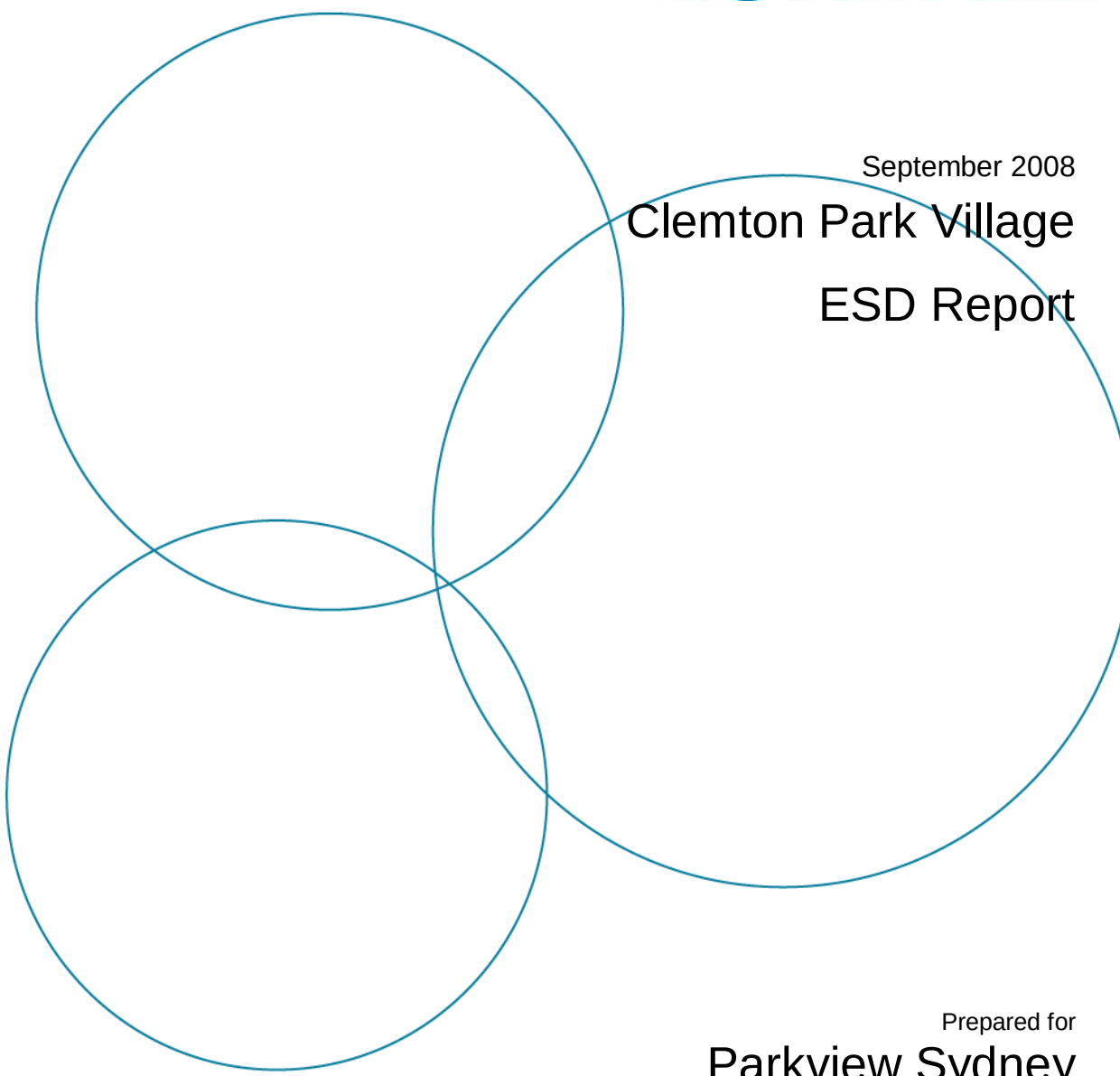




CUNDALL

September 2008

Clemton Park Village ESD Report

Prepared for
**Parkview Sydney
Developments**

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The success and realisation of the proposed initiatives will be dependent upon the commitment of the design team, the development of the initiatives through the life of the design and also the implementation into the operation of the building. Without this undertaking the proposed targets may not be achieved. The use of computer simulation is by its nature predictive with output based on historic weather data and standard assumptions. The results of any computer simulations within this report do not guarantee future performance.					

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Executive Summary

This report identifies the ESD initiatives for the Clemton Park Village development, located at 60 Charlotte St, the site of a former Sunbeam factory. Sustainability has been considered for the whole Concept Plan, which includes five stages of development. Lots 1 and 3 have been analysed in greater detail as part of the Project DA.

The following minimum regulatory requirements apply to this development:

- BCA Section J for Energy Efficiency;
- Building and Sustainability Index (BASIX) for all residential development and seniors living (ILU's), stipulating minimum performance in energy, water and thermal comfort.

An integrated approach to environmentally sustainability design (ESD) involves a broad range environmental indicators, beyond the minimum requirements. The proposed development has been evaluated in response to the following:

- **Energy & Emissions:** Reducing greenhouse gas emissions through energy efficiency of building services and building façades;
- **Indoor Environmental Quality (IEQ):** Preservation of amenity including internal air quality, light and comfort;
- **Water management:** Conserving water and preserving natural waterways;
- **Materials selection** to reduce impacts on the internal and external environments;
- **Impacts of Construction & Operation:** Minimise natural resource consumption, waste, pollution and toxicity during the construction and operation of the facility;
- **Transport, Emissions & Ecology.**

Some of the strategies proposed to address the aforementioned issues include:

- Building form and fabric carefully considered to balance solar heat gains, daylight, glare and views to outside. Passive design strategies include external shading, insulation for walls and ceilings, and high-performance glazing where necessary;
- Energy efficiency in building systems and services, including:
 - A highly efficient lighting design and control strategy will reduce artificial lighting energy consumption and allow maximum advantage to be taken of daylight;
 - Residential units have no AC, and individual ducting of laundries and toilets. Hallways and lobbies will be partially naturally ventilated. Car park ventilation will be fitted with CO monitoring and VSD control;
 - Solar hot water panels will supply domestic hot water demands and pool heating.
- Water-efficient fittings and native/drought-resistant landscape reduce potable water demands, while rainwater is harvested for use in landscape irrigation and car washing. WSUD principles will be applied to assist in stormwater management;
- Materials will be selected to maximise recycled content, minimise indoor pollutant emissions and avoid ecologically sensitive products.

1 Introduction

This report identifies the ESD initiatives for the Clemton Park Village development for both the Concept Development Application and the Project Application for Lot 1 and Lot 3. Sections 2 through to 9 cover the Concept plan ESD initiatives which have been adopted, and those identified for further consideration during design development, while Section 10 outlines detailed commitments adopted for Lot 3.

1.1 Objectives

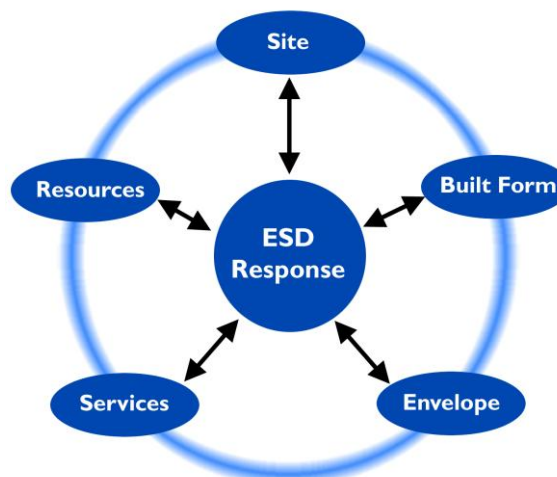
The components of the development will be evaluated in response to the following primary ESD issues:

- Reducing greenhouse gas emissions through energy efficiency of building services and building façades;
- Preservation of amenity including internal air quality, light and comfort;
- Conserving water and preserving natural waterways;
- Materials selection;
- Minimise natural resource consumption, waste, pollution and toxicity during the construction and operation of the facility;
- Preserving ecology of the site.

It is recognised that the development of ESD solutions will be an integrated approach with the architecture and the building services.

1.2 Integrated Design Approach

The integrated design process is crucial to delivering green buildings. It is the process by which all of the design variables that affect one another are considered together and resolved in an optimal fashion. Often referred to as holistic design, it looks at the entire building as a whole with the emphasis on integrating the different aspects of the building's design.



For example day lighting, natural ventilation and water conservation cut across multiple disciplines. Day lighting in particular affects virtually every design discipline including architecture (building envelope and orientation), mechanical (reduced internal heat loads and modified fabric loads), electrical (lighting design and lighting controls), structural (floor-to-floor heights and external shading) and interiors (interior colours and reflectivity).

Each of these key points are interrelated – a building with good daylight will provide better occupant comfort and well-being as well as reducing energy consumption. Similarly, a comprehensive water strategy will reduce water consumption as well as minimise stormwater and waste water emissions from the site.

1.3 Site

The proposed Clemton Park Village development is located at 60 Charlotte St, and comprises five Lots, as follows:

Lot 1: Bulky Goods, Retail, Gymnasium and Commercial;

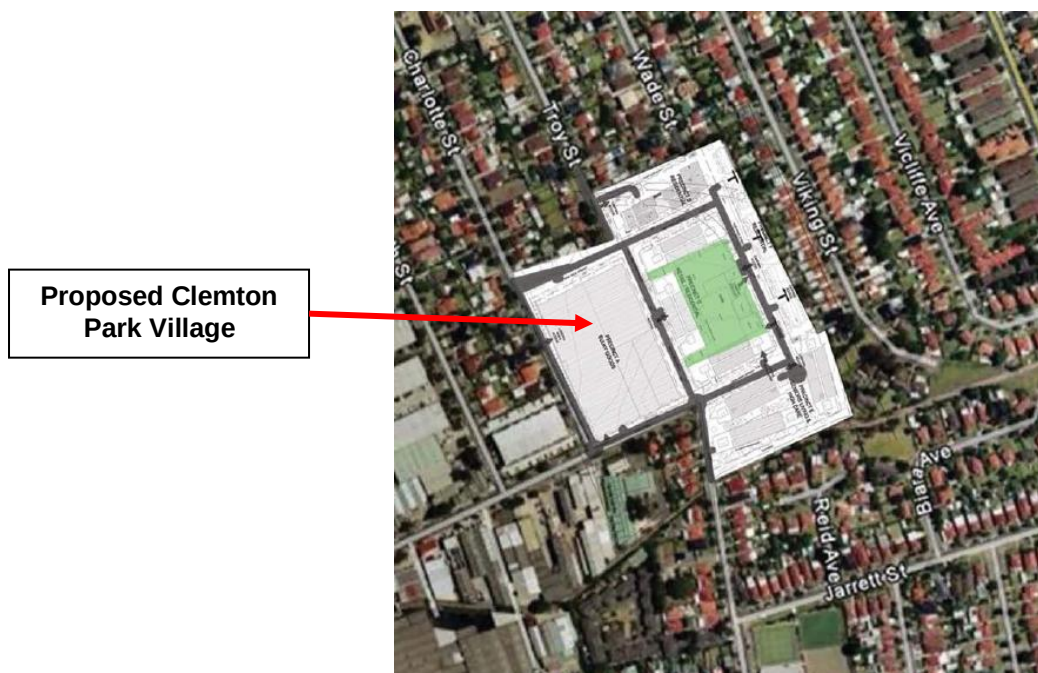
Lot 2: Residential, Retail and Health Care;

Lot 3: Residential and Child Care;

Lot 4: Residential;

Lot 5: Aged care – Senior Living and high-care.

The proposed site can be seen below in the context of the surrounding site.



1.4 Minimum Requirements

Minimum regulatory ESD requirements applying to this site include the following:

- BCA Section J for Energy Efficiency;
- Building & Sustainability Index.

1.4.1 BASIX

New residential developments in NSW must reduce their energy and water use, according to BASIX requirements developed by the Department of Planning. The objectives of the BASIX scheme are relative to an average development in NSW.

- 40% reduction in water consumption
- 20-40% reduction in greenhouse gas emissions, depending on building height.
- Minimum thermal performance requirements for heating and cooling loads.

A separate BASIX assessment will be carried out on a stage by stage basis. Please see Section 10 for a detailed list of Basix commitments for the Project DA, Lot 3.

1.4.2 BCA Section J

The Building Code of Australia Section J sets minimum energy performance requirements for all new development, which cover air-conditioning, ventilation, lighting, power and hot water, as well as building fabric considerations including thermal construction and insulation, building sealing, glazing and shading. The proposed design will be developed to meet the BCA energy efficiency requirements. Please see Section 9 a discussion on achieving the BCA requirements for the proposed site.

1.5 Environmental Performance Requirements

Category	Benchmark	Achievement
Residential		
Passive Design	NatHERS	Minimum heating & cooling performance imposed by Basix.
Water	% reduction NSW average	40%
GHG Emissions	% reduction NSW average	30% for Lot 3 30% for Lot 4 35% for Lot 5 20% for Lot 6
Commercial & Retail		
Passive Design	BCA Section J	Energy efficiency for the building fabric
Systems Efficiency	BCA Section J	Energy efficiency of building services

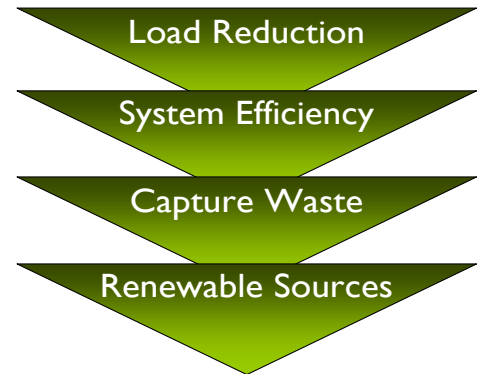
2 Energy & Emissions

Greenhouse gas emissions are directly related to energy consumption. In Sydney, for every 1.1kWh of mains electricity consumed 1kg of CO₂ is released into the atmosphere.

2.1 Integrated Energy Approach

Greenhouse reductions are achieved in a staged approach:

- First, reduction in overall energy consumption through demand reduction and energy efficiency, then;
- Reduction in electricity and gas utility consumption by utilising waste products and renewable energy technologies.



The integrated response to energy proposed for this project, is summarised below:

Load Reduction	Reduce energy demand through a combination of: • Passive design (shading, insulation, glazing type, etc.); • Mixed-mode AC systems (combined natural ventilation & HVAC in residential common areas); • Daylighting to reduce reliance on artificial lighting; • Selection of energy efficient lighting and equipment (to reduce cooling loads); • Water efficiency in hot water systems (showers, taps, etc.).
System Efficiency	• Efficient air-conditioning services; • Fluorescent or T5 lighting where possible with lighting control systems (timers, daylight dimming, etc); • Selection of efficient equipment and appliances (e.g. clothes dryers and dishwashers.)
Capture Waste & Utilise Renewable Sources	Consider viable renewable energy sources: • Solar panels will provide domestic hot water & pool heating. Cogeneration will be considered as an alternative, using waste heat from electricity generation for all hot water needs. • Photovoltaic electricity will be considered to offset common area lighting loads if necessary to meet energy reduction targets in the seniors living buildings.

2.2 Passive Design

Passive design reduces the amount of air-conditioning required and can have a marked impact on the building's energy consumption and greenhouse performance. A building's form, fabric and orientation will have the biggest influence on its thermal comfort and environmental performance. The following factors should be considered in the design:

- Orientation
- Shading
- Structure
- Insulation
- Glazing

An efficient building fabric reduces heat losses and gains inside the building. This not only affects sizing of the mechanical plant but also the thermal comfort of occupants. The diagram below summarises the key issues to be addressed:

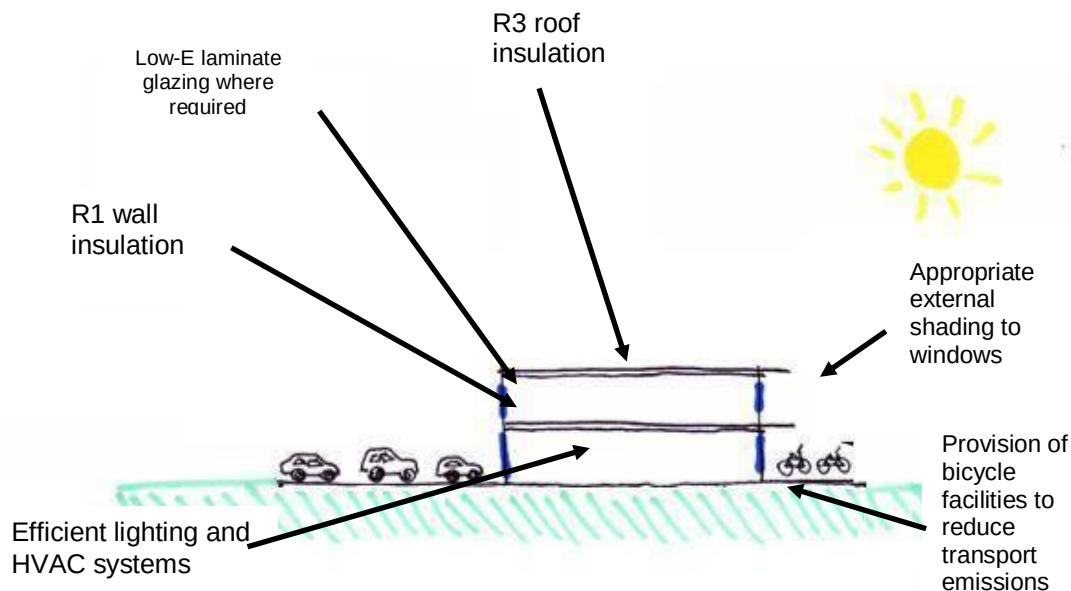


Figure 2.1 *Passive Design features of Clemton Park*

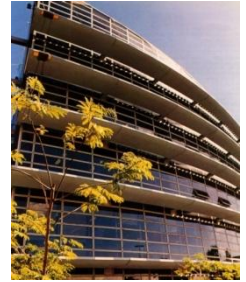
Insulation reduces the heat transfer between the internal and external conditions. By having adequate insulation the heating and cooling load can be reduced and consequently this will be realised in the reduction of the energy consumption over the course of the building's life. This has a twofold saving through a smaller plant capacity along with operating energy consumption reduction.

Choice of glazing will be vital in reducing heating and cooling energy consumption and maintaining occupant comfort. Glazing may be described by the following properties:

- Visible Light Transmission (VLT) – the percentage of visible light transmitted by the glass. The higher the VLT, the more daylight will enter the space.
- Shading Coefficient (SC) – the percentage of solar radiation that is transmitted through the glass. The lower the value, the less solar heat gain into the space.
- U-Value (U) – a measure of how much heat is passed through the glass. The lower the U-Value, the less heat is transmitted and the higher the thermal performance of the glass.

Selecting glazing with a low SC will help to avoid heat gains in the summer, while glazing with a low U-value will reduce losses in the winter through the glass. Incorporating effective shading features into the design can avoid the necessity for low shading coefficients in the glass, which usually also decrease the VLT of the glass. To maximise the natural daylight within the buildings, VLT should be as high as possible.

Passive design will be developed on a Stage by Stage basis pending design development. Passive design considerations for the Project DA (Lots 1 and 3) are outlined in Section 11 (Classes 5-9) and Section 12 (Class 2 Residential).



Example of external shading

2.3 Energy Efficient Systems and Services

Energy consumption can be reduced through the efficient design of lighting, air-conditioning and ventilation systems, as well as water heating and other services. Clemton Park Village will improve energy efficiency in design and operation, utilising the following initiatives.

2.3.1 Lighting

A highly efficient lighting design and control strategy will reduce artificial lighting energy consumption and allow maximum advantage to be taken of daylight. Lighting power density will be required to meet BCA requirements.

- Efficient light fittings including T5 fluorescent lamps or metal halides (commercial and retail) and compact fluorescent lamps (residential).
- Low-power LED lamps can be used in feature lighting and are now available with excellent temperature control.
- Daylight dimming of external and streetscape perimeter lighting, as well as internal lighting adjacent to windows;
- Efficiency controls including timers and motions sensors in car parks, common areas and infrequently used areas such as plant rooms;



Figure 2.2 High efficiency fluorescent light

2.3.2 Heating, Ventilation & Cooling (HVAC)

Once building fabric has been optimised to reduce cooling loads, mechanical air-conditioning energy can be reduced by selecting efficient systems and plant and keeping the hours that it is switched on to a minimum. The following energy initiatives can help to reduce air-conditioning and ventilation energy:

- Air-conditioning will not be provided to residential units. Residential bathrooms and laundries will be individually ducted to the façade, with efficiency controls;
- Commercial and retail areas should consider Variable Air Volume (VAV) air conditioning with economy cycle, high efficiency pumps and fans with VSD. Install higher-efficiency chillers for commercial and retail areas;
- Air conditioning should be zoned so that only occupied areas are cooled, and spaces with different occupancy patterns or different cooling loads are zoned separately. To achieve this, motion sensors and timers should be used to automatically switch off when parts of the centre will be unoccupied (Absence-off control);
- Hallways have supply & extract ventilation with efficiency controls;
- Any enclosed car park areas should be designed with Variable Speed Drive (VSD) and carbon monoxide (CO) monitoring, as well as passive supply or passive exhaust where possible.

2.3.3 Hot Water

Roof-mounted solar panels will provide hot water for all residential domestic hot water needs, as well as pool heating for seniors living. These systems will typically deliver approximately 60% of yearly water heating energy, with a gas back-up for security of supply during night-time or cloudy periods.

Evacuated tube hot water panels (pictured right), are a vacuum technology with low heat losses and good performance at low sun-angles. These are approximately 20-40% more efficient than standard flat-plate solar collectors.



2.4 Tracking & Monitoring

To enable the effective monitoring and tracking of energy consumption, sub-metering should be provided to major energy uses (greater than 100kVa), to help identify areas of inefficiency with potential for improvement.

3 Indoor Environmental Quality

Indoor Environmental Quality (IEQ) affects occupant amenity and incorporates thermal comfort, indoor air quality, daylight and acoustic quality. These are outlined below with respect to the Concept Plan, and will be developed further during detailed design.

3.1 Thermal Comfort

Thermal comfort is a function of the following factors:

- Radiant temperature – the temperature of the surfaces around you, or radiant heat from the sun etc (45% of net comfort effect);
- Air temperature and humidity (35% of net comfort effect);
- Air movement, clothing & activity (20% of net comfort effect).

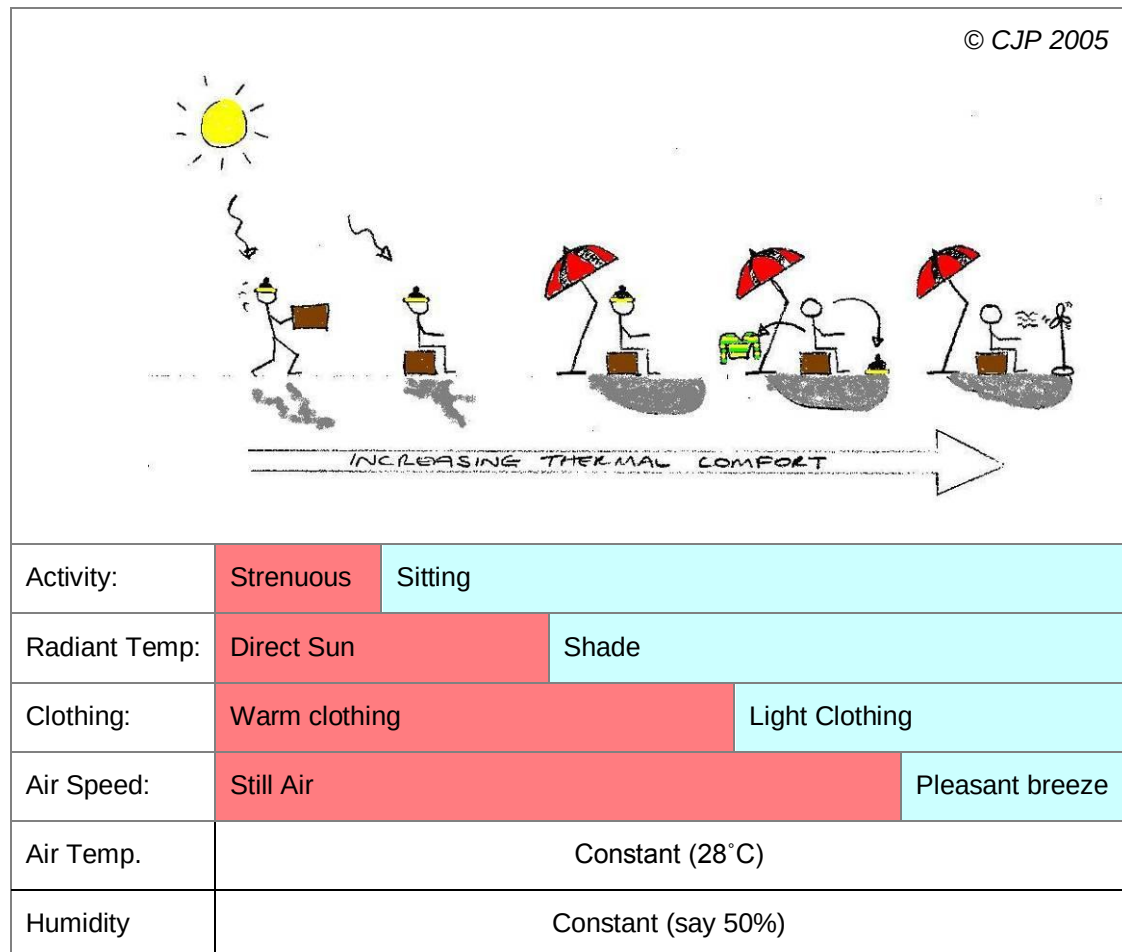


Figure 3.1 Changing perception of comfort for constant temperature and humidity.

Thermal comfort can either be provided by passive or mechanical means. Passive means should be optimised before mechanical systems are designed, reducing operational energy costs, with potential reductions in mechanical plant and ongoing maintenance.

Passive heating and cooling strategies incorporated into the design, which will improve occupant thermal comfort include:

- Wall and roof insulation not only reduce heat gain and loss, but will also moderate radiant temperatures from the walls, floor and ceiling;
- Building facades with large areas of glazing will have a combination of external shading and high-performance glass to reduce heat transfer and radiant temperatures in proximity to the windows;
- Balcony overhangs provide effective external shading;
- Air temperatures through the use of significant ventilation openings within the façade.

3.2 Indoor Air Quality

Indoor air quality is affected by ventilation rates inside buildings and contamination of indoor air by people, internal finishes, odours, and external influences.

Indoor air pollutant levels in most buildings exceed those outdoors by 2-5 times, due to a variety of toxic emissions given off by chemicals present in typical building materials, including paints, furnishings, floor coverings, adhesives and cleaning products.

Contamination of indoor air by common indoor pollutants will be reduced in this development by careful material selection, including low-VOC paints, adhesives and carpets, as well as low formaldehyde composite wood products.

Effective ventilation can be provided by passive and active means. In residential and seniors living buildings, cross-ventilated apartments will be maximised to encourage natural ventilation. Where possible, hallways will incorporate ventilation openings to allow partial or full natural ventilation.

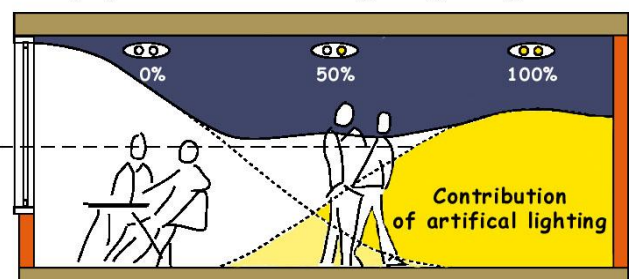
In commercial and retail areas, the following should be considered in the mechanical design:

- Increasing fresh air rates above AS1668;
- Carbon Dioxide Monitoring and Control (or 100% outside air with no recirculation)
- Mixed-mode air conditioning.

3.3 Daylight, Glare and External Views

The level of natural light in buildings is primarily determined by the extent and type of glazing, and the depth of the building floorplate. Extent of glazing must be optimised to allow maximum daylight, views, and winter sun, while minimising uncomfortable glare and excessive solar heat gains in summer. Glazing should be selected with a high Visual Light Transmission to maximise daylight penetration.

Daylight and Artificial Lighting Integration



3.4 Acoustic Quality

Internal noise will be restricted to acceptable levels in accordance with Australian Standard AS/NZS 2107:2000, including general building and services noise.

4 Water Conservation & Management

Water conservation is a critical issue for new development, and is ideally approached in two stages:

- Firstly, reducing the inherent amount of mains or potable water consumed within the development through demand management, then;
- Substituting mains water required to meet this demand by utilising alternative sources such as rainwater, stormwater and treated wastewater.

4.1 Demand Management

Demand management requires water use to be as efficient as possible so that any unnecessary consumption is avoided. Strategies to minimise consumption will differ depending on development type, and many include water-efficient fittings and fixtures, water-efficient appliances and low-water use air-conditioning and irrigation systems. In order to reduce the overall water consumption for this development, the following initiatives will be incorporated:

	Water Conservation Strategies
Fixtures¹	• 4 star wash hand basin taps; • 4 star kitchen taps; • 4 star WC's; • 3 star showerheads; • Low-flush urinals; • Efficient cleaners taps. 
Appliances	• 4 star water-efficient dishwashers; • 4-Star water-efficient clothes washing machines. 
Air-conditioning Systems	• Cooling towers to have 6 cycles of concentration or greater, reducing water consumed in air-conditioning by up to 50%, as well as reducing chemical use in treatment.
Landscape Irrigation	• Water-efficient native species; • Consider subsurface irrigation systems for non-native or drought resistant species.

¹ More information on water efficient appliances can be found at www.waterrating.gov.au

4.2 Rainwater Harvesting & Reuse

Water can be divided into two main uses – potable (drinking standard) and non-potable. NSW Health strongly recommends the use of potable mains water for cooking, showers, wash-hand basins and all other uses where water may be ingested. Non-potable uses such as toilet-flushing and landscape irrigation may be supplied by alternative sources such as rainwater.

In this development, harvested rainwater will be used to supplement the following non-potable water uses, reducing the quantity of high-quality drinking water consumed:

- Common area landscape irrigation;
- Private landscape irrigation;
- Car-washing & wash-down.



Rainwater will be drained from the roofs of buildings and filtered, before storage in above-ground tanks for reuse. This approach is demonstrated in the figure below.

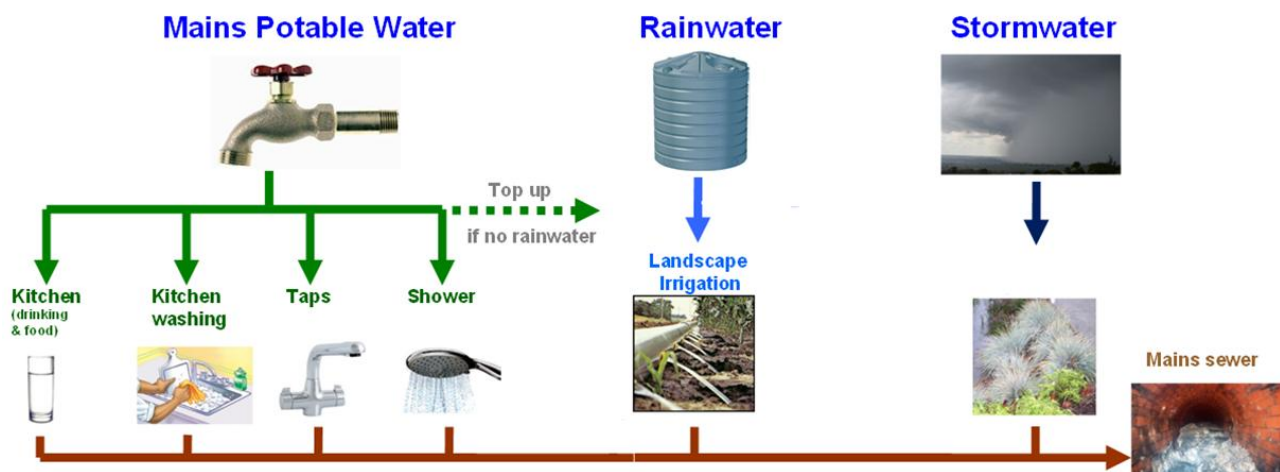


Figure 4.1 Water Source management for Clemton Park

4.3 Landscape Selection

The use of native, drought-resistant planting will be maximised to reduce water consumption used in irrigation. Sub-soil irrigation systems should be considered where non-native species are selected.



Sir Walter Buffalo
drought-tolerant lawn

4.4 Tracking and Monitoring

Sub-metering on major water uses can identify abnormal usage patterns usually associated with leaks, helping to reduce the considerable water lost in this way. In addition, they will allow water efficiency measures to be monitored and tracked.

4.5 Groundwater & Stormwater management

In order to reduce the impacts of stormwater runoff from the site, the following stormwater management strategies will be considered:

- Rainwater capture from rooftops for reuse in buildings will reduce stormwater runoff as well as mains potable water use;
- Extensive stormwater detention will be provided to minimise runoff quantities;
- The use of permeable surfaces will be considered where suitable, allowing stormwater to seep directly into the earth and reducing stormwater flows off-site. The ground acts as a natural filter for any excess water before it enters the water table. Permeable surfaces could include carparks, walkways and traffic thoroughfares. Further geotechnical investigation during design development will determine whether the soil is suitable for this approach.



Figure 4.2: Permeable paving surfaces. Image courtesy of Atlantis

- Roadside curbs can be made from pervious swales rather than the standard concrete drainage system, allowing water to seep directly into the earth, and reducing stormwater run-off quantities. Careful selection of plants and soils will filter harmful chemicals and oils prior to the water dispersing into the surrounding earth, thus improving the quality of runoff.

An area of planting between Precinct E and the culvert has been identified as a suitable location for a bioswale, to be further developed. There may also be potential for such an approach in other locations. An example of such a system is shown in Figure 4.3, overleaf.

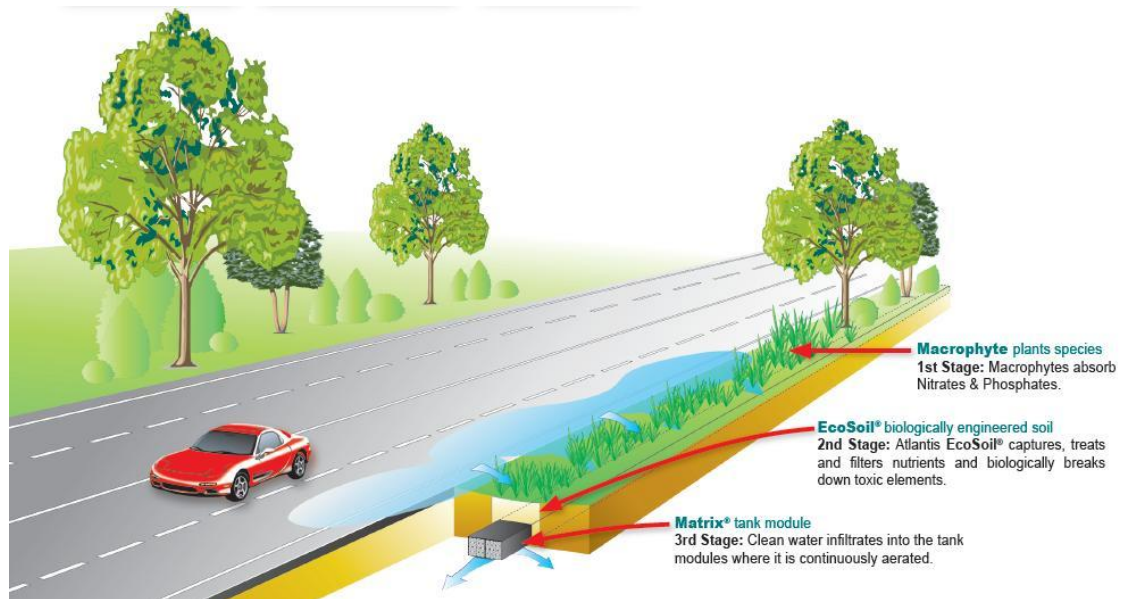


Figure 4.3 Roadside water retention system (Image courtesy of Atlantis)

5 Transport

To encourage residents to cycle, secure and accessible bicycle storage will be provided for building residents and visitors.

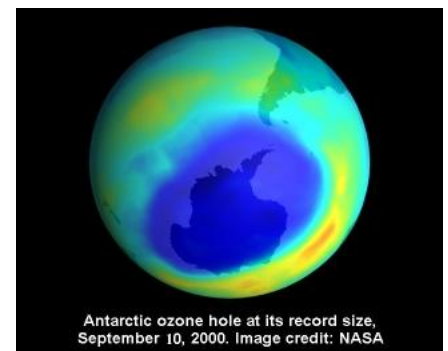
In addition, a reduction in parking on the allowed quantity will encourage the use of alternatives such as public transport, car pooling, cycling or walking.



6 Emissions

In addition to the reduction in greenhouse emissions as a result of lower on-site energy usage, emissions to land, air and water will be minimised in the following ways:

- Where available, thermal insulation products will be selected which have a low Ozone Depletion Potential in their manufacture and composition, reducing the impacts of insulation on the atmosphere;
- 100% of refrigerants by volume will have an Ozone Depletion Potential of zero; and integrated refrigerant leak detection will ensure early identification of leaks;
- Estimated wastewater discharge to sewer will be significantly reduced relative to a standard building through the implementation of water efficiency measures;
- External light pollution will be controlled by careful lighting design, in accordance with AS 4282-1997.

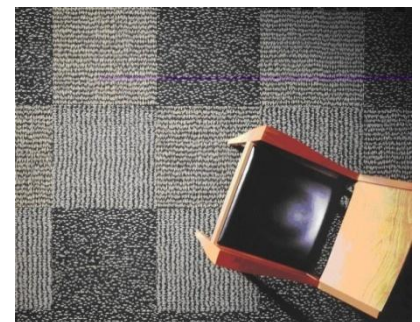


7 Materials Selection

7.1 Principles

Preference will be given to environmentally responsible materials during the selection process, according to the following principles:

- Avoidance of ecologically sensitive products (such as scarce minerals and old-growth forest)
- Selection of materials with a low embodied energy & high recycled content;
- Low toxicity material selection;
- Low impact on the indoor environment;
- Durability, flexibility and recyclability;
- Emissions in manufacture and composition, including greenhouse gases and ozone depleting substances.
- Waste reduction – utilising prefabricated construction can minimise construction work and waste on site.



7.2 Materials

7.2.1 Concrete

Traditional Portland cement production has a considerable embodied energy impact, which can be mitigated by replacing a proportion of cement with an industrial waste product such as fly ash.

Design development should consider the following cement replacement targets, subject to structural considerations:

- Replace 20% of cement with an industrial waste product;
- Use 20% recycled aggregate.

7.2.2 Steel

Steel used in the project should be sourced from recycled suppliers, or be post-consumer product, according to the following criteria:

- 60% of all steel used (by mass) to have a recycled component of 50% or more.

7.2.3 Timber

Where possible, all timber will be supplied from sustainable sources including Forestry Stewardship Council (FCS) certified plantation timbers and recycled products. No timber (either solid or veneer form) should be sourced from rainforests or old-growth forests.

7.2.4 PVC Minimisation

PVC is being phased out in the European Union, as there is widespread evidence to its harmful environmental impact, particularly during disposal or fire. PVC is used in almost all electrical and data cabling and for drainage pipework. Australia does not have any provision for safe recycling or disposal of PVC and it is encouraged that alternatives be considered:

Alternatives to PVC products include:

- HDPE and polypropylene pipe work instead of PVC pipe for water supply and drainage systems;
- Linoleum and other natural products instead of vinyl floor coverings;
- Composite materials for electrical cabling.



7.2.5 Finishes

Contamination of indoor air by common indoor pollutants will be reduced in this development by careful material selection, including:

- Use of low-VOC and water-based paints rather than oil-based paints, stains or sealants, reducing indoor air contamination and consequent side-effects including sick-building syndrome and respiratory problems;
- Selection of low-VOC carpets and adhesives;
- Selection of low formaldehyde composite wood products, avoiding the carcinogenic effects of formaldehyde off-gassing;
- Choose internal paints with light colours to maximise daylight penetration.

8 Environmental Management

Effective environmental and waste management should be implemented throughout the demolition, construction and operational stages of development.

8.1 Environmental Management (Construction & Operation)

8.1.1 Environmental Management Plan

Prior to construction, an Environmental Management Plan (EMP) will be developed to regulate the environmental impacts of the development during construction. This will identify potential environmental impacts and strategies to mitigate these impacts, as well as outlining methods for auditing and tracking the impacts and responsible parties.

The EMP would be used to set out guidelines and policies in the environmentally responsive operation of the various different facilities, providing:

- Statement on the development's Environment Policy and its objectives;
- A series of key environmental performance indicators and targets for improvements, as well as the tracking of on-going performance based on predicted environmental performance benchmarks (i.e. waste, energy, water, etc).

8.2 Waste management

8.2.1 Construction Waste Management

The aforementioned EMP will include a Waste Management Plan, specifying recycling targets for demolition and construction waste. It is recommended that construction and demolition contracts stipulate a minimum 80% target for diversion of waste from landfill. This may be achieved through recycling or reuse.

Purchasing policy should minimise waste from products and packaging and encourage the use of products which have minimum environmental impact. Preference should be given to prefabricated materials, in order to reduce the amount of on-site construction waste.

The construction contract could include commitments for the following:

- Establishment of a waste management area on site for the sorting and segregation of waste.



Figure 8.1 Construction waste streaming

- Identification of appropriate waste sub-contractors for recycling, costs of collection and timing of collection service;
- Participation in waste minimisation training for contractors and sub-contractors;
- Published waste minimisation plan to reduce site waste to landfill;
- Provision of separate waste skips for cardboard, timber, metal, soft plastic, polystyrene, insulation, concrete, glass and bricks.

8.2.2 Operational Waste Management

To encourage and facilitate effective waste management once the development is in operation, sufficient spatial provision should be made to allow for the effective separation of waste from recycling.

Dedicated waste recycling rooms allow space for the separation and storage of recyclable waste during the building's operation, allowing for the following waste streams to be separated:

- | | |
|-------------|--------------|
| - Glass; | - Cardboard; |
| - Paper; | - Organics. |
| - Plastics, | - Metals. |

8.2.3 Handover & Education

In recognition of effective handover being critical to the success of a building in achieving its environmental aspirations, a simple and concise building users' guide will be developed to inform and educate building users, residents and tenants on how to capture and promote strong on-going environmental performance.

In addition, a tenant fitout guide will be provided for commercial building uses, with the objective of encouraging tenants to consider ESD principles in tenancy design, fitout and operations.

9 BCA Section J Assessment

9.1 Introduction

In 2006 new energy efficiency requirements for Class 5 to 9 buildings were incorporated into Section J of the Building Code of Australia (BCA) 2006. These define minimum energy efficiency requirements for the performance of building fabric and building services.

The Clemton Park Village development comprises Class 5 commercial and Class 6 Retail space, as well as Class 9 Child Care, Aged Care, Health Care and gymnasium.

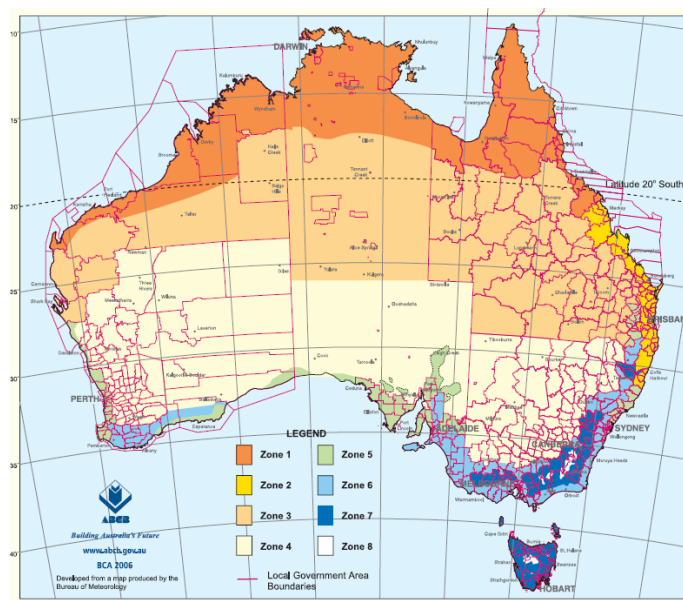
The *Deemed-to-Satisfy* Provisions in Section J of the BCA 2007 are defined in eight parts:

- *Part J1* – Building Fabric
- *Part J2* – External Glazing
- *Part J3* – Building Sealing
- *Part J4* – Air Movement
- *Part J5* – HVAC Systems
- *Part J6* – Artificial Light & Power
- *Part J7* – Hot Water Supply
- *Part J8* – Access for Maintenance

This report discusses considerations for the proposed building fabric against the deemed-to-satisfy provisions in Parts J1& J2 only. All other parts are considered the responsibility of the respective services consultants and will be developed during detailed design.

9.2 Climate Zones

The BCA has divided Australia into 8 climate zones with varying performance requirements. Clemton Park is in Zone 5.



9.3 General Requirements for J1 & J2

Part J1 regulates minimum thermal construction and performance requirements, including the installation and value of insulation for walls, floors and ceilings. Part J2 regulates glazing in buildings. These requirements are outlined in the following table:

BCA Section	Principle	Requirement
J1	Building Fabric Classes 5-9	
J1.1	Does this section apply	Yes
J1.2	Thermal Construction	Insulation is to comply with AS/NZS 4859 Insulation must be installed to comply with J1.2
J1.3	Roof and Ceiling Insulation	Minimum for roof and ceiling generally R=3.2 (Total insulation value) Minimum for ceiling with plant room or unconditioned space above R = 1.6 (Total insulation value) Direction of heat flow = Downward
J1.4	Roof Lights	None Used in this design
J1.5	External walls	Minimum total value of R1.8 OR meet construction requirements set out in table J1.5b of the BCA.
J1.6	Floors	Concrete slab on ground total R=Nil (no in-slab heating system).
J2	Building Glazing Classes 5-9	
J2.1	Does this section apply	Yes
J2.2	Glazing Calculator	High-performance glazing will be installed where necessary to reduce heating and cooling loads in buildings. These will be assessed during design development.

10 BASIX Assessment Lot 3

10.1 Basix Water Strategies

Strategies to achieve the BASIX water target of 40% reduction in potable water consumption are outlined in the table below. Lot 3 exceeds the minimum requirement for water savings:

	Water Conservation Strategies	
Fixtures²	4 star wash hand basin taps; 4 star kitchen taps; 4 star WC's; 3 star showerheads.	
Appliances	4 star water-efficient dishwashers; 4-Star water-efficient clothes washing machines.	
Landscape Irrigation	- Harvested rainwater for all landscape irrigation; - Water-efficient native species.	
Water Savings Required	40%	
Water Savings Achieved	45%	

For a complete list of Basix Water commitments, please refer to the Basix certificate in Appendix A.

² More information on water efficient appliances can be found at www.waterrating.gov.au

10.2 Basix Energy Strategies

Strategies to achieve the BASIX energy target of 30% reduction in energy consumption are outlined in the following table:

		Energy Conservation Strategies
Base Case Strategies – Common Areas		• Variable Speed Drive (VSD) car park ventilation with carbon monoxide monitoring; • Fluorescent lighting to the car park, common areas, hallways and plants rooms; • Efficiency controls including timers and motions sensors to car park, common areas and plant rooms; • Hallways have supply & extract ventilation with efficiency controls;
Base Case Strategies – Individual dwellings	Services	• Solar hot water with gas boost (85m²) and insulated pipework (R1.0); • Bathroom and laundry exhaust individually ducted to façade or roof (with on/off switch), kitchen exhaust recirculating (not ducted); • No air-conditioning provided; • Fluorescent Lighting for bedrooms, bathrooms, laundries, toilets and hallways. 
	Appliances	• Gas cooktop with electric oven • 3.5 star rated dishwasher • 3.5 star rated clothes washer • 2.0 star rated clothes dryer
Energy Savings Required		30%
Energy Savings Achieved		30%

For a complete list of Basix Energy commitments, please refer to the Basix certificate in Appendix A.

10.3 Basix Thermal Comfort

Thermal comfort for Basix is assessed using the Building Energy Rating Scheme (BERS). In NSW, the software required to perform thermal assessments is NatHERS (National House Energy Rating Scheme).

Basix requires that each unit achieve a minimum thermal performance. This is calculated using National House Energy Rating Scheme (NatHERS), which predicts annual heating and cooling loads for a dwelling.

In order to pass BASIX requirements, these loads may not exceed the maximum heating and cooling caps proposed for a certain location. The following objectives must be met:

- Heating and cooling loads for individual dwellings must not exceed the limit specified in the BASIX scheme;
- The average of heating and cooling loads of all the proposed dwellings in a development must not exceed the specified average limit.

Each unit in the proposed Lot 3 development has been assessed to determine heating and cooling load performance. The following thermal performance properties will achieve BASIX requirements. Please see the ABSA certificate in Appendix B for a full list of thermal specifications, and Appendix C for a set of ABSA certified drawings.

	Thermal Performance Requirement
Construction & shading	As indicated on the architectural drawings
Wall insulation	R1.0 to all external walls
Ceiling Insulation	R3.0 plus foil (sisalation) for all exposed roof area
Floor Insulation	R2.0 for Units 1.03 and 1.04
Glazing (Façade)	6.38mm clear laminate throughout, except for Units 4.02, 4.03, 4.13 and 4.14, which require high-performance glazing, as per the ABSA certificate in Appendix B. .
Glazing (Skylight)	Low-e Double glazing

Appendix A: Basix Certificate Lot 3

BASIX Certificate

Building Sustainability Index

www.basix.nsw.gov.au

Certificate number: 211296M

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 29/06/2006, published by the Department of Planning. This document is available at www.basix.nsw.gov.au

Director-General

Date of issue: Friday, 19 September 2008



NSW GOVERNMENT
Department of Planning

Score

- ✓ Water: 45 (Target 40)
- ✓ Thermal comfort: pass (Target pass)
- ✓ Energy: 30 (Target 30)

Description of project

Project address	
Project name	Clemton Park Village Lot 3
Street address	60 Charlotte Street Clemton park 2206
Local Government Area	Canterbury City Council
Plan type and plan number	strata -
Lot no.	3
Section no.	-
Project type	
No. of unit buildings	1
No. of units in unit buildings	58
No. of attached dwelling houses	0
No. of separate dwelling houses	0
Site details	
Site area (m ²)	4217
Roof area (m ²)	1932
Non-residential floor area (m ²)	604
Residential car spaces	85
Non-residential car spaces	8
Common area landscape	
Common area lawn (m ²)	0
Common area garden (m ²)	220.5
Area of indigenous or low water use species (m ²)	176.4
Assessor details	
Assessor number	20399
Certificate number	22984465

Description of project

The tables below describe the dwellings and common areas within the project

Unit building - Precinct B, 58 dwellings, 4 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species: (min area m2)
1.01	3	99.7	0.0	39.4	9.6
1.05	2	64.0	0.0	8.5	6.8
1.09	2	79.6	0.0	27.8	9
2.03	2	82.8	0.0	0	0
2.07	2	87.1	0.0	0	0
2.11	1	56.7	0.0	0	0
2.15	2	89.6	0.0	0	0
3.03	2	82.8	0.0	0	0
3.07	2	87.1	0.0	0	0
3.11	1	56.7	0.0	0	0
3.15	2	89.6	0.0	0	0
4.03	2	82.8	0.0	0	0
4.07	2	87.1	0.0	0	0
4.11	1	56.7	0.0	0	0
4.15	2	89.6	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species: (min area m2)
1.02	3	120.7	0.0	67.6	33.1
1.06	1	56.7	0.0	4.2	3.4
1.10	1	57.7	0.0	15.9	12.7
2.04	1	56.7	0.0	0	0
2.08	2	81.4	0.0	0	0
2.12	2	84.1	0.0	0	0
2.16	2	82.8	0.0	0	0
3.04	2	56.7	0.0	0	0
3.08	2	81.4	0.0	0	0
3.12	2	84.1	0.0	0	0
3.16	2	82.8	0.0	0	0
4.04	2	56.7	0.0	0	0
4.08	2	81.4	0.0	0	0
4.12	2	84.1	0.0	0	0
4.16	2	82.8	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species: (min area m2)
1.03	2	82.8	0.0	24.6	19.7
1.07	2	75.0	0.0	10.3	8.2
2.01	3	99.7	0.0	0	0
2.05	2	72.0	0.0	0	0
2.09	2	79.6	0.0	0	0
2.13	2	83.9	0.0	0	0
3.01	3	99.7	0.0	0	0
3.05	2	72.0	0.0	0	0
3.09	2	79.6	0.0	0	0
3.13	2	83.9	0.0	0	0
4.01	3	99.7	0.0	0	0
4.05	2	72.0	0.0	0	0
4.09	2	79.6	0.0	0	0
4.13	2	83.9	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species: (min area m2)
1.04	1	56.7	0.0	7.2	5.8
1.08	2	81.4	0.0	32.6	10.2
2.02	3	120.7	0.0	0	0
2.06	1	103.5	0.0	0	0
2.10	2	90.1	0.0	0	0
2.14	2	85.6	0.0	0	0
3.02	3	120.7	0.0	0	0
3.06	1	56.7	0.0	0	0
3.10	2	90.1	0.0	0	0
3.14	2	85.6	0.0	0	0
4.02	3	120.7	0.0	0	0
4.06	1	56.7	0.0	0	0
4.10	2	90.1	0.0	0	0
4.14	2	85.6	0.0	0	0

Description of project

The tables below describe the dwellings and common areas within the project

Common areas of unit building - Precinct B

Common area	Floor area (m²)	Common area	Floor area (m²)	Common area	Floor area (m²)
Car park area (No. 1)	2600	Lift car (No. 1)	-	Lift car (No. 2)	-
Lift motor room (No. 1)	20	Garbage room (No. 1)	93	Plant or service room (No. 1)	80
Ground floor lobby type (No. 1)	98.5	Hallway/lobby type (No. 1)	105	Hallway/lobby type (No. 2)	324

Schedule of BASIX commitments

1. Commitments for unit building - Precinct B

(a) Dwellings

- (i) Water
- (ii) Energy
- (iii) Thermal Comfort

(b) Common areas and central systems/facilities

- (i) Water
- (ii) Energy

2. Commitments for attached dwelling houses

3. Commitments for separate dwelling houses

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

- (i) Water
- (ii) Energy

Schedule of BASIX commitments

The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

1. Commitments for unit building - Precinct B

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✓	✓	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✓	✓
(d) The applicant must install an on-demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "Hot water recirculation" column of the table below.		✓	✓
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✓	✓	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✓	
(g) The pool or spa must be located as specified in the table.	✓	✓	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✓	✓	✓

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	Hot water recirculation	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
1.01	3 star	4 star	4 star	4 star	no	4 star	4 star	-	-	-	-	-	-	-
1.02	3 star	4 star	4 star	4 star	no	4 star	4 star	-	-	-	-	-	-	-

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	Hot water recirculation	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
1.03	3 star	4 star	4 star	4 star	no	4 star	4 star	-	-	-	-	-	-	-
1.04	3 star	4 star	4 star	4 star	no	4 star	4 star	-	-	-	-	-	-	-
1.05	3 star	4 star	4 star	4 star	no	4 star	4 star	-	-	-	-	-	-	-
1.06	3 star	4 star	4 star	4 star	no	4 star	4 star	-	-	-	-	-	-	-
1.07	3 star	4 star	4 star	4 star	no	4 star	4 star	-	-	-	-	-	-	-
1.08	3 star	4 star	4 star	4 star	no	4 star	4 star	-	-	-	-	-	-	-
1.09	3 star	4 star	4 star	4 star	no	4 star	4 star	-	-	-	-	-	-	-
1.10	3 star	4 star	4 star	4 star	no	4 star	4 star	-	-	-	-	-	-	-

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	Hot water recirculation	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
2.01, 2.02, 2.03, 2.04, 2.05, 2.06, 2.07, 2.08, 2.09, 2.10, 2.11, 2.12, 2.13, 2.14, 2.15, 2.16, 3.01, 3.02, 3.03, 3.04, 3.05, 3.06, 3.07, 3.08, 3.09, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 4.01, 4.02, 4.03, 4.04, 4.05, 4.06, 4.07, 4.08,	3 star	4 star	4 star	4 star	no	4 star	4 star	-	-	-	-	-	-	-

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	Hot water recirculation	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
4.09, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16														

	Alternative water source									
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection	Laundry connection	Pool top-up	Spa top-up		
1.01, 1.02, 1.03, 1.04, 1.05, 1.06, 1.07, 1.08, 1.09, 1.10	central water tank (no. 1)	See central systems	See central systems	yes	no	no	no	no		

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✓	✓	✓
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✓	✓
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✓	✓

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✓	✓
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✓	✓	✓
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must: (aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and (bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✓ ✓	
(h) The applicant must install in the dwelling: (aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below; (bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and (cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✓ ✓ ✓	✓
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✓	

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	central hot water system 1	individual fan, ducted to façade or roof	manual on / timer off	individual fan, not ducted	manual on / timer off	individual fan, ducted to façade or roof	manual on / timer off

Dwelling no.	Cooling		Heating		Artificial lighting						Natural lighting	
	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
1.01, 1.02, 2.01, 2.02, 3.01, 3.02, 4.01, 4.02	-	-	-	-	3 (dedicated)	0	no	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no
1.04, 1.06, 1.10, 2.04, 2.06, 2.11, 3.06, 3.11, 4.06, 4.11	-	-	-	-	1 (dedicated)	0	no	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no

Dwelling no.	Cooling		Heating		Artificial lighting						Natural lighting	
	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
1.03, 1.05, 1.07, 1.08, 1.09, 2.03, 2.05, 2.07, 2.08, 2.09, 2.10, 2.12, 2.13, 2.14, 2.15, 2.16, 3.03, 3.04, 3.05, 3.07, 3.08, 3.09, 3.10, 3.12, 3.13, 3.14, 3.15, 3.16, 4.03, 4.04, 4.05, 4.07, 4.08, 4.09, 4.10, 4.12, 4.13, 4.14, 4.15,	-	-	-	-	2 (dedicated)	0	no	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no

Dwelling no.	Cooling		Heating		Artificial lighting						Natural lighting	
	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
4.16												

Dwelling no.	Individual pool		Individual spa		Appliances & other efficiency measures							
	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	gas cooktop & electric oven	-	no	3.5 star	3.5 star	2 star	no	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.			
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.			
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✓	✓

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(g) Commitment (h) below, applies to the rooms or areas of a dwelling which are listed in the "Cross Ventilation" table below as comprising a breeze path for the dwelling.			
(h) The applicant must construct the dwelling so that at least one ventilation opening is provided in each such room or area. (If only one room or area of a dwelling is mentioned for a breeze path, then that room or area must have at least two ventilation openings).		✓	✓
(i) The two ventilation openings referred to in (h), must meet the following specifications: (aa) be located as specified for the breeze path in the table; (bb) not be more than 15 metres apart; (cc) if the dwelling is below the 10th storey of the building, be at least 1 square metre in size, or if the dwelling is on or above the 10th storey, be at least 0.5 square metres in size and be located above door head level in the room; and (dd) have only 1 doorway, or opening less than 2 square metres in size, located in the direct path between them.			

Dwelling no.	Thermal loads		
	Heating load (in mJ/m²/yr)	Cooling load (in mJ/m²/yr)	Corrected Cooling load (in mJ/m²/yr)
1.01	100.6	4.2	4.2
1.02	75.8	6	6.0
1.03	104.9	8	8.0
1.04	131.3	10.1	10.1
1.05	135.7	5	5.0
1.06	139.4	5.7	5.7
1.07	101.8	6.4	6.4
1.08	75	3.8	3.8
1.09	74.9	3	3.0
1.10	104.8	5.3	5.3
2.04	120.7	11.2	11.2
2.09	40.1	4.8	4.8
2.12	11.6	8.6	8.6
3.04	99.9	5.6	5.6

	Thermal loads		
Dwelling no.	Heating load (in mJ/m ² /yr)	Cooling load (in mJ/m ² /yr)	Corrected Cooling load (in mJ/m ² /yr)
3.09	40.5	4.8	4.8
3.12	118.6	8.6	8.6
4.01	75	14.3	14.3
4.02	43.1	60.2	60.2
4.03	81.3	57.3	57.3
4.04	100.7	20.5	20.5
4.05	104.9	12.8	12.8
4.06	122.3	30	30.0
4.07	66	4.4	4.4
4.08	55.8	11.7	11.7
4.09	54.6	10.1	10.1
4.10	65.1	4.4	4.4
4.11	118.6	30.2	30.2
4.12	124.5	20.4	20.4
4.13	115.5	60.6	60.6
4.14	76.6	53.1	53.1
4.15	53.9	26.8	26.8
4.16	62	10.6	10.6
2.01, 3.01	61.6	6.7	6.7
2.02, 3.02	40.4	9	9.0
2.03, 3.03	91	8.3	8.3
2.05, 3.05	96.5	3.2	3.2
2.06, 3.06	103.5	7.8	7.8
2.07, 3.07	52.7	1.6	1.6
2.08, 3.08	40.5	5.8	5.8
2.10, 3.10	51.8	1.5	1.5
2.11, 3.11	103.7	8.6	8.6

	Thermal loads		
Dwelling no.	Heating load (in mJ/m ² /yr)	Cooling load (in mJ/m ² /yr)	Corrected Cooling load (in mJ/m ² /yr)
2.13, 3.13	112.8	14.9	14.9
2.14, 3.14	65.7	17.5	17.5
2.15, 3.15	37.3	14.8	14.8
All other dwellings	47.2	4.7	4.7

	Cross ventilation			
Dwelling no.	Breeze path 1	Breeze path 2	Breeze path 3	Breeze path 4
All dwellings	-	-	-	-

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✓	✓
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✓	✓	✓
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✓	✓	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✓	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✓	✓
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✓	✓

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	3 star	4 star	4 star	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 1)	5000	To collect run-off from at least: - 1500 square metres of roof area of buildings in the development - 0 square metres of impervious area in the development - 0 square metres of garden/lawn area in the development - 0 square metres of planter box area in the development (excluding, in each case, any area which drains to, or supplies, any other alternative water supply system).	- irrigation of 220.5 square metres of common landscaped area on the site - car washing in 1 car washing bays on the site
Fire sprinkler system (No. 1)	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✓	✓
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✓	✓
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✓	✓	✓

Common area	Common area ventilation system		Common area lighting		
	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/BMS
Car park area (No. 1)	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	fluorescent	time clock and motion sensors	No
Lift car (No. 1)	-	-	fluorescent	connected to lift call button	No
Lift car (No. 2)	-	-	fluorescent	connected to lift call button	No
Lift motor room (No. 1)	ventilation exhaust only	thermostatically controlled	fluorescent	motion sensors	No
Garbage room (No. 1)	ventilation exhaust only	-	fluorescent	motion sensors	No
Plant or service room (No. 1)	ventilation exhaust only	thermostatically controlled	fluorescent	motion sensors	No
Ground floor lobby type (No. 1)	ventilation (supply + exhaust)	time clock or BMS controlled	fluorescent	time clock and motion sensors	No
Hallway/lobby type (No. 1)	ventilation exhaust only	time clock or BMS controlled	fluorescent	time clock and motion sensors	No
Hallway/lobby type (No. 2)	ventilation (supply + exhaust)	time clock or BMS controlled	fluorescent	time clock and motion sensors	No

Central energy systems	Type	Specification
Central hot water system (No. 1)	solar - gas boosted	Solar collector area (minimum, in square metres): 85 Piping insulation (ringmain & supply risers): (a) Piping external to building: R1.0 (~38 mm); (b) Piping internal to building: R1.0 (~38 mm)
Lift (No. 1)	geared traction with V V A C motor	Number of levels (including basement): 5
Lift (No. 2)	geared traction with V V A C motor	Number of levels (including basement): 5

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✓	✓
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✓	✓	✓
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✓	✓	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✓	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✓	✓
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✓	✓

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	3 star	4 star	4 star	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✓	✓
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✓	✓
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✓	✓	✓

Notes

1. In these commitments, "applicant" means the person carrying out the development.
2. The applicant must identify each dwelling, building and common area listed in this certificate, on the plans accompanying any development application, and on the plans and specifications accompanying the application for a construction certificate / complying development certificate, for the proposed development, using the same identifying letter or reference as is given to that dwelling, building or common area in this certificate.
3. This note applies if the proposed development involves the erection of a building for both residential and non-residential purposes (or the change of use of a building for both residential and non-residential purposes). Commitments in this certificate which are specified to apply to a "common area" of a building or the development, apply only to that part of the building or development to be used for residential purposes.
4. If this certificate lists a central system as a commitment for a dwelling or building, and that system will also service any other dwelling or building within the development, then that system need only be installed once (even if it is separately listed as a commitment for that other dwelling or building).
5. If a star or other rating is specified in a commitment, this is a minimum rating.
6. All alternative water systems to be installed under these commitments (if any), must be installed in accordance with the requirements of all applicable regulatory authorities. NOTE: NSW Health does not recommend that stormwater, recycled water or private dam water be used to irrigate edible plants which are consumed raw, or that rainwater be used for human consumption in areas with potable water supply.

Legend

1. Commitments identified with a "✓" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).
2. Commitments identified with a "✓" in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.
3. Commitments identified with a "✓" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled. (Note: a certifying authority must not issue an occupation certificate (either interim or final) for a building listed in this certificate, or for any part of such a building, unless it is satisfied that each of the commitments whose fulfilment it is required to monitor in relation to the building or part, has been fulfilled).

Appendix B: ABSA Certificate Lot 3

Assessor Certificate

Multiple Dwellings

Certificate Version 6.1. Prior versions not valid after 1 March 2006

Issued in accordance with
BASIX Thermal Comfort Simulation Method.



Assessor			
Name:	Frances Turrisi	Company:	Cundall – GAT & Associates
Address:	Level 7 657 Pacific Highway ST LEONARDS NSW 2065		
Phone:	8424 7000	Fax:	
Email:			
Declaration of interest:	None		
Client			
Name:	Paul Karantonis	Company:	Davidsgroup
Address:	Suite 1102 14 Kings Cross Road POTTS POINT NSW 2011		
Phone:		Fax:	
Email:			
Project			
Address:	60 Charlotte Street CLEMTON PARK NSW 2206		
Applicant:	LGA:		
Assessment			
Date:	17 Sept 08	File ref:	B 733
Software:	NatHERS		Version:
2.32b			
Documentation			

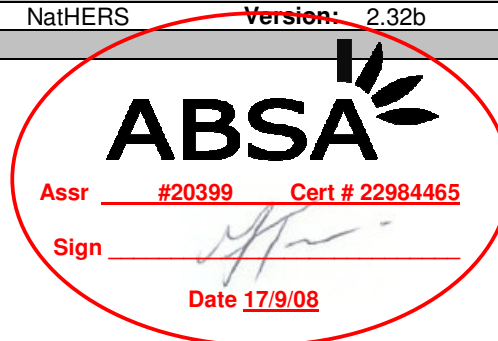
All details, upon which this assessment has been based, are included in the project documentation that has been stamped and signed by the Assessor issuing this certificate, as identified below:

Thermal Performance Spec:

Attached, Affixed to drawings Page#: DA 4.03

Drawings: (Title, Ref.#, Revision, Issue date, etc)
07033

Building Specifications: (Title, Ref.#, Revision, Issue date, etc)



ABSA Assessor Certificate		Assessor	20399	Certificate #	22984465	Issued:	17 Sept 08
Thermal performance specifications							Page 1 of 3
Unit number(s)	Certificate number	Floor area (M ²)		Predict. loads (MJ/M ² /y)		Concessions	Qualify for ventilation bonus
		Cond.	Uncond.	Heat	Cool (Sens & Lat)		
1.01	22984465	100	0	101	4		
1.02	77682263	121	0	76	6		
1.03	31853948	83	0	105	8		
1.04	77578438	57	0	131	10		
1.05	37680249	64	0	136	4		
1.06	54439585	57	0	139	6		
1.07	44981745	75	0	102	7		
1.08	64562133	81	0	75	4		
1.09	46678338	80	0	75	3		
1.10	73614863	58	0	105	6		
2.01 & 3.01	85770139	100	0	62	7		
2.02 & 3.02	76581619	121	0	40	9		
2.03 & 3.03	22972151	83	0	91	8		
2.04	77882131	57	0	121	12		
2.05 & 3.05	45378652	72	0	96	4		
2.06 & 3.06	99383488	57	0	104	8		
2.07 & 3.07	29731862	87	0	53	1		
2.08 & 3.08	68561141	81	0	40	6		
2.09 & 3.09	47442973	80	0	40	5		
2.10 & 3.10	56613133	90	0	52	1		

Assessor # 20399

Certificate # 22984465

Issued: 17 Sept 08

Thermal Performance Specifications

These are the Specifications upon which the Certified Assessment is based. If details included in these Specifications vary from other drawings or written specifications, these Specifications shall take precedence. If only one specification option is detailed for a building element, that specification must apply to all instances of that element for the project. If alternate specifications are detailed for a building element, the location and extent of alternate specifications must be detailed below and / or clearly indicated on referenced documents

Windows	Product ID	Glass	Frame	U value	SHGC	Area M ²	Detail
		Custom	Aluminium	4.03	0.38		To Units 4.02 & 4.03
		Custom	Aluminium	5.36	0.69		To Unit 4.13
		Custom	Aluminium	5.33	0.47		To Unit 4.14
		Custom single	Aluminium	6.672	0.712		To all other units
Skylights	Product ID	Glass	Frame	U value	SHGC	Area M ²	Detail
		Double glazed low-e	Aluminium			2.52	To units 4.04,4.05,4.06,4.11 & 4.12

Window and skylight U and SHGC values, if specified, are according to NFRC 100. Alternate products or specifications may be used if their U value is lower, and the SHGC value is less than 10% higher or lower, than the U and SHGC values of the product specified above.

External walls	Construction	Insulation	Colour – solar abs.	Detail
Concrete Block 190mm		R1.0	Medium SA 0.475-0.7	

Internal walls	Construction	Insulation	Detail
Brick plastered		None	

Floors	Construction	Insulation	Covering	Detail
Concrete		R2.0	Default	To units 1.03 & 1.04
Concrete		None	Default	To all other units

Ceilings	Construction	Insulation	Detail
Plasterboard		R3.0	To all Level 4 ceilings
Concrete		R3.0	To ceilings under terraces/balconies

Roof	Construction	Insulation	Colour – solar abs.	Detail
Metal deck		Foil (sisalation)	Light SA < 0.475	

Window cover	Internal (curtains)	External (awnings, shutters, etc)
Default		As per plans

Fixed shading	Eaves (width - inc. gutters, h't above windows)	Verandahs, Pergolas (type, description)
Varies 0		As per plans

Overshadowing	Overshadowing structures	Overshadowing trees

Orientation, Exposure, Ventilation and Infiltration

Orientation of nominal north:	345
Terrain category:	Suburban Open-Level 4
Roof ventilation:	Unventilated
Cross ventilation:	Standard
Subfloor:	Enclosed
Living area open to entry:	Yes
Doors separate living areas:	Yes
Stair open to heated areas:	No
Seals to windows and doors:	Yes
Exhaust fans without dampers:	No
Ventilated skylights:	No
Open fire, unflued gas heat:	No
Vented downlights:	No
Wall and ceiling vents:	No

ABSA Assessor stamp

