

PLANS AND DOCUMENTS
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SUSTAINABILITY REPORT

STAGE 1 PROJECT WATERS FORTITUDE VALLEY

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Revision 5

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1 SUMMARY

The sustainability report has been prepared on behalf of the Metro Property Development Pty Ltd and Bureau Proberts Architects to document and demonstrate the sustainability features for Stage 1 of the Project Waters, located on the corner of Water Street and Brunswick Street, Fortitude Valley. The report seeks to identify how the development will meet and exceed the sustainability requirements of the ULDA by demonstrating compliance with the Brisbane City Guidelines for sustainability and development and have addressed each of the fifteen principles within the guidelines.

In providing our assessment, we have taken a conservative approach to the individual items and believe that additional items will be incorporated into the final design throughout the design and development process.

During design team meetings a number of sustainable items have been specifically targeted including reduced energy consumption, increased water efficiency, residential cyclist facilities, access and amenity and development of a safe and diverse community.

The report clearly demonstrates that the proposed development successfully meets and responds to each of the Brisbane City Council's Fifteen Principles for Sustainable development in a number of different ways.

- Established agreed sustainable design values
- Applied integrated and collaborative design and construction process
- Design for our sub tropical pace
- Protect and restore the natural eco-systems
- Utilise land appropriately
- Integrated water management
- Manage energy use
- Select appropriate building materials
- Manage waste
- Consider cost efficiency
- Create healthy indoor environment
- Support green transport
- Development adaptable buildings and spaces
- Build a safe and diverse community
- Inform the end owner and user

2 BACKGROUND

Environmental responsibility has become increasingly more important to both responsible developers and users.

The property industry is well placed to deliver significant long term environmental improvements using a broad range of measures. More importantly, it is unique in that it can directly influence and create behavioural changes at all stages to of the supply chain. However, there are inherent barriers within the industry that often occur to ensure that efficient measures are not adopted, despite the fact that a strong business case can be made for their implementation. Most significantly, these barriers relate to the developer/contractor/owner divisions or split incentives that often result in the benefit of efficiency or improved performance measures not accruing to the party that initiated them.

The ULDA and BCC have a strong focus on creating a more socially and environmentally sustainable city and the Council's Guidelines for Sustainable Development demonstrate this commitment. The importance of planning for sustainable outcomes is reinforced through the 15 Principles for Sustainable Development, various management plans and implementation strategies.

On state and national levels, ESD is encouraged through a range of different documentation from mandatory regulation down to guiding principles, including the Queensland Development Code and the BCA Energy Efficiency provisions.

Sustainability initiatives are also encouraged through Environmental Rating tools such as Green Star and BERS energy rating schemes. Of particular relevance to building development is the Green Star suite of tools produced by the Green Building Council of Australia.

2.1 IMPORTANCE OF SUSTAINABILITY

The integration of sustainability as a valuable and fundamental consideration in the planning and design process recognises that quality of life, ecological services and economic progress are not independent of each other and achievement in one area cannot be at the expense of the others.

Current consumption patterns utilise finite resources and have resulted damage to our environmental support systems which cannot continue indefinitely, the use of recycled materials, renewable resources and reduction of ongoing energy and resource requirements are essential for sustainable growth.

Of the gases emitted into the atmosphere by human activity which contribute to global warming, the most significant is carbon dioxide (CO₂). Together with water vapour, methane, nitrous oxide and ozone, CO₂ contributes to maintaining the earth's 'greenhouse' effect, in which these atmospheric compounds trap most of the heat radiating from the earth's surface, keeping the surface temperature warmer than it would be otherwise. Human activity has increased the level of carbon dioxide from the 1750 pre-industrial level of about 280 parts per million (ppm) to around 380 ppm today and thus has also increased the global temperatures by 0.8°C with another 0.6°C in the pipeline.

CO₂ emissions are rising at an increasing rate. A May 2007 study found that the annual growth in global CO₂ emissions caused by human activity jumped from an average 1.1 per cent for 1990-1999 to more than 3 per cent for 2000-2004. The growth rate since 2000 is greater than for 'business as usual', the most fossil fuel intensive of the International Panel on Climate Change (IPCC) emissions scenarios and 'no region is decarbonising its energy supply' (Raupach et al. 2007).

Traditional building and development projects also contribute to climate change through tree clearing for land, resource use for construction and maintenance and emissions from transport of building occupants to and from other necessary services (school, shops, entertainment, etc). By recognising these links and accounting for them in the development phase, many of these factors can be significantly reduced or eliminated through better planning and design decisions.

3 PRINCIPLE 1 – ESTABLISH AGREED SUSTAINABLE DESIGN VALUES

Project Concept and Design

Sustainability has been well thought through from the initial concept phases of the project starting with the chosen site being an elevated site through building orientation to minimise solar heat gains and incorporation of water saving features throughout the initial design process.

Integrated Design

Sustainability has remained a high importance item on the agenda of every design team meeting, incorporating many diverse forms such as discussion of the residential cyclist facilities that are required. Reduction in energy use through passive solar design through to the landscaping in order to ensure that there is a healthy living environment for the occupants of the building as far as sufficient landscaping to help treat stormwater and thereby increase the water quality discharged to the local stormwater system.

Communication Engagement the Design Team Council Community and End Users

A sustainability consultant has been engaged for the project with sustainability workshops having commenced through the initial and schematic phases of design through to the DA phase the project and will continue during the design development stages of the project.

Building manuals will be prepared to highlight the end users and the building manager the design principles incorporated into the building. This will allow the building to operate as per the design intent after building handover and many years into the future when future building managers have been commissioned to look after the building and initial knowledge training of the building sustainable features may have been lost.

4 PRINCIPLE 2 - APPLYING INTEGRATED AND COOPERATIVE DESIGN AND CONSTRUCTION PROCESS

Design Team

Sustainability has been high on the agenda of each and every design team meeting with clear outcomes being defined and the concept stage of the project. In order to clearly define the required targets it was agreed amongst the design team to adopt the Brisbane City Council guidelines for sustainable development and assess the building against the 15 principles contained within.

Design Materials

Design materials have been drastically reduced during the early phases of the design and documentation process via the electronic issue of drawings in PDF format. Where necessary, drawings and documents have been reproduced on paper at the smallest size possible using recycled paper where available. Design team minutes and other documents have also been circulated electronically in order to reduce the amount of paper required during the documentation phase of the project.

5 PRINCIPLE 3- DESIGN FOR A SUB-TROPICAL PLACE

Site Analysis

The site is within the Mixed Use Zone of the Water Street Precinct of Bowen Hills ULDA. The preferred uses in the precinct are:-

- Community facilities
- Food premises located at ground level
- Home based businesses
- Indoor sport recreation entertainment
- Multiple residential
- Office
- Other residential
- Shop where located at ground level and not exceeding 250 sq m of GFA
- Service industry not exceeding 250 sq m of GFA

The site contains a multi level residential development on a slightly elevated site on the corner of Brunswick Street and Water Street with good access to breezes throughout the apartments. Access from surrounding streets is very good with strong connections to local bus routes with easy pedestrian access. Currently there exists a Drill Hall on site which is believed to be listed as a heritage building. In future the development proposes to integrate the use of the Drill Hall into the overall site planning to provide recreational facilities for local residents and members of the community.

The development opens onto both Water Street and Baxter Street extension with retail outlets on ground floor. Apartment balconies overlook these areas providing good views of the streets and improving casual surveillance of the site.

Stage one of the development has the majority of units orientated to the north and south therefore minimising the exposure to the harsh east and western sun. The majority of the glazing is on the north and south sides of the building and is generally protected via the balconies and their overhangs. The site is currently a carpark with limited vegetation. Varied landscaping will be provided as part of the development to enhance to overall appearance and amenity of the development.

The site is currently entirely built on and as a result the development will not result in a significant clearance.

Built Environment

Balconies with large overhangs are provided to the majority of the individual apartments from the living areas, sharing some external space which can be opened and closed to the outdoor environment enabling tenants to passively control the temperature in the apartments according to the seasons. The balconies are connected directly to living areas, enhancing the feel of indoor/outdoor living areas. The ability to open up the living areas to the apartments will also maximise the ability of the apartment to self regulate its temperature by capturing the natural breezes and daylight. This will further enhance the provision of good natural ventilation to the development. Varied landscaping is used throughout the project in order to provide communal outdoor living areas via the use of varied materials, soft landscaping and differing building lines. High ceilings are proposed to each of the apartments with the aim to provide 2600 clear head height in the living areas of the apartments to enhance the temperature control and lighting within the apartment.

The building has two distinct entrances, the pedestrian entrance being a clearly designated lobby/entrance from Water Street with the car entry from the Baxter Street extension. Carparks have been provided for the apartments within the building basement thus limiting the visual impact on the surrounding areas.

Rainwater will be collected from the roof and stored on site in order to provide irrigation to the local landscaping and water for toilet flushing.

The external building envelope will be highly insulated in order to protect the internal envelope and in order to minimise heat gains and losses throughout the seasons. Suitable glazing will also be selected in order to minimise solar heat gain on the windows where exposure to the sun occurs.

The frontage to both Water Street and the Baxter Street extension have also been activated with the provision of small retail outlets at ground floor level.

6 PRINCIPLE 4 – PROTECTION AND RESTORING NATURAL ECOSYSTEMS

Protecting and Restoring Ecological Processes

The site is currently covered by on grade carparking with limited vegetation. The proposed development will enhance local ecological processes by providing significant additional landscaping and minimising clearance within the site.

During the construction phase of this development, the developments footprint will be minimised by the implementation of adequate erosion and sediment controls.

Biodiversity

The development incorporates the major elements of water sensitive urban design including rainwater harvesting, use of efficient fixtures and fittings, use of efficient irrigation systems and via the treatment of stormwater as described in the Stormwater Management Plan. Landscaping will also be used to significantly reduce the pollutants within stormwater prior to discharge to the stormwater system.

New street trees and deep bed planting will be provided to the development. A body corporate structure has also been set up to protect the onsite ecological processes that will be incorporated into the design of the development.

Landscape Design

Potable water consumption for landscaping has been reduced via the use of rainwater collection for irrigation purposes and drip irrigation systems that will be controlled via automatic timers. The evaporation of irrigated water will also be minimised by the use of suitable organic and pebble

mulches along with soil moisture retention agents. Landscaping will also be irrigated via the stormwater runoff at podium level. High water usage species will be minimised within the landscaping. The public spaces to the development will be shaded via large overhangs to the ground floor area providing comfortable seating areas. The private podium to the development will also contain shaded barbecue areas for public/private spaces.

Scenic Amenity

The development will provide good views and vistas of Breakfast Creek, Newstead, the Brisbane River, the RNA Exhibition Grounds and views to Moreton Bay.

The proposed development will incorporate a clearly defined pedestrian entry off Water Street frontage environment with retail facilities adjacent. This in conjunction with street trees on both sides of the development will activate the street frontage and enhance the amenity of the development.

7 PRINCIPLE 5 – UTILISE LAND APPROPRIATELY

Transport Integration

The development is situated within easy reach of numerous bus stops and train stations with easy access to the public transport network serving Fortitude Valley.

Pedestrian networks are extensive within the development with a high degree of shading provided.

Extensive bike parking is also provided for both residents and visitors.

Site Planning and Analysis

The balcony areas together with the sliding doors to the adjoining living areas provide maximum access to both daylight and breezes.

The podium level external recreation facilities (BBQ and landscaped gardens) have been positioned on the desirable north eastern side of the residential tower to take advantage of the Brisbane subtropical climate.

Ample bicycle (approximately 177 parks) is provided within the development for residents to further encourage the use of alternative means of transport. The total number of bicycle parks is made up from 142 internal and 33 external spaces.

The methodology that will be implemented during the construction phase will be undertaken in accordance with a Standard Environment Management Plan.

The site will provide a communal podium throughout the majority of the development providing safe pedestrian access throughout the mixed use site and to the leisure facilities located within the Drill Hall.

Contamination

Any public spaces will not include contaminated land. Any contamination found in other areas of the site will be suitably dealt with. The site will be fully secured during the construction process with all waste materials being secured within the site.

8 PRINCIPLE 6 – APPLY INTEGRATED WATER MANAGEMENT

Integrated Water Management Strategy

In order to reduce potable water consumption, the development incorporates rainwater harvesting, stormwater treatment and water efficient fixtures and appliances.

Blackwater and greywater treatment systems are very expensive to design and implement and are generally not suitable for a project with an affordability focus. These systems have therefore been excluded from this project in order to remain affordable.

Rainwater Collection and Reuse

A tank with a minimum capacity of 25kL will be provided for the capture and reuse of rainwater. The captured water will be pumped from the basement tanks as required.

Condensate from air conditioning fan coil units will be collected and discharged into the rainwater downpipes for collection in the storage tanks for reuse.

Stormwater

The site is currently covered by on grade carparking with nearly the entire extent of the site contributing to stormwater run off.

The proposed development will drastically reduce the extent of impervious surfaces over the site, such that post development flows will be reduced when compared to pre-development stormwater flows. Stormwater will also be treated via landscaping and permeable pavements.

Landscape Design

New street trees and 'sub-tropical' planting in Water Street are proposed. Individual Street Tree Plantings in tree grates are proposed for Baxter Street Extension to allow vehicle and pedestrian use of this street.

Soft landscaping will provide screen planting in raised planters to terrace perimeter. Sub-tropical planting throughout the podium is proposed to link with the BCC Precinct plant theme.

Deep rooted trees will be provided in the footpaths.

There are no areas of lawn incorporated in the development thus reducing the need for excessive irrigation. Refer to the Landscape Concept Plans prepared by Latitude 27.

Areas vegetated with species that will require irrigation, will be provided with automatic sub-soil drip irrigation systems complete with rain sensors and time clock control.

Water Efficient Fittings and Appliances

Aerators will be provided in all taps.

Dishwashers with a minimum 4 Star WELS rating and tapware with a minimum 6 Star WELS rating will be used throughout, with the exception of showers which will have a 3 Star WELS rating incorporating a 7.5 L/min flow restrictor.

9 PRINCIPLE 07 – MANAGE ENERGY USE

Hot Water Systems

A central gas fired hot water plant will be installed avoiding high consumption, resistive electric hot water heater.

Hot Water Systems Location

The roof mounted hot water distribution system will be designed such that two vertical mains are installed in dedicated hydraulic risers located in close proximity to apartment wet areas to minimise the length of horizontal branches (dead legs) and therefore hot water wastage. The dual hot water risers reduce the length of dead legs by approximately 40 percent. A hot water recirculating system in

conjunction with limited heat trace will also be implemented to further improve the energy efficiency of the system. All hot water pipework will be insulated.

Passive Design

The passive design of the development will ensure that a minimum BERS rating of 4.5 stars is achieved for all apartments.

The majority of apartments have been orientated to face north/south, with the remaining apartments sized to provide minimum exposure to the east and west.

The building facade will incorporate light colours on prefinished panels. Metal panels will have a factory metallic rather than matt finish, whilst masonry will be pre-coloured and smooth, all to increase reflectance and reduce solar absorption.

Ceilings within the apartments will be predominantly at 2600 mm maximising head height with clear lines from the balcony areas back in to the apartment. This additional height has been maintained to the project to provide greater natural ventilation opportunities. This will also allow for the provision of ceiling fans.

The balcony areas in all apartments can be opened up or fully enclosed to permit residents the opportunity to control the balcony and living areas via the provision the breeze or sunlight as required.

Minimum exposure to western sun has been designed into the building with future stages providing additional shading to the Western side.

Concrete construction of not only floors but extensively for walls as well has provided thermal mass for the stabilisation of internal temperatures. Insulation will be provided as required to achieve the desired BERS rating.

Many of the glazed elements contained within the facade are provided with a combination of sun shading elements to assist with the weather protection of the building.

Heating and Cooling

The development will be served by energy efficient inverter driven split units. This ensures that the capacity of plant being required to operate at any particular time is accurately matched to the cooling demand ensuring high energy efficiency of the system when operating at part load conditions.

In addition, all air conditioning equipment will comply with the minimum energy performance requirements set out in the Building Code of Australia.

Air cooled has been selected for the development to eliminate the requirement for cooling towers and to minimise water consumption.

Apartments will be provided with individual temperature controls for each room/space.

Each retail tenancy will also be provided with a dedicated air conditioning system for individual temperature control.

Thermal Performance Rating System

The thermal performance of the apartments will be modelled and rated using BERS.

Under the Queensland Development Code, the development is required to achieve a minimum BERS rating of 4.5 Stars for any individual apartment and an average apartment BERS rating of 5 Stars for the entire development. The design team anticipates a significant improvement on these minimum standards.

Energy Efficient

At least 80% (eighty percent) of the lamps installed in the residential apartments will be energy efficient, having a minimum efficiency of 27 lumens/watt to meet the requirements of Part 4.1 of the Queensland Development Code (QDC).

All common area lighting (internal and external) will utilise energy efficient lamps such as fluorescent, compact fluorescent, LED or metal halide.

The control of common area lights will be automated using as a minimum, photoelectrical switches, time switches and motion sensors to minimise the energy consumption.

Two-way switching will be provided within the apartment where appropriate. All rooms within apartments will be locally switched.

Daylighting

The architectural design of the balcony will assist in the glare reduction into the apartments. The apartment layouts are designed with living and bedroom areas adjacent to the facade to maximise the daylight infiltration.

10 PRINCIPLE 8 – SELECT APPROPRIATE BUILDINGS MATERIALS**Local Materials**

Selection of materials and services will be investigated with in the Design Development stages taking into consideration the availability of local supply.

Renewable/Recycled Materials

Renewable and recycled materials will be incorporated into the project, however, as a minimum, the following will be included.

Steel reinforcement will contain a minimum post- consumer content of 60%.

Concrete will contain a minimum cementations amount of 25% of industrial waste products (fly ash) as a substitute for Portland cement.

Embodied Resources

A construction waste management plan that addresses the demolition and construction phases of the development will be prepared to maximise recycling of materials during construction and hence helping to reduce the overall embodied energy within the building.

The reduction of the use of Portland Cement as described above will also help this reduction.

Manufacturing Process

The proposed design incorporates and utilities materials and products from manufacturer's standard ranges to the maximum extent possible.

PVC Minimisation

The use of PVC materials will be minimised where practical. This will be achieved in line with Green Star principles for PVC minimisation.

11 PRINCIPLE 09 – MANAGE WASTE

Waste Management Plan – Construction, Operation and Demolition

A construction waste management plan that addresses the demolition and construction phases of the development will be prepared in order to recycle construction waste and divert it from land fill.

Construction and Demolition

The demolition contractors will be required to report on the reuse and recycling of the demolished materials when they clear the site.

The waste management plan will require that monthly waste reports are generated identifying the percentage of construction waste that is recycled and the percentage that goes to landfill. The minimum target for recycling of construction waste is 80%. This will be achieved by dedicated recycling bins for wood, concrete, steel and general waste.

Operation

The management of waste during the operational phase of the development will be in accordance with the Waste Management Procedures to be developed and incorporated within the Handover Manuals issued to the individual apartment owners and the Operating and Maintenance Manuals issued to the Body Corporate.

Specific refuse facilities are set aside in ground level for recycling of waste, which are readily accessible to all occupants via the lifts.

Recycle bins for comingled recyclable waste are provided on every level of the development and a refuse chute is providing for general waste.

These facilities and operational procedures will be incorporated in the Waste Management Procedures to be developed and incorporated within the handover Manuals issued to the individual apartment owners and the Operating and Maintenance Manuals issued to the Body Corporate.

The main refuse room is located in close proximity to the loading dock on ground level from where waste will be collected. This area is completely separated from the residential apartments to avoid any odour/noise issues.

Insinkeratorators will not be installed in the development.

12 PRINCIPLE 10 – CONSIDER COST EFFICIENCY

Life Cycle Assessment

During the design/development phase, a life cycle cost analysis will be performed on the major building elements, including the services. It is anticipated the lifecycle analysis will provide an efficient solution for both construction costs and in giving operation costs.

Cost Efficiency in Construction

Products from manufacturer's standard modules and ranges will be utilised to the maximum extent possible in order to keep purchase costs low. In addition the design philosophy is to standardise the designs and layouts of apartment types to increase the degree of repeatability and efficiency.

Selection of materials and services will be investigated within the design development stages taking into consideration the availability of local materials.

Materials have been selected to maximise the opportunity for recycled content or utilisation of waste product as part of its production to maximise the cost efficiency of construction.

Operation Costs

Rainwater harvesting will be implemented along with the use of energy efficient chilled water air conditioning systems, hot water systems, light fitting, appliances, etc to reduce both water and energy consumption.

The building facade will be clad in a variety of materials with long life spans to reduce maintenance costs during the life of the building.

Suitable insulation will also be provided to reduce heating and cooling costs. The majority of exterior materials will be self finished to reduce ongoing costs.

13 PRINCIPLE 11 – CREATE HEALTHY INDOOR ENVIRONMENTS

Natural Lighting/Glare Control

Balcony projections will minimise heat and glare penetration to the apartments to those northern facing areas in the hotter summer months. The building has been orientated to minimise eastern and western glazing, the primary contribution to excessive heat and glare. Internal apartment layouts are designed to position habitable areas with greatest access to daylight.

Natural Ventilation

There are a number of corner units per floor providing the opportunity to achieve cross ventilation through adjoining living and sleeping areas. Remaining units will also have multiple openable windows to the external facade to allow for good natural ventilation.

Access to Outdoors

The majority of apartment layouts incorporate open plan kitchen/living areas which link to the outdoors via the balcony spaces.

All habitable rooms within the apartments are provided with windows.

The entry into the carpark at Ground level is located off the proposed extension to Baxter Street, well removed from the apartments and pedestrian thoroughfares so as not to impact on their use of natural ventilation.

The balconies provided to the apartments are flexible and have the ability to be opened up to the exterior, linking through to the living areas via sliding doors, providing a desirable indoor-outdoor connection. Other apartments are provided with generous glazing to maintain this feel of linking the exterior and for ventilation purposes.

The elevation of most of the units above the podium level contributes to the reduction in noise from activities in the immediate surrounds. Suitable glazing and screening will also enhance the noise reduction to the apartments.

Indoor Air Pollutants

Low VOC paints, adhesives, floorings, etc will be specified during the design process for the construction of the building.

Hard floor finishes will be used throughout the apartments, with the possible exception of the living rooms and bedrooms.

Where feasible, mechanical fixings will be incorporated during the design process for the construction of the building.

14 PRINCIPLE 12 – SUPPORT GREEN TRANSPORT

Pedestrian and Cycle Networks and Facilities

A total of 177 dedicated secure bicycle storage spaces will be provided within the carparking levels of the development.

Accessible pedestrian access from the Water Street frontage through the main entry foyer and the lift lobby is provided. There are accessible (PWD) carpark spaces provided on the basement level carpark. Accessible lifts are provided serving all levels of the development ensuring that people with disabilities have full access to all communal facilities. The common site podium will provide suitable access throughout the development including access to the recreational facilities located within the Drill Hall.

Public Transit Stops

The development is situated within easy reach of numerous bus stops and train stations with easy access to the public transport network serving Fortitude Valley.

Pedestrian networks are extensive within the development with a high degree of shading provided.

Extensive bike parking is also provided for both residents and visitors.

15 PRINCIPLE 13 – DEVELOP ADAPTABLE BUILDINGS AND SPACES

A communal pool and recreation area with an adjoining covered area with fitness facilities will be provided on the north-eastern side of the site within the Drill Hall providing ideal casual surveillance opportunities from the various users. The landscape design and plant selection is based on providing both shade (via trees and pergola structures) and clear sight lines. Clean trunk native trees will form the basis of the higher canopy while allowing surveillance throughout the landscape with low grasses and groundcovers forming a matting texture to the garden surface. Fencing details will allow a minimum of 50% transparency.

The Podium BBQ area will be afforded shade from the pergola.

The proposed development will comply with the appropriate guidelines.

The development incorporates a gymnasium, swimming pool and associated landscape and terrace, and BBQ facilities, providing residents with numerous locales and opportunities for social interaction and a sense of community. A ground floor café/retail area with shaded areas will also be provided.

Car movements are entirely restricted to a single entry/exit off Baxter Street and do not impact upon pedestrian/resident movements (off Water Street) between their apartments, the retail outlet(s) and the communal areas located on the ground level above.

Internal Universal and Safe Design

Thermostatic mixing valves will be incorporated into the hot water system to prevent scolding.

A child proof cupboard for all household cleaners, poisons and medications will be provided in the Laundry.

Slip resistant flooring will be provided throughout the common areas and apartments where tiled.

Security lighting will be provided to all common areas (eg carpark, lift lobbies, corridors, etc) to provide safe access for residents after hours and to enhance casual surveillance.

There are no apartment recreation areas or communal facilities located in the vicinity of the carpark entry minimising dangers to occupants from car/van movements.

The community pool within the Drill Hall recreational facilities will be provided with appropriate fencing and gate in accordance with statutory requirements. Adjacent to the pool is the BBQ facility incorporating amenities, seating and shade. BBQ facilities will also be provided to the building podium.

Services

The development will incorporate multiple underground conduits to permit telecommunication connections by a number of different service providers. A dedicated communications riser cupboard will be provided within the tower with provision for various communications infrastructure back bone cabling systems.

16 PRINCIPLE 14 – BUILD A SAFE AND DIVERSE COMMUNITY

Social Connectivity and Diversity

The communal facilities described above including the landmark Drill Hall, together with the Retail Zone fronting Water and Baxter Streets will combine to create numerous locations and opportunities for social interaction.

Public Safety- Crime Prevention Through Environmental Design (CPTED)

On the ground floor, the retail zone and pedestrian entry, combined with the residential entry lobby lounge, provide ideal casual surveillance opportunities for those entering and leaving the site/building.

In addition, the podium level outdoor recreation areas are creating a further elevated communal gathering spaces and casual surveillance opportunities.

The landscape design and plant selection is based on providing both shade (via trees and pergola structures) and clear sight lines.

The street frontage of the development at ground floor is primarily comprised of the retail zone shop fronts, permeable and solid walls, presenting little or no opportunity for concealment. Furthermore, these faces incorporate a mixture of materials and finishes which deter graffiti and vandalism.

Pedestrian entry to the site will be via an "Access Controlled" residential lobby located off Water Street, minimising the risk of vandalism and entry by unauthorised persons. In a similar manner, vehicular entry into the carpark will be via "Access Controlled" roller doors.

Clear information, directional and way finding signage will be installed on the site for residents and visitors alike.

Personal Safety and Security

A child proof cupboard for all household cleaners, poisons and medications will be provided in the laundry. In addition, high level cupboards will also be provided in the kitchen for the storage of potentially harmful household items.

Where required, slip resistant flooring will be provided.

Security for residents is provided by an access control system and a closed circuit for television (CCTV) system.

Access to residential floors is controlled via card readers installed at the main residential entry doors to the central entry lobby, and in the lift car entrances.

Access to the carpark is controlled via card readers installed on the entry/exit roller shutters.

Furthermore, an audio intercom system will ensure that only welcome visitors are provided access to the appropriate areas.

Valued Features

The orientation of the residential building development provides various view cones/corridors and in particular, Breakfast Creek to the North, the Brisbane Exhibition Grounds and the CBD to the South, Newstead and the Bulimba Reach of the Brisbane River to the East, and Mt Coot-tha and beyond to the West. The development also makes use of the old Drill Hall, a significant Heritage feature of the site for a communal leisure facility.

Equitable access is provided to the main residential building entry and common public facilities are throughout the site via a common podium. Strong pedestrian links are also provided to the existing community and access to the local facilities within Fortitude Valley.

17 PRINCIPLE 15 – INFORM THE END OWNER AND USER**User Guide/Body Corporate Induction**

A building user's guide or operation and maintenance manual will be provided to the Body Corporate and On Site Manager. All apartment and Retail Owners will receive a User's Guide noting the sustainable features and how they are to operate and to be maintained for their particular unit or tenancy

This will help to ensure that the building continues to operate in the manner intended by the original designers after a change in ownership of Building Manager.

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1. The first part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation

$$f(x) = \int_0^x \frac{1}{1+t^2} dt$$

It is well known that this function is the arctangent function, i.e. $f(x) = \arctan x$. The first part of the paper is devoted to the study of the properties of this function, particularly its monotonicity and concavity.

2. The second part of the paper is devoted to the study of the function $g(x)$ defined by the equation

$$g(x) = \int_0^x \frac{1}{1+t^4} dt$$

It is well known that this function is the arctangent function, i.e. $g(x) = \arctan x$. The second part of the paper is devoted to the study of the properties of this function, particularly its monotonicity and concavity.

3. The third part of the paper is devoted to the study of the function $h(x)$ defined by the equation

$$h(x) = \int_0^x \frac{1}{1+t^6} dt$$

It is well known that this function is the arctangent function, i.e. $h(x) = \arctan x$. The third part of the paper is devoted to the study of the properties of this function, particularly its monotonicity and concavity.