

Wahroonga Estate Redevelopment

Ecologically Sustainable Development Review

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Introduction

The Wahroonga Estate is an approximately 65 hectare parcel of land situated primarily on Fox Valley Road and the Comenarra Parkway, Fox Valley. The site is owned by the Seventh Day Adventist Church and managed by the Australasian Conference Association (ACA) as the property trustees of the Church. A proposal is currently being considered under Part 3A of the EP&A Act 1979 for redevelopment of the site providing a mix of urban development centered on the existing Sydney Adventist Hospital. If approved, the development is likely to occur over a 10-20 year time frame to deliver a compact and sustainable living working community.

The Department of Planning (DoP) issued Director General Requirements (DGRs) for the Part 3A environmental assessment process, including a need to address the principles of ecologically sustainable development (ESD). The Church has a strong commitment to the preservation and nurture of the environment¹ and the principles of ESD are consistent with its organisational beliefs. This report addresses a DGR to:

Demonstrate how the development will satisfy ESD principles, including BASIX, water sensitive urban design measures, energy efficiency and recycling and waste management.

The Wahroonga Estate concept plan has considered the basic tenets of ESD being:

- the precautionary principle;
- intergenerational equity;
- conservation of biological diversity and ecological integrity; and
- improved valuation, pricing and incentive mechanisms.

¹ The Seventh-day Adventist Church released a statement on caring for creation in 1992, a statement on the environment in 1995 and a statement on stewardship of the environment in 1996. Copies of these statements are available at the SDA Australia website <http://adventist.org.au/home>.

While design and construction details are not incorporated into the concept plan, the site configuration and development controls incorporate appropriate flexibility to allow future development to be designed and constructed in accordance with ESD principles and regulatory requirements. Individual elements contributing to the DGR are contained in the following paragraphs.

BASIX

BASIX is the NSW State Government's regulatory device to deliver minimum specified levels of water and energy savings for new dwellings and certain alterations and additions to existing residential development. The three key sections of the BASIX regulations are:

- Energy (target reduction figure),
- Thermal Comfort (pass/fail criteria), and
- Water (target reduction criteria).

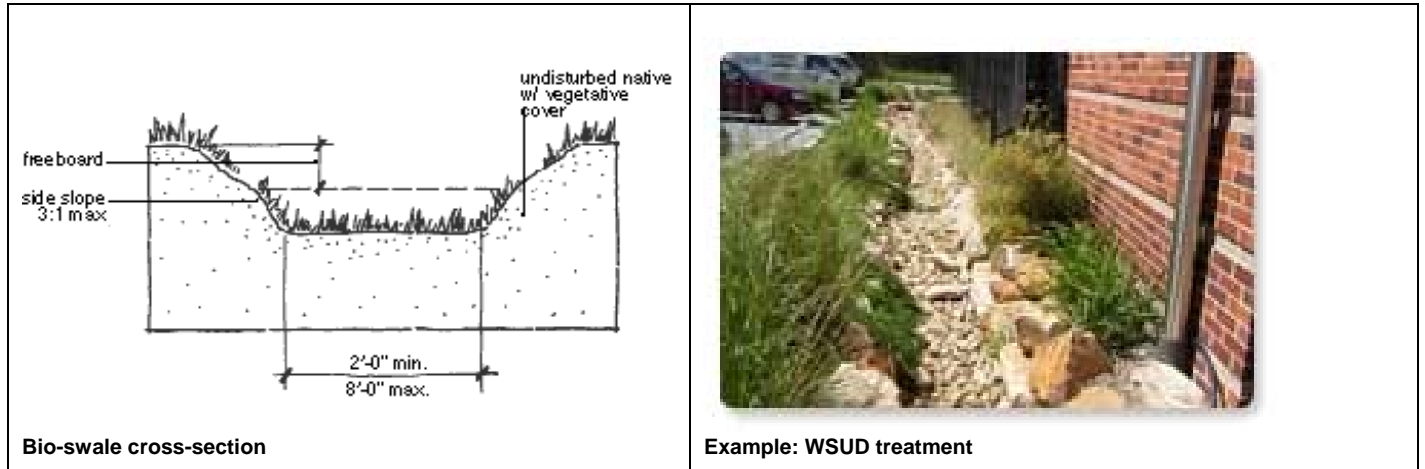
Applications for residential development within the Wahroonga Estate have a legislative requirement to achieve compliance with BASIX. Future design and construction is capable of incorporating measures to address energy efficiency, water consumption and thermal comfort including:

- rainwater tanks, plumbed for non-potable domestic use;
- water efficient showerheads, toilets, tap fittings;
- use of indigenous, endemic species for landscaping;
- grey water systems or sewer mining as appropriate;
- solar, heat pump or high efficiency gas hot water systems;
- good solar orientation for solar passive design;
- cross ventilation;
- insulation and external shading;
- performance glazing for large glazed areas and/or poorly oriented areas;
- ceiling fans, evaporative coolers or high efficiency air conditioning;
- energy efficient lighting; and
- alternative / renewable energy.

Details of the built form are not included in the concept plan approval but future residential development will respond to relevant targets at the time of development application and incorporate measures to comply with and ideally exceed BASIX requirements.

Water sensitive urban design

Water Sensitive Urban Design (WSUD) principles have been considered in the *Wahroonga Estate Flooding and Stormwater Master Plan* prepared by Hyder Consulting as part of the EA process. Site stormwater and water cycle management infrastructure will control flooding, improve water quality for receiving waters (Coups Creek, Lane Cove River, Sydney Harbour) and facilitate the conservation, harvesting and reuse of water on the site. Modeling and WSUD recommendations are contained in the *Flooding and Stormwater Master Plan* including rainwater tanks, detention basins, rain gardens, wetlands and ponds. It demonstrates that future development is capable of implementing measures to meet current regulatory requirements, promote long term sustainability and reduce operating costs within the site.



Energy efficiency

Future legislative changes may provide mandatory energy and water efficiency targets for non-residential buildings, while energy efficiency of residential development is currently addressed through BASIX. Notwithstanding this, the concept plan has considered current guidelines and best practice for incorporating the components of ESD into non-residential development. Existing voluntary methods of applying and measuring ESD principles and performance of non-residential buildings include²:

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

These systems reflect a growing market expectation and the principles, design and technology used are consistent with the Church commitment to the environment and long term resource sustainability. Design and operational measures contained in these systems will be applied to future development within the Wahroonga Estate to maximise energy efficiency, reduce long term operating costs, and minimise the environmental footprint of future development. While design detail is relevant at project application and construction stage, issues such as floor plate and façade design strongly influence Indoor Environmental Quality³ (IEQ) and energy performance and hence are important components in designing for ESD.

² **Green Star.** Set up as a holistic sustainable design rating tool that addresses a wide spectrum of environmental performance dealing with social, environmental, economic and environmental issues. The focus is on evaluating the potential environmental performance of a design. Green Star provides design credits for key criteria in nine environmental categories that include:

1. Management,
2. Indoor Environmental Quality,
3. Energy,
4. Transport,
5. Water,
6. Materials,
7. Land Use & Ecology,
8. Emissions, and
9. Innovation.

The categories are given different weightings, depending on the relative importance of the category. The Green Building Council of Australia (GBCA) provides Green Star accreditation only for projects that achieve a minimum of 4 Green Stars.

NABERS. NABERS is a performance-based rating system primarily for existing buildings but also now incorporates a NABERS Energy Commitment Agreement that allows developers to state a commitment to design, build and commission the premises to a nominated star level. NABERS rates a building on the basis of its measured operational impacts on the environment, and provides a simple indication of how well you are managing these environmental impacts compared with your peers and neighbours. (NB: NABERS now incorporates the Australian Building Greenhouse Rating (ABGR), which has been re-named **NABERS Energy for offices.**)

³ Indoor Environmental Quality refers to the quality of the air in an office or other building environments associated with building characteristics, including dampness, cleanliness, and ventilation characteristics.

Appropriate consideration has been given in the concept plan to the site configuration to enable future development to implement design measures such as:

- Appropriate building orientation to promote solar passive design opportunities;
- Narrow building floor plates (12-16m) to optimise daylight penetration.
- Maximise external views using narrow floor plates to provide outdoor connection and improve IEQ.
- Flexible floor plate design to enable cross or mixed mode ventilation including façade structural frames to allow operable windows catering for mixed mode operation, cross ventilation and night flush, reducing the need for mechanical cooling and heating and improving fresh and clean air supply for indoor spaces.
- Using light shelves etc to increase natural lighting, decrease lighting loads and improve internal comfort.
- Utilise reflective blinds to prevent low angle sun from entering buildings during early mornings and late afternoons thereby avoiding glare, minimising solar gain and improving thermal comfort and energy performance.

Recycling and waste management

The Wahroonga Estate redevelopment incorporates adaptive reuse of buildings where practical and commercially viable. For new construction, demolition or excavation works a Waste Management Plan will be implemented as part of project applications to maximise recycling or reuse of waste materials. This will incorporate a range of measures including:

- Reuse of concrete aggregate in low load applications such as road base, basement foundations etc.
- Reuse of existing structures to reduce the consumption of new material.
- Recycled or environmentally certified construction materials – materials with a high recycled content and/or environmental certification should be specified ahead of virgin, non-certified materials. This will reduce consumption of resources and contribute to reducing the embodied energy of the building.
- Use of appropriate recycling firms for the disposal of recyclable products.

Other ESD measures

Access, mobility & public transport

Improved access and mobility, both externally and within the site, will improve links with public transport and reduce future demand for private vehicle travel. It will also promote active and passive recreation opportunities within the site.

Redevelopment of the site, with a resultant increase in population numbers and density (both residents and workers) will improve the commercial viability of existing transport services. Monetary contributions and works-in-kind will be considered as part of development contributions to improve access, mobility and public transport outcomes by providing transport subsidies, infrastructure, services etc.



Internal movement networks to promote accessibility and passive recreation opportunities.

Parking facilities

Car parking facilities are provided on a user pays basis. Manipulating pricing can be used as a mechanism to encourage public transport, particularly where subsidies occur in these services. Future design of car parking structures should consider priority parking spaces reserved for small cars, car pooling and car sharing vehicles, and spaces for motorbikes / scooters. Parking facilities and non-residential buildings should also include substantial bicycle storage racks, lockers, and change rooms where appropriate to encourage alternate means of transport. Allowance should also be made to incorporate recharge points for existing and future forms of hybrid vehicles as an incentive for people to convert to and utilise such vehicles.

Car pooling & car sharing

A voluntary staff car pooling scheme currently operates to reduce traffic congestion and parking demand; reduce staff travel costs; and promote the safety and wellbeing of staff, particularly hospital shift workers who may be at an increased risk of driver fatigue due their hours of work. This car pool scheme will continue to operate post redevelopment, while the Wahroonga Estate redevelopment will also introduce a formal car sharing scheme within the estate. The program is to be funded and operated through a combination of strata levies on specified residential apartments and membership costs. The hospital may also, in the future, incorporate fleet operations and staff membership into the car sharing scheme to broaden its user base and improve whole of site benefits. The scheme, based on the principles and guidelines in the Commonwealth Governments *Car Sharing: An Overview*,⁴ will provide residents with access to a range of fully maintained vehicles. This will reduce trip generation and distances travelled by private vehicles and provide access to vehicles without the high fixed costs of private vehicle ownership.

Light

Unnecessary lighting consumes excess energy while light pollution can have an adverse affect on the natural environment by interfering or disturbing neighbouring people and fauna. Lighting within the Wahroonga Estate will, by necessity, be incorporated for design and safety measures. It will, however, utilise appropriate technology to minimise energy consumption and will comply with relevant Australian standards such as *AS4282: The Control of the Obtrusive Effects of Outdoor Lighting*.

Alternative energy options

The nature, scale and variety of development proposed in the Wahroonga Estate redevelopment will introduce commercially viable potential for alternative energy options. Consultation with service providers, as detailed in the *Wahroonga Estate Civil Engineering Utilities Report* prepared by Hyder Consulting as part of the EA process, confirms the existence of high pressure natural gas in the eastern precincts of the site that may be utilised for steam boilers or cogeneration / tri-generation. It may also be viable given emerging technologies and the timeframe of the project, to incorporate renewable energy options within the estate. These options provide the opportunity to reduce greenhouse gas emissions and provide operating cost efficiencies. Detailed development planning will consider the implementation of these and emerging technologies to provide efficient and sustainable energy for the estate.

Site coverage

The concept design for the Wahroonga Estate redevelopment retains significant vegetation and open space, with approximately 40% of the site to be retained for these purposes. Riparian corridors and EECs are largely protected within the estate and active and passive open space is provided throughout the site. The

⁴ Australian Government, *Car Sharing: An Overview*, (Australian Greenhouse Office of the Department of Environment and Heritage, December 2004)

combination of green space and movement paths will provide a high level of amenity for workers and residents, without prejudice to existing biodiversity values. Protection of the environmental qualities of the site is consistent with the ESD principle of inter-generational equity and conservation of biological diversity and ecological equity.

Conclusion

Technologies and design relating to sustainable development are constantly evolving. This report, while not detailing design and construction outcomes for the Wahroonga Estate, demonstrates that future development can not only adhere to regulatory provisions but also incorporate measures to establish the site as an example of sustainable living. The Wahroonga Estate Redevelopment is a valuable opportunity to deliver a compact, sustainable urban community centered on the Sydney Adventist Hospital and existing local centre of Fox Valley. Improved access, mobility and public transport; the provision of affordable, onsite employee housing; a holistic WSUD strategy; upgraded and improved utility service provision; and, appropriate protection, rehabilitation and management of environmental values combine to deliver an outcome consistent with the principles of ESD and with the DGRs issued for the environmental assessment.