

14.0 Services and Sustainability

14.1 Water Sensitive Urban Design

A Urban Infrastructure Management Strategy Report prepared by Robert Bird Group is included at **Appendix P**. The report identifies the existing utility services connecting the site. The existing services available to the site are summarised previously in this report at Section 6.11. The proposed servicing arrangements are described below.

14.2 Water Sensitive Urban Design

Water Sensitive Urban Design (WSUD) pertains to the interactions between the urban environment and the urban water cycle which includes potable water, wastewater and stormwater. A Water Sensitive Urban Design Strategy has been prepared by Ecological Engineering and is included at **Appendix U**. The report also identifies a series of WSUD targets for the proposed provision of water, wastewater and potable water systems, which are summarised in Table 11:

Table 11 – WSUD Targets

Objective	Performance Measure and Targets
Water Conservation	<ul style="list-style-type: none"> ▪ Residential – consistency with the BASIX Scheme i.e. a 40% reduction in potable water use. ▪ Commercial – Use at least 3 star water fittings and appliances ▪ Irrigation – 80% of irrigation demand for open space should be made up from on-site collection and reuse.
Pollution Control	<ul style="list-style-type: none"> ▪ 45% reduction in the mean annual load of Total Nitrogen. ▪ 45% reduction in the mean annual load of Total Phosphorus. ▪ 80% reduction in the mean annual load of Total Suspended Solids. ▪ Litter Retention of litter greater than 50mm for flows up to the 3 month ARI peak flow ▪ Oil and grease – No visible oils for flows up to the 3 month ARI peak flow.
On Site Detention (OSD)	20m ³ for every 1000m ² of developed site area.

14.3 Potable Water

The concept for water reticulation to the proposed redevelopment of the site is shown on drawings 06372-SKC501 and 06372-SKC502 which form the appendices to the Robert Bird Group report. The proposed water mains will be constructed in stages to correspond with the staged construction of the proposed road network. The proposed network is fully linked between existing mains so there will be no 'dead end' lines. The Robert Bird Group report identifies where the proposed water mains will be connected to the existing infrastructure.

In accordance with the requirements of Sydney Water and the Fire Brigade, hydrants will be installed at intervals along the mains. All buildings within the site will be provided with a water connection in the street frontage.

In addition to the water mains located in Balfour Street, there is a large concentration of other existing services in Balfour Street which make it difficult if not impossible to route new services within that road reserve. Other services include a trunk sewer, a high-pressure gas main and many electrical cables. However, it is quite feasible to construct potable water services and other services crossing Balfour Street, as there is a useful gap between the shallow services (water mains, gas, electrical and telecommunications cabling) and the deep trunk sewer. Because of the difficulty of providing shoring of any trench excavation with so many services interfering with trench shield installation, bored pipelines would most likely be required.

14.4 Stormwater

The site is traversed by two major stormwater systems. These are demonstrated on drawing reference _ in COX/ATA drawing included at **Appendix A**.

The concept for stormwater drainage through the site is shown on drawings 06372-SKC301 and 06372-SKC302 which form the appendices to the Robert Bird Group report. Section 6.1 of the Robert Bird Group report describes the proposed drainage works, however, the main features of the plan are:

- All new drain lines within the site will be designed to capture and convey the runoff from the peak 20 year ARI storm.
- The extension of the interceptor drain to Abercrombie Street will facilitate future drainage augmentation, as this new drain can potentially be linked into a new relief drain constructed on the eastern side of the existing Abercrombie Street drain.
- Within the site, all stormwater connections from buildings to sewers will be terminated.
- Drainage swales have been provided in appropriate locations and can incorporate filtration systems for water treatment.
- A Gross Pollutant Tap incorporating the capability to remove oil and medium to coarse particles sedimentation is proposed at the downstream end of the interceptor drain in Abercrombie Street.

In addition, the Water Sensitive Urban Design Strategy prepared by Ecological Engineering and included at **Appendix U** identifies further opportunities for the proposed water infrastructure concept to achieve a reduction in demand for reticulated potable water. Specifically, the report proposes two options for the management of the site's stormwater; a communal system that would treat the majority of water in the main park and a more local system utilising smaller open spaces and open spaces along streets.

14.5 Sewerage

The concepts for sewerage reticulation throughout the site are shown on drawings 06372-SKC401 and 06372-SKC402 which are located in the appendices to the Robert Bird Group report. In short, the proposed redevelopment of the CUB site will include the following sewerage infrastructure works:

- As buildings on the site are demolished, all sewer connections will be sealed off. Where buildings are to be retained, the existing property connections to combined sewers will be intercepted by new gravity sewers in Kensington Street.
- New, larger sewer infrastructure is to be provided, and will be designed to meet the needs of the maximum future population on the site.

There is an existing sewer line in the Telstra services tunnel in Broadway, which could be used for connection of gravity sewers from the site. However, it is unclear how connections can be made to this sewer, as connections usually require the construction of an access chamber, and this may not be possible within the confines of a services tunnel. Any such proposal would need to be discussed in detail with both Sydney Water and Telstra. This issue is appropriately dealt with at the Project Application stage.

14.6 Waste removal and recycling

The Environmentally Sustainable Development (ESD) Strategy Report prepared by Arup and attached at **Appendix U** provides recommendations for the incorporations of ESD principles in the future development of the site. In terms of waste management, the report recommends that a Waste Management Plan be undertaken prior to construction.

The Waste Management Plan should, as a minimum, set a target of at least 80% (by weight) recycling or reuse of waste materials. This can generally be achieved through most recycling organisations. As outlined when addressing co-generation/tri-generation organic waste may also effectively be used to generate heat and/or cool and provide electricity. A feasibility study on this option will be undertaken prior to any application proposing the erection of new buildings as provided for in the Statement of Commitments.

14.7 Electricity

Future electrical works as part of the proposed CUB redevelopment will be in accordance with the requirements of Energy Australia and take into account the expected demand from each building site. No transmission will be affected by the development. Where necessary, particularly on blocks with large demand loads (such as Block 2), new substations will be integrated into the building design at the project application stage. All overhead power through the site will be removed and replaced with underground cables.

14.8 Natural gas

Gas reticulation within the CUB redevelopment will be designed by Agility and installed during road construction. No existing mains will be affected by the proposed development.

14.9 Telecommunications

Telecommunications ducting within the proposed CUB redevelopment will be designed by Telstra and will be installed during road construction. No transmission mains will be affected by the proposed development.

14.10 Energy Efficiency

Environmentally Sustainable Development Strategy (ESD)

An ESD Strategy has been prepared by Arup and is located at **Appendix U**. The report provides minimum energy, water and health targets based on current ESD requirements. However, it is recognised that these targets may change and become more stringent over time. The report recommends that a staging strategy that considers the ability to implement more efficient technologies as they become available and cost effective be prepared for the site. The recommendations contained in the report are as follows:

Recommendations for residential development

The following regulations apply generally to residential building developments at Project Application stage:

- BASIX
- NatHERS

The ESD report states that the government BASIX regulations will be reformed within 2 years to meet the following more stringent targets:

- A 40% reduction on the BASIX energy consumption benchmark.
- A 40% reduction on the BASIX water consumption benchmark.
- A 4.5 average star comfort rating using NatHERS or equivalent

The residential development within the CUB site will need to comply with these standards in the future through the Project Application process for individual project sites. The following recommendations are provided to allow future residential development to achieve the future BASIX targets:

Energy

Generally buildings will achieve 40% target if configured with the following provisions:

- Efficient gas fired Central Solar Hot Water (Central Building Plant);
- High efficiency air conditioning split systems (5 or 6 star) with ceiling fans also installed;
- Central Cooling Tower;
- Rooms should be primarily (80%) lit by either compact fluorescent or LED lighting. Where less flexibility is required in the lighting design, dedicated fittings should be installed;
- Renewable energy for pool and/or spa heating including photovoltaics or heat from cogeneration;
- Access to gas for cooking, heating, and boosting solar systems;
- All common area building services connected to a BMS (Building Management System);
- High rise towers over 10 storeys may require Co-generation to achieve energy targets.

Thermal Comfort

Generally future buildings will achieve a NatHERS 4.5 star target if configured with the following provisions:

- R2 wall and R4 roof Insulation levels;
- Performance Glazing selection;
- Shading that responds to orientation – Fixed to North, operable to East and West; and
- Cross ventilation and limited floor depths preferably between 15 to 18 meters.

Water

Generally buildings will achieve 40% target if configured with the following provisions:

- Rainwater collection, treatment, and reuse for irrigation, toilet flushing, and pool and/or spa top up;
- Stormwater collection, treatment, and reuse for irrigation;
- Efficient fitting and fixtures installed for all water uses in the building;
- Efficient appliances specified for all water uses in the building; and
- Low water use and/or indigenous species for any landscaped areas.

Recommendations for Commercial Development

A number of minimum targets are proposed for the future commercial developments in response to current legislation and industry standards, which include:

- Australian Building Greenhouse Rating (ABGR),
- Green Star environmental rating system
- National Australian Building Environment Rating Scheme (NABERS)

When deciding upon appropriate sustainability targets for the CUB, the Property Council of Australia (PCA) 2006 guidelines, current commercial designs, the development of NABERS and City of Sydney requirements were taken into consideration by Arup. It was determined that future commercial buildings should be capable of achieving the following targets:

- A minimum target of 4.5 stars ABGR energy performance (this target may increase to 5 stars for buildings over 20,000 square metres NLA due to commercial pressures).
- A target of a 4 star Green Star rating. This will require a minimum of 45 Green star weighted points to be achieved.
- A NABERS 4 star rating.

Buildings will contain the following provisions to meet these targets:

- High performance glazing
- Fixed external shading devices are to be used where necessary to further minimise solar glare and increase thermal comfort on the North-Eastern and Northern facades of Blocks F, G and J.
- Opaque external envelope U-values for all commercial blocks are to be less than $0.5\text{W/m}^2\text{K}$.
- Low temperature, low flow, high efficiency Variable Air Volume air conditioning to achieve a 4.5 star ABGR rating.
- High efficiency pumps with variable speed drives are to be used.
- Internal equipment loads are to be limited to 15W/m^2 while T5 fluorescent lighting or more efficient lighting is to be used so as to be limited the lighting load to less than 10W/m^2 .
- Infiltration not to exceed 0.5 air change rates per hour.
- Buildings with a large area of car park relative to the NLA of the building are more likely to obtain a lower ABGR star rating. This is especially the case for conditioned car parks. Car park lighting loads should not exceed 25MJ/m^2 of NLA.
- Dedicated tenant exhaust facility should be provided.
- Installing water efficient fittings, fixtures and appliances to appropriate efficiency.
- Rainwater should be collected and reused in the cooling tower, in the toilet flush and for irrigation and wash down purposes.

Recommendations for Retail Development

Currently, the only regulations for retail are included in the BCA 2006. A reduced lighting load will play the most significant role in complying with this regulation. The ABGR Scheme is in the process of developing and releasing a similar rating tool for retail. If this rating scheme becomes compulsory, future DA's for retail developments within the CUB Site will need to meet these standards.

Other recommendations are contained in the report in relation to the public domain and overall water savings on site.