughout the design and construction phases.
1.7.2	**Passive surveillance**			
	Orient buildings to front on to circulation routes and present an active frontage. For existing buildings, find ways to activate ground-level spaces that can open onto circulation routes.	Highly Desirable	Y	All external circulation is accessible by an access point from the new building and visible from inside the main circulation space. The southern laneway is lit with catenary lighting and the orientation of the student accommodation public spaces front this laneway to help activate the space at night and provide passive surveillance of the space.
1.8.1	**Integration of art**			
	Identify publicly accessible locations to install public art to strengthen the identity of the University and assist in orientation and interpretation. Where possible, encourage site-specific art installations that correspond to the inherent natural qualities or proposed architecture of the site.	Recommended	Y	The University of Sydney shall make allowance for the procurement and installation of artwork. Art consultation is considered as part of the heritage response, as an interpretation around the building. Consultation services in regard to this have been allowed for.
1.8.2	**Green walkways**			
	Provide trees, at natural ground level, for shade and visual interest, where they do not obscure views to facades of important buildings nor visual linkages between.	Mandatory	Y	External spaces are enhanced by landscaping design and tree placement complementary with the building design and maintaining the security of users.
2. Intellectual Leadership				
2.1.1	**Design Excellence**			
	For new buildings, design adaptable buildings that enable staff to deliver quality teaching and conduct quality research. For existing buildings, refurbish accommodation so that it can be adapted quickly and cost-effectively to the changing needs of the University.	Highly Desirable	Y	The teaching spaces and academic workplace are considered by the user group and an expert panel to be of a contemporary spatial quality within new pedagogy parameters. All the boxes were design as a similar dimension so they are agile and adaptable over time. The pods fit all sizes of teaching and research/workplace spaces apart from the lecture theatres. Columns are generally located at the façade to facilitate the adaptability of any space. Access floors have been provided to the workplace levels to assist in the reconfiguration of areas with minimal impact to the building fabric.
2.1.2	**Living Laboratory**			
	Incorporate an educational display of at least three or more of the building's environmental and economic benefits in a way that can be easily understood by a causal observer. As a minimum, one of the display attributes must relate to energy. Displays may include a digital display of utility consumption/GHG production, a display of a design aspect of the building and how it works, or of a unique research activity that is being undertaken in the building.	Highly Desirable	Y	Electronic signage board located in the main entry area shall be utilised to provide directional and building information with the ability to display the key performance indicators of the building with regard to environmental factors and performance.
2.1.4	**Technology Demonstration**			

	As a demonstration project, incorporate the use an innovative building material, design element or on-site non-polluting renewable energy generation technologies (such as solar, wind, geothermal, small scale/micro hydroelectric, and biomass with peak electrical generating capacity of at least 1% of the project's specified electrical service load.) This project should be set-up to both educate the public and accommodate University teaching and learning. Specific consideration must be given to how the technology can be monitored and analysed by staff & students.	Highly Desirable	N	Following ESD workshops held during the initial design phase, the provision of such items was deemed to be cost prohibitive to the project. Consideration of such a demonstration can still be accommodated within the building space but would need to be reviewed with respect to funding.
	Develop a set of indicative targets founded on a baseline of Australian University or public sector precedents for similar buildings and seek to improve upon them in at least one category of design: potable water consumption, energy consumption, and greenhouse gas emissions per m2 and as a percentage reduction from BAU.		Y	A comparison of predicted building performance to established University of Sydney baseline data will be included in the final design report. This information may be used by the University to develop ongoing management targets. As a minimum, the project seeks to improve on water efficiency in respect to similar buildings.
	An extra point can be achieved for each additional categories where the building is shown to be an improvement on baseline data as per the credit above.		Y	In addition to targeting water efficiency John Holland will also seek to target improvement opportunities in CO2 and Energy efficiency. Opportunities to improve on benchmarks may be limited by existing design requirements.
2.3.3	**Whole of Life costings**			
	Ensure a Whole of Life/Life Cycle Cost (LCC) analysis is used to select between HVAC options and determine the true cost implications of different facade designs. Mechanical plant analysis should be conducted on a 25 year time-frame, and facade designs should be analysed on a 50 year time-frame. This analysis should take into account plant/materials choice, construction costs, ongoing operations and maintenance costs, and use the following assumptions; • Electricity= 19c/kWh • Gas=1.8c/MJ • Inflation= 3%p.a. • Discount rate= 7%	Mandatory	N	Selection of HVAC (and facade system) is predetermined in conforming design tender and as such and WOL modelling should have already been completed by others. John Holland can perform WOL analysis if required, however we note opportunity to vary HVAC specification is limited at this stage of the project.
2.3.4	**Procurement Guideline**			
	Review the University's procurement guidelines and develop a strategy for how they will be effectively incorporated into the project's design and construction process.		Y	Consideration of the University's procurement guidelines and Environmental Policy will be given in the development of a project specific procurement strategy. This will involve the identification of key principles and inclusion in John Holland's procurement strategy where possible. John Holland recognises that unforseen supply chain risks and excessive expenditure may arise as a result of such strategies and will only make allowance where practical.
2.3.5	**Commissioning - Commissioning Clauses**			
	Incorporate requirements for comprehensive pre-commissioning, commissioning, and quality monitoring for all building services into contracts. Ensure that commissioning is carried out as per CIBSE codes and ASHRAE guidelines.	Mandatory	Y	Commissioning included to meet CIBSE codes and ASHREA guidelines as specified in tender documents.
2.3.6	**Commissioning - Commissioning Handover**			
	Ensure the design team and contractor transfer project knowledge to the University through design documentations, as built drawings, Operations and Maintenance Manuals, Commissioning report and training of building manager/staff	Highly Desirable	Y	All O&M Requirements included in John Holland commissioning plan.
2.3.7	**Commissioning - Building Tuning**			
	Ensure that a building tuning strategy is incorporated into the design and construction processes including; 1. monthly reporting on tuning during the first year of operation with a full re-commission a year after practical completion 2. Building owners and University maintenance staff are included in tuning process and provided monthly reports to ensure transfer of knowledge 3. A final tuning report is provided following re-commissioning for review by owners	Highly Desirable	N	Initial building tuning and reporting for mechanical and BMS systems allowed only.
2.3.8	**Commissioning - Commissioning Agent**			
	Appoint an independent building commissioning agent to provide professional advice throughout the commissioning process including review of commissioning clauses and the commissioning of building systems	Mandatory	N	John Holland has internal expertise capable of delivering complex, high quality commissioning services. Recent examples include the successful commissioning of datacentres both for Commercial and Defence clients. Direct expertise has been assigned to the Abercrombie project team.
2.3.9	**Environmental Management Plan**			

	Adopt an Environmental Management Plan throughout construction phase in accordance with section 4 of the NSW Environmental Management System Guidelines (1998) to address issues of client, public and worker health and safety, community concerns and environmental risks. The main contractor must also be have ISO 14001 certification.	Mandatory	Y	John Holland maintains Environmental Management System certification under both ISO14001 and NSW Government EMS certification. Project specific environmental management plans are an integral part of project execution and will be developed and implemented from project commencement to finalisation.
2.3.10	**Construction Impacts**			
	Monitor, report and set targets for CO2 or energy arising from site activities, transport to and from site, and water consumption arising from site activities.	Highly Desirable	Y	John Holland will monitor and report monthly on energy, fuel, waste and water usage as a result of construction activities. At project establishment, suitable project specific targets will be established to ensure positive environmental outcomes. Such target's include; 80% recycling rate, minimising plant idling, optimisation of haul roads, etc.
2.3.11	**Maintenance Evaluation**			
	Ensure that members of the Engineering & Sustainability Team have performed and submitted a design review at both the preliminary and final design stages. This review must consider the design with respect to access, ongoing maintenance and ongoing cleaning of building services and external building features.	Mandatory	Y	Preliminary design review stakeholder consultation has been conducted by others to-date. During design finalisation stakeholder consultation opportunities will be available to ensure this group has further input as required.

3. Communication, engagement and community benefit

3.1.1	**Communications plan**			
	Develop a community and stakeholder communications plan tied to major project milestones. Ensure that feedback is distributed to the entire project team and that all design responses are documented and relayed back to the community and stakeholders. Provide a resource for distributing building environmental design and performance information, either through a website dedicated to the building or through another publication approach	Mandatory	Y	JH has dedicated resources available for the development and support of community consultation processes. JH has made a comprehensive allowance for community consultation throughout the design and construction phases. These include a dedicated project resource, 24hr hotline, website, production and distribution of information to surrounding community.
3.1.2	**Community Meetings**			
	Hold a minimum of two public community meetings to introduce the design and gauge feedback. These meetings should be publicised to the wider community and provided during convenient times outside of normal business hours. The design team should be present at these meetings as deemed appropriate by the project manager.	Highly Desirable	Y	Community meetings will be incorporated into the communications plan outlined in 3.1.1. The first of these meetings will be held at the Section 75W submission stage. The second meeting will occur towards the end of the detailed design phase. Key design personnel will be made available for these meetings. Where implementation of community feedback aligns with project objectives and is reasonable and practicable all efforts will be made to include in project delivery.
3.1.3	**Community Awareness**			
	Develop a public exhibition of design concepts and schematic plans for the project and display for an appropriate amount of time in a publicly accessible gallery space at the University. Consider expanding the scope of the exhibition to chart the design as a “work in progress.”	Recommended	Y	Working in conjunction with University of Sydney, public exhibition would be included in the consultation processes described above in section 3.1.2.
3.3.1	**Building Users' Guide**			
	Provide a simple and accessible Building Users’ Guide that incorporates relevant information about the building’s use, functional and environmental aspects, and special features. At a minimum, follow the guidelines developed by the GBCA for the Green Star Education Man-5 credit or equivalent.	Mandatory	Y	A Building User's Guide will be developed at project completion in accordance with GBCA guidelines as required.
3.3.2	**Post-Occupancy Evaluations (POE)**			
	Implement a post-occupancy evaluation at least 12-18 months after building completion to gauge thermal comfort, building functionality, and amenity performance for occupants. Develop and implement an action plan for addressing the key outcomes of the evaluation. Ensure POE survey results are fed back to building occupants	Mandatory	N	Not currently allowed.
3.4.1	**Local employment**			
	Provide retail, commercial, recreational and/or cultural floor area, in addition to the main building functions, to increase expenditure, demand for services, and local employment opportunities.	Recommended	Y	Building facilities (kitchen, amenities, etc.) provided in the design in combination with a high volume of unimpeded open spaces and forecourt areas allows for alternative utilisation by university as desired during non-teaching periods. The design with respect to security and compartmentation can be further developed to support this functionality as required.
3.4.2	**Local employment in Construction**			

	Require that contractors/subcontractors that tender for major construction works must submit a Local Employment Strategy (including an Aboriginal Participation Plan) as part of their package.	Recommended	Y	An indigenous participation strategy will be developed for the project that identifies opportunities for either direct or indirect indigenous participation in line with Category 2 NSW Government guidelines.

4. Healthy Environment

4.1.1	**Flicker Reduction**			
	Use high frequency electronic ballasts for all fluorescent luminaries for at least 95% of the floor area (applies to UFA only)	Mandatory	Y	Included in specifications.
4.1.2	**Avoid Overlighting Spaces**			
	Ensure the building lighting design provides a maintenance illuminance of no more than 25% above those recommended in Table E1 of AS1680.2.3 for 95% of the nominated area as measured at the working plane (or as required by AS1680.2.3). (applies to UFA only)	Mandatory	Y	Compliance for building lighting design complies with AS1680.2.3.
4.1.3	**Daylighting 30%**			
	Demonstrate that a Daylight Factor (DF) of 2% is achieved at desk-height level (720mm AFFL) under a uniform design sky for at least 30% of the UFA. This credit does not apply to areas where it is deemed necessary to engineer out daylight (eg. specific laboratories, cool rooms, lecture theatres)	Mandatory	Y	The chosen façade system maximises natural lighting to UFA meeting this design intention. No formal DF studies has been conducted to date, however design indicates that this is achieved. JH will verify with daylight factor modelling.
4.1.4	**Daylighting 60%**			
	Demonstrate that a Daylight Factor (DF) of 2% is achieved at desk-height level (720mm AFFL) under a uniform design sky for at least 60% of the UFA. This credit does not apply to areas where it is deemed necessary to engineer out daylight (eg. specific laboratories, cool rooms, lecture theatres)	Recommended	Y	See above. Report to determine DF achieved.
4.1.5	**Avoid Glare**			
	Reduce glare through the use of fixed shading devices, window tinting or operable devices such as shades or blinds. Provide black-out shades as appropriate for spaces with audio-visual requirements as determined by the design brief.	Mandatory	Y	The façade is provided with glare control externally with fixed sunshading devices. Internal blinds and blackout facilities have been provided to the teaching and workplace areas.
4.1.6	**Views 40%**			
	Ensure that 40% of the UFA area (excluding lecture theatres, toilets, cool rooms and any spaces where the presence of daylight is specifically unwanted- some laboratories) has a direct line of sight to the outdoors, or into an adequately sized and day lit internal atrium.	Mandatory	Y	This has been achieved whereby views from within the building are provided from majority of spaces except for lecture theatres and some case study areas. A variety of spaces are provided to allow for a diverse approach to teaching spaces regarding external views. All Workplace areas have access to external views except for BOH areas and some meeting rooms (that have internal views i.e. glass walls).
4.1.7	**Views 60%**			
	Ensure that 60% of the UFA area (excluding lecture theatres, toilets, cool rooms and any spaces where the presence of daylight is specifically unwanted- some laboratories) has a direct line of sight to the outdoors, or into an adequately sized and day lit internal atrium.	Highly Desirable	Y	This has been achieved. Please refer to the line item directly above.
4.1.8	**Thermal Comfort**			
	Provide individual user controls of the mechanical or natural ventilation system for air supply rates, air temperature, radiant temperature, or the like according to the University Design Standards and in consultation with the University Engineering & Sustainability Team	Mandatory	Y	Individual thermal comfort provided on an individual controller per room basis as per design requirements.
4.1.10	**Ceiling fans**			
	For all mixed modes ventilated areas include ceiling in open plan offices, foyer spaces and areas to increase airflow	Highly Desirable	N	Not allowed for.
4.1.11	**Natural Ventilation**			
	Design the building so fresh air could be capable of being delivered to the occupied spaces of the building via a natural ventilation strategy if developed in the future. Including the provision of operable windows for perimeter spaces. This credit excludes laboratories or controlled spaces where the supply of fresh air is specifically engineered out ot needs to be tightly controlled.	Mandatory	N	The mechanical addendum excluded the requirement for natural ventilation. Louvers still included in design to allow for future provision only.
4.1.12	**Provision of Stairs**			
	Provide accessible and highly visible stairs in the building as an alternative to vertical transportation by lift based on the requirements of the Green Star Education Ene-8 credit or equivalent.	Mandatory	Y	Alternative vertical egress allowed at entrance and other locations.
4.1.13	**Plant Noise**			

	Design so that the building services noise is in line with AS/NZS 2107:2000	Mandatory	Y	Services and building physical elements are fully treated to comply with this requirement.
4.1.14	**Building Noise**			
	Design the overall building sound levels in line with the lower values specified by AS/NZS 2107:2000	Mandatory	Y	The design complies with the lower end of the range of noise and reverberation limits in AS2107:2000 Table 1.
4.1.15	**Ventilation Rates 1**			
	For mechanically ventilated spaces provide outside air at an additional 50% over and above the supply rates required by AS1668.2 for at least 95% of the nominated area.	Mandatory	N	The mechanical system was designed to provide outside air of more than 50% over the minimum requirements of AS1668. This requirement was removed as a part of Tender Clarification GEN 4.03.
4.1.16	**Ventilation Rates 2**			
	For mechanically ventilated spaces provide outside air at an additional 100% over and above the required rate or provide a mixed-mode capability for the building.	Highly Desirable	N	Refer above.
4.1.17	**CO2 Monitoring points**			
	Provide a carbon dioxide (CO2) monitoring and control system with a minimum of one CO2 sensor at all return points on each floor to facilitate continuous monitoring and adjustment of outside air ventilation rates to each level in order to ensure independent control of ventilation rates to achieve outside air requirements in accordance with AS1668.2-2002	Mandatory	Y	CO2 sensors and control as per NDY 6 are integral with mechanical systems to reduce energy of part occupancies.
4.1.18	**VOC Monitoring system**			
	Provide a VOC monitoring system that facilitates continuous monitoring of VOC pollutants and can detect and provide an alarm when VOC pollutants reach 0.5 mg/m3 level.	Highly Desirable	Y	VOC monitoring and alarm integrated into mechanical system as per NDY 6 to reduce exposure to airborne pollutants.
4.1.19	**Air Change Effectiveness**			
	Design the ventilation strategy to achieve an Air Change Effectiveness (ACE) for at least 95% of the UFA (not including labs and areas with higher ACE requirements)	Highly Desirable	N	Air change effectiveness will be maximised to cover as great an area of the UFA as possible but due to the shape of the Glue areas we believe it may be very difficult to achieve 95%.
4.1.20	**Location of air intakes**			
	Ensure that air intakes serving occupied areas avoid major sources of external pollution and recirculation of exhaust air.	Mandatory	Y	Air intake locations will be designed to the minimum requirements of AS1668 to avoid recirculation.
4.1.21	**Humidity control**			
	Design for humidity control either by naturally ventilating the building or ensuring the mechanical system can actively control humidity below 60% in the space and below 80% in supply ductwork.	Mandatory	N	The mechanical system includes control systems however these provisions cannot be guaranted for all times of the year
4.1.22	**Volatile Organic Compounds- Paints/carpets/walls & ceilings**			
	Ensure that carpets, paints, wall and ceilings have low Total Volatile Organic Compound levels (TVOCs) as stipulated by Geca or eco-specifier certification or in accordance with the Green Star Education IEQ-8 credit or equivalent.	Mandatory	Y	This requirement has been included in the design documentation and will be passed on to all relevant subcontract trades.
4.1.23	**Volatile Organic Compounds- Adhesives/sealants**			
	Ensure that adhesives and sealants have low Total Volatile Organic Compound levels (TVOCs) as stipulated by Geca or eco-specifier certification or in accordance with the Green Star Education IEQ-8 credit or equivalent.	Highly Desirable	Y	This requirement has been included in the design documentation and will be passed on to all relevant subcontract trades.
4.1.24	**Formaldehyde Minimisation**			
	Ensure that wood products either have low formaldehyde emissions or contain no formaldehyde.	Mandatory	Y	This requirement has been included in the design documentation and will be passed on to all relevant subcontract trades.
4.3.1	**Location of exhaust stacks**			
	Ensure that exhaust stack outlets have been coordinated with adjacent buildings, both existing and planned. In addition, ensure that exhaust filtering requirements are incorporated as necessary. For laboratories, exhaust provisions should exceed the requirements of AS2243 and AS2982.	Mandatory	Y	Design of exhaust stacks and filters to meet AS2243 and AS2982.
4.3.2	**Site Lighting Coordination**			
	Ensure that the building's site lighting is coordinated with the larger precinct and adjacent buildings to minimise light pollution and dark sky impacts, as well as providing a continuity of security for building occupants.	Mandatory	Y	Lighting of the external areas has been designed in accordance with CPTED principles which have dictated moderate uniform levels of lighting and are connected to active pedestrian routes along the perimeter of the development.

5. Resource use

5.1.1	**Indoor Water Use**			
	Based on the Australian Government's National Water Efficiency Labeling and Standards Scheme (WELS), the following star ratings shall be used as a minimum: • 6 Star taps and flow controllers, • 4 Star for lavatories, • 3 Star for urinals, and, • 3 Star for showers	Mandatory	Y	This requirement has been included in the design documentation and will be passed on to all relevant subcontract trades.
5.1.2	**Water harvesting & recycling**			
	Install a rainwater collection, storage and reuse system so that rain water captured from roof areas can be used for toilet/urinal flushing, irrigation and cooling tower use. The tank must be sized appropriately to maximise water collection potential of the building/surrounding buildings (minimum of 50,000L or 0.05 cubic meters per 1m2 of the roof plan area, whichever is greater)	Mandatory	N	Rainwater capture and storage is provided at a reduced size to meet University preference for cooling tower top up and landscaping only.
5.1.3	**Recycled Water Reticulation**			
	Install appropriate separate water supply pipe network work to facilitate rain water re-use and/or the future potential of a centralised recycled water reticulation serving toilet/urinal flushing, irrigation and to cooling tower water supply for buildings	Recommended	N	See above.
5.1.4	**Water Use Opportunities**			
	Identify additional sources and uses for non-potable water in the building as part of a site water balance report.	Highly Desirable	N	Recycled (non-potable) water to be used for landscaping applications only.
5.1.5	**Water Usage Monitoring**			
	Install water meters and sub-meters at a building level for all major water uses (cooling towers, toilet/urinal flushing, irrigation, hot water, rainwater re-use, fire system test water) and connect these meters to the University Advanced Utilities Monitoring system. Any leased areas, or high use areas (eg. Laboratories, kitchens etc) should be metered separately. Metering should be installed in line with the University Standards	Mandatory	Y	All practical water metering has been allowed for and is connected to centralised BMS.
5.1.6	**Cooling Towers**			
	Reduce water consumption of water-based heat rejection systems by 50%	Highly Desirable	N	This initiative is not pursued due to cooling towers being topped up with recycled water
5.1.7	**Fire Systems**			
	Provide a system to capture, store and reuse fire system test water or use a fire protection system that does not expel water for testing.	Mandatory	Y	Capacity (nominally 24km^3) is provided in the rainwater tank to collect 80% of test water.
5.1.8	**Condensate Reuse**			
	Provide a condensate water capture and reuse system for the major mechanical equipment to supply this waste water to cooling towers or for other non-potable water purposes where significant volumes of condensate are generated.	Recommended	Y	A condensate capture system is included in the mechanical and hydraulic design of the building.
5.1.11	**Storm Water Harvesting**			
	Where the building site is near a watercourse, water body or experiences high flows of storm water and space permits, incorporate a storm water detention and natural water treatment system (wetlands). This system should include tanks to store the filtered water for re-use in irrigation or nearby grey water systems	Highly Desirable	N	No natural water course adjacent and no allowance to harvest stormwater.
5.2.1	**Annual Energy consumption**			
	For new buildings (over 2000m2), complete an energy model using the Greenstar Education V1 energy modeling Guidelines. Provide a report to show predicted energy consumption for each space type within the building and a predicted total value for the Building's annual energy use. Use this information to complete the Education V1 Energy Model, and ensure all listed space types meet the benchmarked value. Spaces not covered by this tool and their associated plant can be excluded from the benchmarking	Mandatory	N	No allowance made.
5.2.2	**Energy consumption performance**			
	Demonstrate that the building will perform at least 20% better than the BCA Section J Energy Efficiency requirements for building services.	Highly Desirable	N	Due to design constraints, façade selection, and the inclusion of HVAC to the Glue area we do not believe this is realistically achievable.
5.2.3	**Peak power**			
	Reduce the building's peak energy demand load on electricity infrastructure by 20% or flatten the demand curve through the use of energy demand reduction systems. Consider designing the building's energy and mechanical and electrical services to address other buildings in the precinct or campus where overall enery and cost efficiency can be achieved.	Highly Desirable	N	No allowance made for off-peak thermal/energy retention systems.

5.2.4	**Renewable energy 5%**			
	Design and incorporate the use of shared on-site non-polluting renewable energy generation technologies such as solar, wind, geothermal, small scale/micro hydroelectric, and biomass with peak electrical generating capacity of at least 5% of the project's specified electrical service load or of the project's annual electrical and thermal energy consumption. Consider sizing the system to accommodate demands associated with other buildings in the precinct.	Highly Desirable	N	The University could consider utilising the rooftop as space for clean energy technologies/projects linked with the University, or renting this space for similar commercial based technologies. JH can assist the University on initiatives that are worthy of the considerable additional capital investment.
5.2.5	**Renewable energy 10%**			
	Design and incorporate the use of shared on-site non-polluting renewable energy generation technologies such as solar, wind, geothermal, small scale/micro hydroelectric, and biomass with peak electrical generating capacity of at least 10% of the project's specified electrical service load or of the project's annual electrical and thermal energy consumption. Consider sizing the system to accommodate demands associated with other buildings in the precinct.	Recommended	N	See above.
5.2.6	**Solar Hot Water**			
	Install a solar hot water system to contribute to 100% of the building's kitchen & bathroom hot water demand. The solar hot water contribution should be assessed by virtue of predicted and/or actual proportion of annual hot water demands met by solar collection.	Mandatory	N	No solar hot water provision.
5.2.7	**Energy Consuming Appliances**			
	Use a minimum of 5 star-rated energy-efficient for the following appliances; clothes dryers, dishwashers, refrigerators, freezers, televisions, and any decentralised air-conditioning units. (http://www.energyrating.gov.au/)	Mandatory	Y	Allowed for in specifications and provisional sum for all FF&E items.
5.2.8	**Energy Consuming Equipment**			
	Ensure all electrical appliances which do not fall under the Energy Rating Scheme (including specialist laboratory equipment) are to include energy efficiency as part of their evaluation criteria where more than one option exists.	Mandatory	Y	Specifications/Procurement guidelines to incorporate energy efficiency criteria where more than one option exists.
5.2.9	**Monitor Energy Use**			
	Provide energy meters for the primary electrical and gas services, as well as electrical sub-meters for the following loads (in accordance with the University Design Standards): • Total incoming supply • Mechanical services • Essential services • Individual building floors supplies • Any tenanted or potentially tenanted space • Combined Lighting and general power for each functional space over 200m2 • Any laboratory/specialist equipment or high energy use area with total load >50 amps	Mandatory	Y	Sub-metering provided for mechanical and electrical services as per NDY 6. All energy metering to key zones and plant and equipment has been allowed for and is connected to centralised BMS.
5.2.10	**Energy Use Public display**			
	In addition to the above, install a digital meter reading and display device in a public area in order to encourage behavioural change in building occupants.	Highly Desirable	Y	Digital information to be displayed on electronic board as per 2.1.1.
5.2.11	**Lighting Controls**			
	Provide a lighting control systems integrating daylight and occupancy sensor lighting control systems into a centralised system. Refer to University standards for more details.	Mandatory	Y	Daylight and occupancy lighting control is achieved through inclusion in the electrical specification.
5.2.12	**External Lighting**			
	Install eternal lighting with a light source efficacy of at least 50 lumens/watt. Ensure that 95% of outdoor spaces meet or exceed the minimum requirements of AS1158 for illuminance levels and that 95% of all external lights are connected to daylight sensors (daylight sensors can be combined with a time switch)	Mandatory	Y	External light source efficiency and illuminance levels achieved through inclusion in the electrical specification.
5.2.15	**Unoccupied Spaces**			
	Provide a control system such that lighting and mechanical systems can be shut down, both manually and automatically, in unoccupied spaces as per the University Design Standards	Mandatory	Y	Included in specifications.
5.2.16	**Hot water in Restrooms**			
	Eliminate the provision of hot water to wash basins in public restrooms and other facilities as deemed appropriate.	Mandatory	Y	Hot water is not provided in the public amenities wash basins in the car park and can be reduced in other amenities in agreement with the University.
5.3.1	**Construction Waste 60%**			

	Provide in the waste management plan contract provisions to require the contractor to re-use and/or recycle waste such that 60% of construction waste by weight is re-used or recycled	Mandatory	Y	As standard practice, John Holland operates an 80% waste recycling target on all projects within NSW. A project specific waste management plan will be implemented including maintenance of a waste register for the duration of the works.
5.3.2	**Construction Waste 80%**			
	Provide in the waste management plan contract provisions to require the contractor to re-use and/or recycle waste such that 80% of construction waste by weight is re-used or recycled	Highly Desirable	Y	In addition to the 80% target noted above. John Holland will also review opportunities to divert material from the waste stream into beneficial reuse applications, thus avoiding waste in the first instance.
5.3.3	**Public Realm Bins**			
	Provide recycling bins in the public realm (i.e. lobbies, plazas, entrances) for the collection of recyclables as per the University's waste management guidelines	Mandatory	Y	Public area bins with recycling capabilities will be installed as per the university guidelines. Part of the FF&E provisional sum.
5.3.4	**Waste Storage**			
	Provide a dedicated storage area for the separation and collection of recyclable waste that is adequately sized to handle the recyclable waste streams is accessible via the goods lift, reduces the manual handling for waste handlers and provides adequate room for manoeuvring delivery vehicles and waste collection vehicles	Mandatory	Y	Design incorporates provision of a waste management room that is situated in the loading dock area. Non-fixed waste receptacles will be the responsibility of the University waste contractor.
5.4.1	**High quality finishes in the public realm**			
	The building and its surrounds incorporate the use of high quality materials and finishes to all pedestrian areas, including street edges, footpaths, retaining walls, bridges, street trees, planting and plazas with an emphasis on high pedestrian use areas. All materials and finishes should be selected to appropriately reflect the design life of the building and this should be able to be demonstrated.	Mandatory	Y	High quality materials have been selected for use in high traffic areas and in the external areas generally. This is reflected in the design documentation.
5.4.2	**Materials LCA**			
	Consider Life Cycle Assessment of the buildings construction materials to compare material choices and limit embodied emissions relating to the building construction. This assessment must analyse GHG emission over a 50 year building life, for cradle to gate scope, and must take into account 90% of the base building materials (by cost) using the guidelines and database developed by the Building Production Innovation Council (http://www.bpic.asn.au/LCI)	Mandatory	N	No allowance made.
5.4.4	**Sustainable Timber**			
	Use re-used, post-consumer recycled, or FSC-certified timber for at least 95% by cost of all timber products used on the project	Mandatory	N	Not allowed for in all construction materials. If required, intent could be met through implementation in procurement guidelines for all installed finishes however this may contradict other specifications.
5.4.5	**Recycled Steel 60%**			
	Ensure that at least 60% of all steel, by mass, has a post-consumer recycled content greater than 50% or is reused	Highly Desirable	N	Due to the availability of high quality recycled steel in the market, 60% by mass is cost prohibitive to achieve. This can be investigated further if required by the University.
5.4.6	**Recycled Steel 90%**			
	Ensure that at least 90% of all steel, by mass, has a post-consumer recycled content greater than 50% or is reused	Recommended	N	See above.
5.4.7	**Recycled Concrete**			
	Use recycled or slag aggregate for at least 20% of all concrete aggregate or use artificial aggregates for non-structural concrete in accordance with the Green Star Education Mat-4 credit or equivalent	Highly Desirable	N	No allowance for recycled aggregate content allowed in concrete in the interest of maintaining a high quality and consistent surety of supply.
5.4.9	**Avoid Toxic Substances**			
	Avoid the use of materials that contain lead or cadmium and other products containing toxins that may lead to environmental contamination during manufacture, use or end-of-life disposal.	Mandatory	Y	Materials that contain lead or cadmium and other products containing toxins will not be utilised unless no alternative solution is available or if nominated by external utilities i.e. substation. This requirement will be included in design documentation.
5.4.10	**Mercury Reduction**			
	Reduce mercury within the building by using low-mercury lamps or ensuring that lamps and thermostats contain no mercury.	Mandatory	Y	Low mercury fluorescent lamps and non-mercury containing thermostats specified in services specs.
5.4.11	**Regional materials**			
	Source at least 50% of construction and fit-out materials from within 800km of the project site.	Recommended	N	A Procurement Strategy will be prepared that includes this requirement however as UOS is procuring FFE items this cannot be guaranteed for all fit-out items. This strategy will consider mode of transport which may be more important than distance travelled in terms of environmental impact. The Procurement strategy will feed into a detailed materials strategy. Excludes plant and equipment procured internationally.
5.4.12	**Flooring / Joinery/ Loose Furnishings**			

	Ensure at least 50% of Joinery, loose furnishings, and flooring must be Eco-specifier, or Geca certified. Preference should be given to joinery that is either modular and reusable, furnishings and flooring that has high recycled content, recyclability and reuse potential	Mandatory	Y	Specifications will reflect the intent of Eco-specifier or Geca certified products, and where possible, preference will be given to such products.
5.4.13	**Dematerialisation**			
	Identify opportunities for reducing the total quantity of materials used in the construction and fit-out of the project in accordance with the Green Star Education Mat-9 credit or equivalent.	Highly Desirable	Y	The design will be compared to a reference case by a structural engineer to assess if this credit has been achieved. There is likely to be more opportunity for dematerialisation within the fitout. This can be explored with the architects and it is assumed that it may be cost neutral. Note. dematerialisation may contradict other requirements - acoustic, aesthetic, etc. so this credit may not be achievable.
5.4.14	**PVC Minimisation 30%**			
	Reduce PVC content by 30% (by cost) of all building materials with alternative materials	Highly Desirable	N	University has previously requested design change from HDPE Sewer to uPVC.
5.4.15	**PVC Minimisation 60%**			
	Reduce PVC content by 60% (by cost) of all building materials with alternative materials	Recommended	N	As per item above.
6. Climate change impact and design				
6.1.1	**High Albedo Roof Materials**			
	Use roofing materials having a Solar Reflectance Index (SRI) equal to or greater than 78 for low-sloped roofs (less than a 2:12 pitch) or 29 for steep-sloped roofs (greater than a 2:12 pitch) for a minimum of 75% of the roof surface.	Mandatory	N	Primary roof is flat concrete. For metal roofing materials, JH proposes to use a light colour, however this will not have an SRI > 78.
6.3.1	**Flood Risk Assessment**			
	Undertake a flood risk assessment or identify concerns from an existing master or precinct plan.	Mandatory	Y	A flood study has already been undertaken by Warren Smith & Partners and its recommendations are adhered to in the design.
6.3.2	**Flood Risk Mitigation**			
	Where there is concern with flood risk, locate essential building services equipment, such as electrical and mechanical systems, in a manner that minimises exposure to flood potential	Mandatory	Y	All essential mechanical and electric equipment located above the 1:100 year flood level plus 500mm freeboard at RL26.1 or bunding options reviewed to eliminate flood risk.
6.4.1	**Micro-climates**			
	In order to optimise conditions for creating good micro-climates, ensure the building design takes advantage of passive solar gains, summer breezes, and reduced wind speeds around buildings that are likely to suffer heat loss (predominately tall buildings) in winter	Mandatory	Y	The building form is articulated in such a way to minimise wind tunnelling and provides pockets of spaces that are shaded by other parts of the building to provide a variety of microclimatic conditions around the building.
7. Infrastructure				
7.1.4	**Utility Expandability**			
	To offer economies of scale and improvements in energy efficiency, incorporate provisions in the new building's plant facilities to allow for the expansion of HVAC and utilities services to supply buildings in the local precinct. Identify the buildings that will benefit from these provisions and the requirements of additional plant to meet this demand.	Highly Desirable	N	As the plant is very much tailored to specific areas of the building we do not see how this can be accommodated without large change in the systems, such as an introduction of trigeneration facilities which would be a significant extra capital investment.
7.1.5	**Infrastructure Future proofing**			
	Future proof all infrastructure and plant rooms to allow for connections to future precinct based energy, water and waste systems (eg. Hot/chilled water loops, recycled water and automated waste collection services). This credit is designed to ensure that when future precinct cooling, heating and recycled water systems have been developed, buildings are able to transition across to these centralised	Mandatory	Y	Future proofing has been limited to increased capacity provisions in infrastructure services and plant room spatials only.
7.2.6	**Transport Information**			
	Install an information display/system in the building's main lobby that collates and displays public and active transportation information, including maps, schedules, bicycle parking, end of trip facilities, and after-hours service options for all transport services within 1km	Highly Desirable	N	No allowance made.
7.2.7	**Cycling parking**			
	Provide secure bicycle storage for at least 10% of the peak number of students using the building at any one time and 10% of building staff (where no other bicycle facilities within the precinct can accommodate the new or refurbished building). Staff parking must be located in a secure storage bicycle facility with shelter from the weather. Student parking can be located in the public domain, however at least 50% of racks must be sheltered from the weather	Mandatory	Y	This requirement has been provided for, with staff bicycle storage in the basement and undercover, external student storage locations.
7.2.8	**End of trip facilities- staff**			

	Provide shower, locker and change room facilities to accommodate 10% of permanent building staff.	Mandatory	Y	This requirement has been provided for in the basement area adjacent to the bike parking area.
7.2.9	**End of trip facilities- students**			
	Provide shower facilities accessible to all students in main bathrooms amenities. These should be designed to accommodate postgraduate students located in the building full time.	Mandatory	N	Currently not provided within the building for student allowance. This is deemed not required as students are able to access neighbouring facilities in the Noel Martin Recreational Centre. Alternative design variations may be considered on request of the University such as installing showers in basement accessible for post graduate students.
7.3.1	**Smart metering**			
	Provide smart metering to measure electrical, gas and water utilities as per University standards. Metering should be connected to the University Advanced Utilities Monitoring System. All metering should be installed to NABERS-equivalent standards.	Mandatory	N	Sub-metering provided in accordance with specifications only, not to NABERS equivalent standards.
7.3.2	**Building Management System**			
	Provide a comprehensive building management system to tie all building services operation into a centralised system. Coordinate this system with existing campus and precinct systems to ensure consistency of operation.	Mandatory	Y	A comprehensive BMS has been allowed that coordinated with the existing campus systems.
7.3.3	**Public telecommunications**			
	Ensure WiFi is available within the buildings and in outdoor areas with close proximity. WiFi hotspots must be planned for 24 hour access and designed to University ICT standards	Mandatory	N	No external Wi-FI hotspots.

8. Land use, landscape and biodiversity

8.1.3	**Green space**			
	Provide open space within the building site or linkages to open space within the precinct.	Mandatory	Y	Open space around the building is provided for university students as well as the community. Linkage potential both north-south and east-west, are provided through the site to connect to the surrounding precinct.
8.2.1	**Increase net flora**			
	Increase the number of trees while recognising the cultural value of the campus landscape.	Highly Desirable	Y	The planting of a total number of 75 advanced native trees is proposed for the site. All existing trees that are not within the building footprint or excavation zone will be retained and protected.
8.2.2	**Control weeds**			
	Minimise future spread of weeds within and beyond the building landscape areas through the removal of weed species (including trees that are considered weed species).	Mandatory	Y	The control of weeds and weed species has been considered in the landscape design. No species considered weed is retained or proposed for the development.
8.3.1	**Erosion control plan**			
	Develop an indicative erosion and sediment control plan for the building site. Include separation and protection of topsoil impacted by the building construction is applicable.	Highly Desirable	Y	A site specific Soil and Water management plan will be developed that identifies actions required for the ongoing management of Erosion and Sediment Controls during construction. Site Environment Plans will highlight ERSED controls and other environmentally significant features/controls.
8.4.1	**Native planting**			
	Prioritise the planting of endemic native trees suitable, for native fauna for their food, shelter and roosting, paying attention to canopy stratification, whilst recognising the cultural values of the campus landscape.	Mandatory	Y	All proposed planting such as trees, shrubs, grasses and ground covers are native and locally endemic to the area.
8.5.1	**Greening**			
	Provide a green roof to at least 50% of the available roof area and/or a green wall for at least 20% of the vertical surface area of the building in order to reduce the heat island effect of the project	Recommended	N	As this item has been considered in previous iterations of the design and discarded by the University we do not intend to pursue this initiative.