SECTION H – ENERGY EFFICIENCY – TABLE OF CONTENTS

UNSW DESIGN & CONSTRUCTION REQUIREMENTS – WEB ENTRY PAGE

H.1 MINIMUM ENERGY PERFORMANCE REQUIREMENTS

H.1.1 DESIGN PHILOSOPHY FOR ENERGY EFFICIENCY

The energy efficiency design philosophy shall address “Whole of System” design (i.e. optimizing the whole system instead of its individual components), life cycle thinking (decisions should consider implications over the lifetime of the building), and quality of the spaces (including occupancy comfort and productivity). This philosophy should be the principle attributes of building design from the energy efficiency point of view.

The underlying premise being that UNSW wants to foster is that buildings are for the occupants; hence, UNSW buildings must offer the best environment for the occupants to work in a safe, practical and comfortable space, whilst achieving the highest energy efficiency and sustainability credentials in its construction and operation.

Compliance with the energy efficiency requirements of the Australian National Construction Code(NCC) shall be the absolute minimum standard for new buildings and renovations. However, in general, it is required that efficiencies of 15% in excess of the minimum compliance are achieved where no other criteria are expressed in this document.

This document provides a guide to achieving the design goals expressed above in terms of reaching world leading levels of energy efficiency in the construction and operation of new buildings and renovations. Design teams are expected to work closely with UNSW Estate Management (UNSW EM) team so as to achieve the best outcomes for each project.

H.1.2 ENERGY DENSITY BENCHMARK PER FUNCTIONAL AREA

UNSW has a long history of energy efficiency projects and of pushing the boundaries of building design for sustainable goals. As such, UNSW has a comprehensive historic energy use database that has been used in this guideline to inform new designs. An important element of the database is UNSW’s historical energy density per functional area, as presented in Table 1. The data in the table has been normalized to ‘office’ areas, representing low energy density, so to provide an easy reference of the expected energy and water intensity of the different areas in a building. For example, it is expected that in a University building, a high energy research lab (3 High density) would use around six times the amount of energy per m^2 than an office space (1 Low density). A complete list of spaces and their allocation to Low, Med, and High energy density areas is given in Appendix 1. Following NABERS rules, only the lettable floor area, or in UNSW case, the usable floor area (UFA) should be used for the rating. Hence some areas of the building should be excluded (5 Excluded areas), which receive a factor of zero. The energy density ratios were calculated assuming a weekly occupation of 30 hours for each building. As such, this value should be used as a standard occupation time for the modified NABERS rating calculation, unless a different value has been agreed with UNSW Energy Management Unit.

Table 1 – Energy density ratios per space type relative to low energy use areas (office areas)

Space type	Electricity density (per m^2)	Gas density (per m^2)	Water density (per m^2)
1 Low density	1.0	1.0	1.0
2 Medium density	3.0	2.9	1.0
3 High density	5.6	5.9	1.0
4 Server rooms	5.5	0.0	1.0
5 Excluded areas	0.0	0.0	0.0

The ratios in the above Table can also be used to estimate the energy performance of current and future building designs for good, very good, or outstanding performance. For example, using the C25 building current space type allocation, we can calculate that the aggregated indexation factor for the building is 2.84 for electricity and 2.91 for gas (this is done by multiplying the area of each space by the relevant energy density ratio, adding all the 'normalised' areas, and then dividing it by the total building area); hence, the building should, on an annual basis, use 2.84 times more electricity and 2.91 times more gas than an equivalent "office building". An example calculation of the normalization methodology for electricity is shown in Table 2.

Table 2 – Example of normalization methodology for electricity

Space type	**Electricity density (per m^2)**	**C25 area (m^2)**	**C25 adjusted area (m^2)**	**Normalized Density (per m^2)**
	[1]	**[2]**	**[3] = [1]x[2]**	**[4] = [3]/[A]**
1. Low density	1.0	5,237	5,237	0.57
2. Medium density	3.0	517	1,551	0.17
3. High density	5.6	3,417	19,735	2.07
4. Server rooms	5.5	59	325	0.04
Total		**9,230 [A]**	**26,248**	**2.84**

In this way the ratios can be used to normalise a building's energy use and benchmark it against NABERS ratings for an office building. Using this methodology, the total energy density for C25 Lowy building is currently 493 kWh/m^2; including 300 kWh/m^2 of electricity and 193 kWh/m^2 of gas. The normalized energy density is 105 kWh of electricity (300/2.84) plus 66 kWh of gas (193/2.91), which equals to a value of 172 kWh/m^2. This is approximately equivalent to a 3 Star NABERS office building in Sydney (assuming 30 hours of operation per week and 255 computers).

A similar methodology can be used to determine the required energy performance of a building to achieve a target NABERS rating. Using the same example above, if a 6 Stars NABERS target is set, then a normalised energy density of 71 kWh/m^2/year must be achieved. Assuming only electricity use (in line with the electrification goal of UNSW campuses), the real energy density of the building should be 71 x 2.84 = 202 kWh/m^2 per year (approximately 40% of its current energy use).

All water density ratios are set to 1 given the use of bore water in most UNSW buildings, particularly for high water density applications like cooling towers, toilets, RO systems, and irrigation. Hence no adjustments are needed in order to assess UNSW buildings using the NABERS rating for water.

H.1.3 BUILDING ENERGY DENSITY TARGETS

Using the normalised NABERS method explained in section H.1.2, UNSW groups the performance of buildings in the following categories:

- Average performance:	4.0 normalised NABERS rating
- Good performance:	4.5 normalised NABERS rating
- Very Good performance:	5.0 to 5.5 normalised NABERS rating
- Outstanding performance:	6.0 and above normalised NABERS rating

UNSW expects all new buildings and renovations to achieve an "outstanding" performance level unless it's demonstrated that it's not feasible due to physical or economical constrains for a particular project. In this case, the project team should aim for the maximum performance achievable, which should be no less than a "good" performance. The view of UNSW is that an "outstanding" performance could be achieved with no or little cost premiums compared to a "good" performance building, when a whole of system approach philosophy and sound design principles are applied. In all cases, a long-term cost/benefit analysis (or a life cycle costing) should be carried out to determine the operational performance target for each project.

H.1.4 NATIONAL CONSTRUCTION CODE (NCC)

This guideline should be considered as a complement to the current NCC, and particularly to Section J of the code. Use of this this guideline does not waive the requirement of Section J compliance. If for any reason, the NCC and this guideline appear to be in conflict, the design team should obtain further clarification from UNSW.

H.1.5 BUILDING RATING SYSTEMS

UNSW expects that design teams will use complimentary building rating systems to guide the design process, as they include sustainability initiatives beyond energy efficiency, which contribute further on improving the occupant's wellbeing and comfort and reduce the Campus' environmental impact. UNSW's preferred rating system is Green Star and the design target is to obtain 110 points, equivalent to 6 stars. Furthermore, the use of operational rating tools is also expected, so to monitor the real building performance during its lifetime. Using the methodology presented in H.1.2 allows the use of NABERS tools for continuous benchmarking, but other tools like 'Green Star – Performance' may also be used.

H.2 RECOMMENDED ENERGY EFFICIENCY INITIATIVES

H.2.1 STEAM SYSTEMS

A centralised system with steam reticulation will only be considered where it can be demonstrated to be advantageous both from a capital investment and an operational cost and efficiency basis. In all other cases requirements for steam services should be solutioned either by distributed/local generation installations that are operated when needed or by equipment procured with its own steam generating ability.

Whilst natural gas may remain as the energy source for centralized systems, where appropriate, steam systems that use electricity or any type of renewable energy (most likely solar thermal or solar PV with heat pump) will be favoured.

H.2.2 COMPRESSED AIR SYSTEMS

A centralised compressed air system and its associated reticulation system will only be considered where it can be demonstrated to be advantageous both from a capital investment and an operational cost and efficiency basis. In all other cases requirements for compressed air systems should be solutioned either by distributed/local equipment that can be operated only when needed or by equipment procured with its own compressed air generating ability.

H.2.3 HVAC SYSTEMS

In general, Heating, Ventilation and Air Conditioning (HVAC) systems can be categorised as either; "house systems" which provide air conditioning to communal areas and people spaces, or "special use systems" which provide air conditioning to areas which have a particular requirement. Examples of special use areas include computer and server rooms, communications equipment rooms, clean rooms, PC2/3 laboratories, animal holding facilities and areas with 24/7 operations. Special use areas generally require significantly higher air conditioning performance hence a need to be considered separately.

To avoid the energy inefficient solution of "over designing" house systems to provide conditioning to special use areas, local dedicated HVAC systems should be provided to cater for the enhanced requirements of those special use spaces. The local systems can be either stand alone or as a boost to the house system. The final solution being dependent upon achieving best energy efficiency outcome and running costs. This local, dedicated, solution can also avoid running house systems 24/7, as it is the case when they also serve special use areas.

Outside air economy cycles must be implemented in all 'house systems' and where possible in the 'special use' systems.

Classroom theatres and any other space requiring high volumes of fresh should include dynamic delivery systems that can adjust airflow and fresh air amount depending on set conditions and measurements. For example, outside air quantity and air volume of a classroom could be adjusted based on occupancy sensors or CO_2 sensors monitoring the space.

H.2.3.1 SPACE HEATING

The preferred solution for space heating is to use dedicated heat pumps, hence, gas boilers should be avoided where possible. NOTE: reverse cycle chillers are not a preferred solution.

Bore water can be used to preheat fresh air or for operating the heat pumps (water-to-water heat pump).

Solar thermal systems can also be used to complement space heating requirements when appropriate.

The project team can consider the use of gas boilers (and hence the inclusion of gas infrastructure) as a backup for the main space heating system, in accordance with the specific requirements of the project.

H.2.3.2 SPACE COOLING

The system design should aim for a minimum average system COP of 5 across the year. High efficiency chillers and cooling towers should be used, while pump and fan power should be minimised by reducing pressure loss in ducts, pipes, filters, and coils.

Low cooling loads should be serviced by low load chillers and not by running large chillers below their specified minimum output. Chiller choice and sizing must also comply with the requirements of the UNSW Mechanical Systems Design Guide.

Examples of novel energy efficiency initiatives are the use of bore water for precooling fresh air or using ground coupled systems for the condensed water cycle.

H.2.3.3 HEAT AND ENERGY RECOVERY SYSTEMS

Energy recovery systems should be used where appropriate, particularly in systems that require large amounts of outside air and/or dehumidification.

H.2.3.4 DEHUMIDIFICATION

If dehumidification is required, then a dedicated dehumidifier must be considered as the preferred option. Dehumidification by the house system by over cooling and reheating shall be avoided.

H.2.3.5 AIR AND WATER RETICULATION

System pressure should be minimized by increasing duct or pipe size, reducing flowrate, and minimizing bends, fittings and complexity in the reticulation.

H.2.3.6 VENTILATION

Fans and motors should be high efficiency and always have a variable speed drive (VSD) if the fan motor power is higher than 3 kW, or if it is operated 24/7. Electronically Commutated (EC) fans are recommended as a better solution to the standard VSDs/Fan combination.

Outside air intakes should be located in areas with low solar heat gain and surrounded by light colour elements. Research has found that air intakes located near dark façade or roof elements, have air temperatures well above ambient, reducing the performance of the HVAC system. This can be even more detrimental on days of extreme temperatures, as the conditions will fall outside the HVAC design parameters.

H.2.3.7 FUME CUPBOARDS AND EXHAUST SYSTEMS

Fume cupboards and exhaust systems are responsible for a large portion of energy use in lab spaces, not only due to the energy use in the fans, but also because of the exhausting of conditioned air that must be replaced. Hence, the overall energy use of fume cupboards and exhaust systems must be minimised. Low flow cabinets, automatic sash and local ON/OFF controls, are some of the expected solutions for new buildings. Further novel solutions can include indirect energy recovery systems, or fresh air supply to the cabinets to reduce the amount of exhausted conditioned air.

H.2.4 EQUIPMENT COOLING WATER (ECW)

In cases where ECW temperature can be kept at or above 18°C, use of treated bore water should be considered, as local measured data shows a consistent temperature over the year fluctuating between 18°C to 19°C.

Generally, ECW systems should not be designed to deliver chilled water. Where specific laboratory equipment requires chilled water then it should be procured with a dedicated local water chiller with the ECW being utilized for heat rejection.

ECW cooling pipes should always be insulated throughout the building. Pump power should be minimized by reducing the system head for the designed flow rate.

H.2.5 BUILDING ENVELOPE

The building envelope is probably the most important design aspect of a building when it comes to energy performance. It regulates the heat transfer between indoors and outdoors, it controls solar gains and it also controls the air exchange with the environment and infiltration. Hence, a well-designed building envelope not only ensures a good energy performance but also high levels of comfort for its occupants. The orientation of a façade will also influence the performance required from its design with north facing aspects requiring greater resistance to solar gain than other aspects across the year; however, west aspects must be particularly considered and optimized for summer days, as afternoon solar gains contribute to maximum demand loads and occupant's comfort. The notion of non-homogenous façade design where the performance of each aspect is optimised to its particular performance requirements must be used, as discussed in detail in the next sections.

H.2.5.1 FAÇADE R VALUE

Each façade face should be designed independently; hence, the average R value of each façade should be calculated independently and comply with the minimum value as stated in the NCC or as optimized to achieve the target building energy performance. This is in addition to (and be compliant with) the standard Section J Verification method.

The effective average R value of each façade should be at least 2.8 K.m^2/W, this value must include all façade elements, including windows. Furthermore, individual façade elements, including windows, must have a minimum R value equal or above to 0.4 K.m^2/W (see Section H.2.5.2).

The designers will have to optimize the design to provide enough natural light while maintaining the façade performance. The window to wall ratio (WWR) of each façade plays a big role in this respect. It is recommended that the WWR is no more than 30% for each façade.

H.2.5.2 GLAZING

The U value and solar heat gain coefficients (SHGC) should be minimized while maintaining good visual light transmittance (VLT). The total glazing area in a façade should be optimized for the user's comfort and productivity, trying to harvest enough indirect daylight, without compromising the thermal performance of the building envelope. Recommended values below:

- U value must be below or equal to 2.5 W/K.m^2.
- SHGC should be kept below 0.30 unless other specific requirements are set.
- VLT should be at least 0.50, unless other specific requirements are set.

H.2.5.3 THERMAL BREAKS

Façade elements exposed to direct solar radiation should include thermal breaks to stop direct heat conduction to the inside of the building. Thermal breaks should be considered irrespectively of the compliance to R and U values, as they are included to stop localized heat transfer to façade elements. However, shading of exposed elements is the preferred solution and this can be a valid way to minimise the requirement for thermal breaks.

H.2.5.4 SHADING

Shading is one of the most important elements in a façade, usually overlooked when using ‘high performance’ windows. However, a low SHGC is not a replacement for good shading practice, as effective shading can block direct sunlight (therefore reducing direct solar gain) while allowing diffuse daylight into the building. Furthermore, good shading can allow higher SHGC levels if the glass is well protected from direct sunlight for most of the year.

UNSW has the following recommendations for each façade orientation:

- North façade: shading should allow direct sunlight only during late autumn and winter period (May to Aug). This can be achieved quite effectively by horizontal shading devices.
- East façade: direct sunlight is only allowed during early morning time on late autumn and winter months (May to Aug). This can be achieved by using vertical shading devices angled towards north.
- West façade: direct sunlight is allowed only during early afternoon time on late autumn and winter months (May to Aug). This can be achieved by using vertical shading devices angled towards north. Late afternoon sun, specially between October to March must be avoided.
- South façade: normally the southern façade does not need shading. However, during late hours in summer important amount of direct sunlight can ingress the building via the southern façade. This can be avoided by using small vertical elements.

As discussed above, diffuse sunlight is welcome in the building to improve natural lighting and certain shading elements can help on this task. For example, some companies have developed horizontal shading elements that reflect diffuse light inside rooms. This can be used on tall windows where the reflection can be orientated towards the ceiling.

H.2.5.5 INFILTRATION

Infiltration when unmanaged, can greatly reduce the energy performance of the HVAC system in a building, particularly when extreme outdoor temperatures occur. Together with glazing, infiltration can be the weakest link in an otherwise well designed façade.

Infiltration should be kept below 8 ACH_{50}. Solutions to reduce infiltration can include air traps, like double doors. Infiltration tests should be carried out in different sections of the façade to test the amount of air leakage at the rated pressure.

H.2.6 FLOOR AND ROOF INSULATION

Floor and roof insulation although important are probably less relevant for the whole building performance, when compared to other façade elements. For example, it is common to have plantrooms on roofs, which could reduce the need for high levels of insulation. However, minimum BCA values should be achieved and R value optimization for greater energy efficiency is encouraged. The floor should be insulated if hydronic floor heating is used.

H.2.7 BUILDING MANAGEMENT SYSTEM (BMS) AND ANALYTICS

Please refer to D&C Section E.2.1 - Campus Building Automation and Control System for UNSW BMS and Control Standards. All buildings must include a BMS to control the HVAC system, which must be integrated into UNSW central control system. From the energy management point of view, the BMS should be programmed and controlled to maximize energy productivity and avoid energy waste. The use of an analytic platform is recommended to monitor the performance of the building and aid in the maintenance of the HVAC system.

H.2.8 LIGHTING AND NATURAL LIGHT

Natural light harvesting should be maximized without compromising thermal comfort. A maximum energy gain of 100 W per m^2 of window area due to natural light is allowed. An ideal level of 80% of daylight should be aimed at.

All lighting should be controlled by a lighting control system integrated to UNSW central lighting control server. Efficient light sources and optics should be used, with a final lighting efficiency of at least 100 lumens/watt for a light fitting. The design team should bear in mind that some low-quality LED lights might not reach the required light efficiency, while some high efficiency CFLs might. It is however a consensus that efficient LED lights are currently a leading energy efficient solution. The standard colour temperature to be used in UNSW spaces is 4000 K.

H.2.9 DEMAND MANAGEMENT (DM)

The building should have a demand management capability in order to reduce its electricity demand during peak demand periods. The demand management mode can enable the following elements:

- Local ‘stand by’ generator: normally a diesel generator that can be used in parallel with the grid (UNSW has experience on this type of systems with several generators already used for this function).
- Storage system: battery storage systems can be considered for demand management systems, as they can also provide other functions to the building, including but not limited to: PF correction, renewable energy smoothing, renewable energy firming, cost arbitrage, filtering, etc.
- HVAC demand management: it might be possible to reduce the level of service to non-critical areas during max demand events, without affecting the occupant’s comfort, if it is done during small periods of time (1 hour maximum). This could include a wider temperature set point dead band, lower flow rates, or higher chilled water temperatures. Precooling or preheating are also valid strategies. However, HVAC DM is the less desirable option due to its potential negative impacts.

H.2.10 APPLIANCES

All appliances used in the building should be of the highest energy efficiency, i.e. a minimum of 4 or 5 stars as per the energy rating label.

The same applies to water fittings and appliances under the WELS standard. Appliances using water and water fittings (including taps and shower heads) should achieve a minimum of a 5 star rating.

H.3 RENEWABLE ENERGY SYSTEMS

All new building and renovation projects must consider the use of renewable energy to reduce the energy reliance on the electrical grid. Rooftop Solar PV has shown to be the most cost-effective way to achieve this goal (as a reference, a 100 kW system is the common target), but solar thermal systems and building integrated PV (BIPV) systems should also be studied.

The use of a large amount of PV (including BIPV systems) can be explored as a potentially more cost-effective way to reduce energy use rather than other initiatives. Some of the most common energy efficiency initiatives (like insulation) have diminishing returns, while solar PV doesn’t, as long as the additional installed capacity is not shaded. A recommended guide to energy efficiency measures is the use of a MAC curve, which could be developed for a specific project.

H.4 APPENDIX – List of allocated areas

Space type description (functional area)	**Energy density**
Assembly Hall/Auditorium	1. Low
Audio Visual/Media Room	1. Low
Breakout/Informal Work Space	1. Low
Child Care Facility	1. Low
Circulation Space	1. Low
Closed Stack/Reserve Collections	1. Low
Collaborative Teaching Space	1. Low
Committee/Conference/Meeting Room	1. Low
Common Room General Access	1. Low
Common Room Staff access	1. Low
Common Room Student access	1. Low
Compactus Stack	1. Low
Conference/Meeting Service Room	1. Low
Departmental/Reference Library	1. Low
Dining Area	1. Low
Display Area/ Museum/ Research Collection	1. Low
General Facility with specific type not defined	1. Low
Hot Desk	1. Low
Incidental Learning	1. Low
Informal Learning	1. Low
Informal Learning/Student Led spaces	1. Low
Interview/Consultation Practice Room	1. Low
Investment - Houses	1. Low
Investment - Offices	1. Low
Kitchenette/Tea Room	1. Low
Language Lab	1. Low
Lecture Theatre (< 99 seats)	1. Low
Lecture Theatre (>100 seats)	1. Low
Lecture Theatre/Seminar Support Room	1. Low
Lecture/Seminar/Tutorial (>70 seats) Flat Floor	1. Low
Lecture/Seminar/Tutorial/Class Room (<30) Flat Floor	1. Low
Lecture/Seminar/Tutorial/Class Room (31 to 69) Flat Floor	1. Low
Library / Study Areas	1. Low
Library Services	1. Low
Locker Area/Room	1. Low
Lounge/Common Areas	1. Low
Mail Room/ Goods Receipt/Despatch	1. Low
Media Room	1. Low
Medical Centre	1. Low
Microfilm/Plans/Maps Collection	1. Low
Moot Court Room	1. Low
Multi Function Space	1. Low

Space type description (functional area)	Energy density
Music Teaching and Practice Room	1. Low
Office - Academic Staff	1. Low
Office - Honours/Postgraduate Students	1. Low
Office - Professional/General Staff	1. Low
Office - Research Staff	1. Low
Office - Specific Type not defined	1. Low
Office - Student Associations	1. Low
Office - Technical/Laboratory/Store Staff	1. Low
Open Plan - Academic Staff	1. Low
Open Plan - Honours/Postgraduate Student	1. Low
Open Plan - Professional/General Staff	1. Low
Open Plan - Research & General Staff	1. Low
Open Plan - Research Staff & Honours/Postgrad	1. Low
Open Plan - Specific Type Not Defined	1. Low
Open Plan - Technical/Laboratory/Store Staff	1. Low
Open Plan- Research Staff	1. Low
Open Stack	1. Low
Parents Room	1. Low
Problem Based Learning Room	1. Low
Reading room	1. Low
Reception	1. Low
Religious/Prayer Facility	1. Low
Residential Category With Specific Type Not Defined	1. Low
Residential Laundry	1. Low
Resource/Utility Room	1. Low
Secondary Circulation	1. Low
Sick Bay/First Aid	1. Low
Small Group Study Room	1. Low
Spec Teaching - Gym Human Movement Space Undergrad/Postgrad	1. Low
Staff/Visitor House	1. Low
Staff/Visitor Unit/Apartment	1. Low
Store Room	1. Low
Store Room Art Works	1. Low
Store Room/Storage Space	1. Low
Student Apartment	1. Low
Student Studio Apartment	1. Low
Studio - Ceramic	1. Low
Studio - Dance	1. Low
Studio - Design	1. Low
Studio - Drama	1. Low
Studio - Multipurpose Studio	1. Low
Studio - Music	1. Low
Studio - Other	1. Low

Space type description (functional area)	**Energy density**
Studio - Photography	1. Low
Studio -Multimedia	1. Low
Studio -Sculpture/Metal/Woodwork etc	1. Low
Studio Support Room	1. Low
Teaching - Specific Type Not Defined	1. Low
Toilet/Amenities - Female Accessible	1. Low
Toilet/Amenities - Male Accessible	1. Low
Toilet/Amenities - Other	1. Low
Toilets/Amenities- Unisex Accessible	1. Low
Toilets/Amenities-Female	1. Low
Toilets/Amenities-Male	1. Low
Toilets/Amenities-Unisex	1. Low
Toilets/Change Room/Shower Room	1. Low
Training Room	1. Low
Waiting Area/Foyer	1. Low
Art Gallery/Exhibition/Museum	2. Med
Darkroom	2. Med
Dry Computing Lab - Open Access	2. Med
DRY Lab - Scientific/Medical/Engineering - Teaching	2. Med
DRY Laboratory - Scientific/Medical/Engineering - Research	2. Med
Dry/Computer Lab - Research	2. Med
Dry/Computing Lab - Teaching	2. Med
Glasshouse/Greenhouse	2. Med
Indoor Sporting Facilities including Swimming Pool	2. Med
Instrument Room	2. Med
Laboratory Service and Preparation	2. Med
Observation/Control Room	2. Med
Student - Bed/Study	2. Med
Workshop (Staff)	2. Med
Animal Holding	3. High
Animal Holding - Controlled Temperature	3. High
Clinical Areas	3. High
Controlled Temperature Room	3. High
Mortuary	3. High
Operating Theatre	3. High
Operating Theatre - PC Rated	3. High
Operating Theatre Support	3. High
Sample Drops	3. High
Scientific/Medical/Engineering Specific Type not defined	3. High
Wet Lab - Scientific PC Rated	3. High
WET Lab - Scientific/Medical/Engineering - Research	3. High
WET Lab - Scientific/Medical/Engineering - Teaching	3. High
Central Computing	4. Server Room

Space type description (functional area)	Energy density
Comms Network System/Telephone PABX	4. Server Room
Local Computing/Server Room	4. Server Room
Ablutions	5. Exclude
Ancillary - Specific Type Not Defined	5. Exclude
Archives	5. Exclude
Bicycle Storage Shed	5. Exclude
Bulk Storage/Warehouse	5. Exclude
Car Park – Multi Storey - Free Standing	5. Exclude
Car Park-<50% of a Building	5. Exclude
Cleaners Room	5. Exclude
Communication Riser	5. Exclude
Dangerous Goods Storage	5. Exclude
Dining/Kitchen	5. Exclude
Electrical Cupboard/Riser	5. Exclude
Fire Services Cupboard	5. Exclude
Function/Social/Bar	5. Exclude
Garage/Loading Bay	5. Exclude
Investment - Specific Type Not Defined	5. Exclude
Kitchen/Servery/Food Storage	5. Exclude
Laundry	5. Exclude
Lift	5. Exclude
Lift Motor	5. Exclude
Lift Shaft	5. Exclude
Lounge/dining/kitchen	5. Exclude
Mechanical Plant Room	5. Exclude
Mechanical Service Riser	5. Exclude
Media Services Room	5. Exclude
Non - Usable Floor Area – With Specific Type Not Defined	5. Exclude
Not Elsewhere Classifiable	5. Exclude
Other Plant Room	5. Exclude
Retail Facility	5. Exclude
Service Cupboard/Riser	5. Exclude
Service Riser	5. Exclude
Sub Station	5. Exclude
Switch Room	5. Exclude
UCA	5. Exclude
UCA - Carpark/Carport	5. Exclude
Under Construction	5. Exclude
Under Refurbishment	5. Exclude
Unusable Space	5. Exclude
Veranda/Balcony	5. Exclude
Waste Management	5. Exclude

END OF DOCUMENT