












Built Ecology

# CENTRAL PARK BLOCK 4S – STUDENT ACCOMMODATION

Ecologically Sustainable Development Strategy  
Concept Report

18/12/2012

# Quality Management

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# Central Park

## Block 4S – Student Accommodation

### Ecologically Sustainable Development Strategy Concept Report

18/12/2012

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# Executive Summary

Block 4S forms part of the Central Park Development in Chippendale, Sydney.

The Central Park Development master planning approach targets a number of site wide initiatives unique at a precinct scale, providing opportunities for ecologically sustainable development (ESD) initiatives unavailable to a standalone residential, commercial or retail developments. Central to this philosophy has been the development of a Central Thermal Plant (CTP) to cater for the precinct's thermal load, which is in contrast to a traditional building-by-building (decentralised) thermal plant solution.



Since the outset of the design of the Central Park Development, several studies had been compiled in order to determine the optimum CTP configuration. Outcomes from these studies established that a trigeneration system, with the benefit of thermal storage, provided significant added value for the development in terms of environmental performance. This benefit can be quantified by an improved greenhouse gas (GHG) emissions factor associated with the thermal energy supplied by the CTP when compared to conventional gas (25% lower) or electricity (85% lower) systems.

Another site wide initiative unique to the Central Park Development is the construction of a new four-level basement water centre known as the Recycled Water Treatment Plant (RWTP). The plant will treat 100% of the precinct wastewater and will supply recycled water to the CTP and most buildings/blocks within the precinct.

Block 4S, on the western boundary of Central Park, is to be developed as student accommodation and is the focus of this report.

The ESD initiatives to be implemented for the building include:

- Connection to the CTP to meet the comfort cooling, space heating and domestic hot water (DHW) heating demands: It is expected that this will provide significant environmental benefit through GHG emissions savings (see above);
- If additional capacity is provided within the Central Thermal Plant, then there maybe the potential opportunity to utilise this energy within Block 4S
- Connection to the RWTP for wastewater treatment and recycled water supply: All wastewater from Block 4S will be treated by the RWTP. Recycled water will be supplied to the block for non-potable water uses, such as sanitary flushing, laundry use and irrigation;
- Meeting the Deemed-To-Satisfy (DTS) Provisions of Part J1 Building Fabric and Part J2 Glazing of Section J Energy Efficiency of the National Construction Code (NCC) 2012;
- Demonstrating alignment with the BASIX energy and water efficiency benchmark targets. Fittings, fixtures and appliances have been specified, where provided, to maximise water and energy efficiency. Connection to the CTP and RWTP further improves the water and energy efficiency of the building; and
- As required by the Central Park Concept Plan, the project meets the principles of a 5 star Green Star rating: due to the space use of the building (Class 3) the building does not meet the eligibility criteria of any pre-existing Green Star tools. Therefore, in order to demonstrate the sustainability aspirations of the project, a 5 star Green Star “principle led” pathway using the Green Star Multi Unit Residential v1 tool has been established to support the application of ESD initiatives across a full range of environmental categories.
- This report addresses the relevant Director General’s Requirements (DGRs) issued for this project.

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# 1 Project Background

Frasers Property Australia's mission is to set a new benchmark in quality accommodation developments. Constantly scouring the world for innovative design or technological initiatives to bring to local markets, and interpreting new concepts for local conditions, Frasers work with the very best international and local award-winning architects and designers.

Frasers, in joint venture with Sekisui House may have a long term interest in this student accommodation facility. Frasers is committed to the success and suitability for the whole life cycle of each of its developments.

Every Frasers development has a specific focus on high quality design, sustainability, and community engagement to ensure that each development enhances the economic, social, and environmental attributes of its local community. Development sites are specifically chosen to enable active transport by its residents, with attributes including secure bicycle storage, and close proximity to public transport hubs, walking paths and amenities.

The Frasers development at Abercrombie St, Central Park comprises of fourteen (14) storeys and includes residential accommodation for 823 students, a variety of communal recreation, dining and study facilities, rooftop terraces, administration facilities, ground floor retail and a basement Central Park precinct-wide central thermal plant tri-generation plant. These areas have been classified in accordance with Part A3 of the Building Code of Australia (BCA) 2012 as follows:

- Student Accommodation Areas on Levels 00-14 classified as Class 3;
- Retail areas on Level Gnd and 00 classified as Class 6;
- Basement carpark and motorbike parking are class 7a and the basement plant rooms are ancillary to 7a;
- Storage in basement is class 7b; and
- Push bike store is ancillary to main class of the storey it is located in.

Block 4S will be designed with ESD considerations incorporated into the design and operation of the building and will take advantage of the site wide services provided at Central Park, namely the Central Thermal Plant (CTP) and Recycled Water Treatment Plant (RWTP).

## 2 Sources of Information

- Architectural layouts provided by Foster + Partners dated 17<sup>th</sup> December 2012
- NCC 2012;
- GBCA Green Star rating tool and technical manual for Multi Unit Residential Design v1; and
- The BASIX online rating tool.

## 3 Objective

The objective of this report is to provide an overview of the ESD strategies that will be employed for the Block 4S student accommodation. The following ESD initiatives will be discussed:

- Connection to the CTP to meet the comfort cooling, space heating and domestic hot water (DHW) heating demands;
- Connection to the RWTP for wastewater treatment and non-potable water supply;
- Meeting the solar access "rules of thumb", as prescribed by the Residential Flat Design Code (RFDC);
- Demonstrating compliance with Parts J1 and J2 of Section J of the NCC 2012
- Demonstrating alignment with the BASIX energy and water benchmark targets; and
- Demonstrating the project meets the principles of a 5 star Green Star rating.

## 4 CTP Connection

The CTP being constructed at Central Park has been designed to supply chilled water (CHW) for comfort cooling, and heating hot water (HHW) for space and domestic hot water (DHW) heating.

The CTP has been optimised to reduce energy and water consumption through the inclusion of a tri-generation system that will reduce reliance on the electricity grid and the utilisation of recycled water from the RWTP to meet the heat rejection make-up water requirements, respectively.

CHW and HHW from the CTP will be reticulated throughout the precinct to individual blocks via a pipework reticulation network installed in pre-defined stages. Reticulation routes include buried trench sections and pipework runs exposed within basement levels.

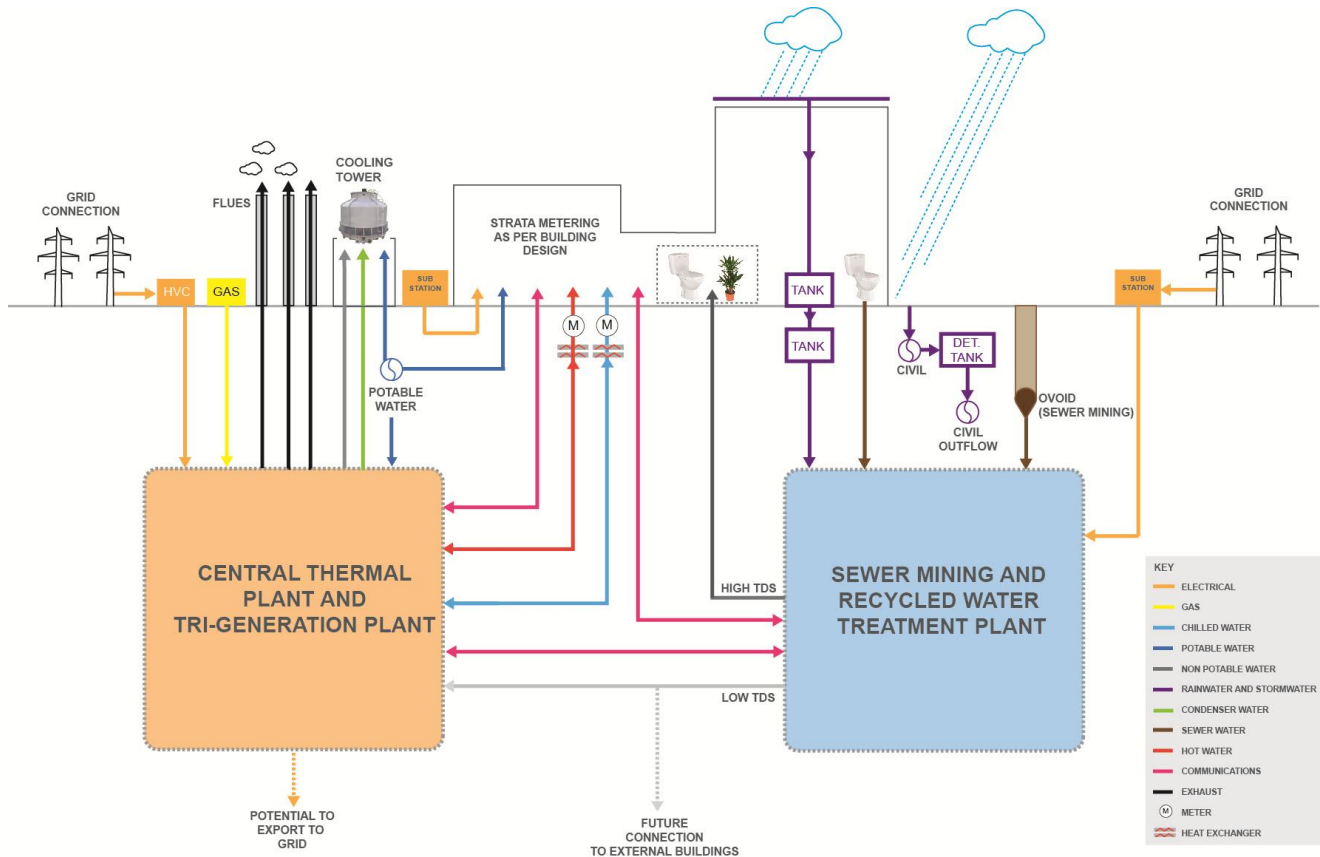


Figure 1: Central Park precinct systems and their interaction

Since the outset of the design of Central Park, several studies had been compiled in order to determine the optimum CTP configuration. Outcomes from these studies established that the tri-generation system, with the benefit of thermal storage, provided significant added value in terms of environmental performance for the development. This benefit can be quantified by a reduced greenhouse gas (GHG) emissions factor associated with the thermal energy supplied by the CTP when compared to conventional gas (25% lower) or electricity (85% lower) systems.

Block 4S will connect to the CTP to meet the comfort cooling, space heating and DHW heating demands. Chilled (CHW) and heating hot water (HHW) will be reticulated to each room for use in 2-pipe fan coil units, with and to 4-pipe fan coil units in common areas, which will condition the space. This enables the building to take advantage of the lower greenhouse gas emissions associated with the thermal energy supply of the CTP when compared to conventional air conditioning systems, reducing the environmental impact of the building.

## 5 RWTP Connection

The RWTP being constructed at the Central Park Development has been designed to treat 100% of the precinct wastewater and will supply recycled water to the CTP and each building/block within the precinct. Any seasonal load will be supplemented by sewer mining from the Sydney Water sewer main that runs through the precinct.

Significant environmental benefit is achieved through a reduction in potable water demand and the minimisation of wastewater discharged to sewer – reducing pressure on and mitigating reinforcement impacts to the existing infrastructure.

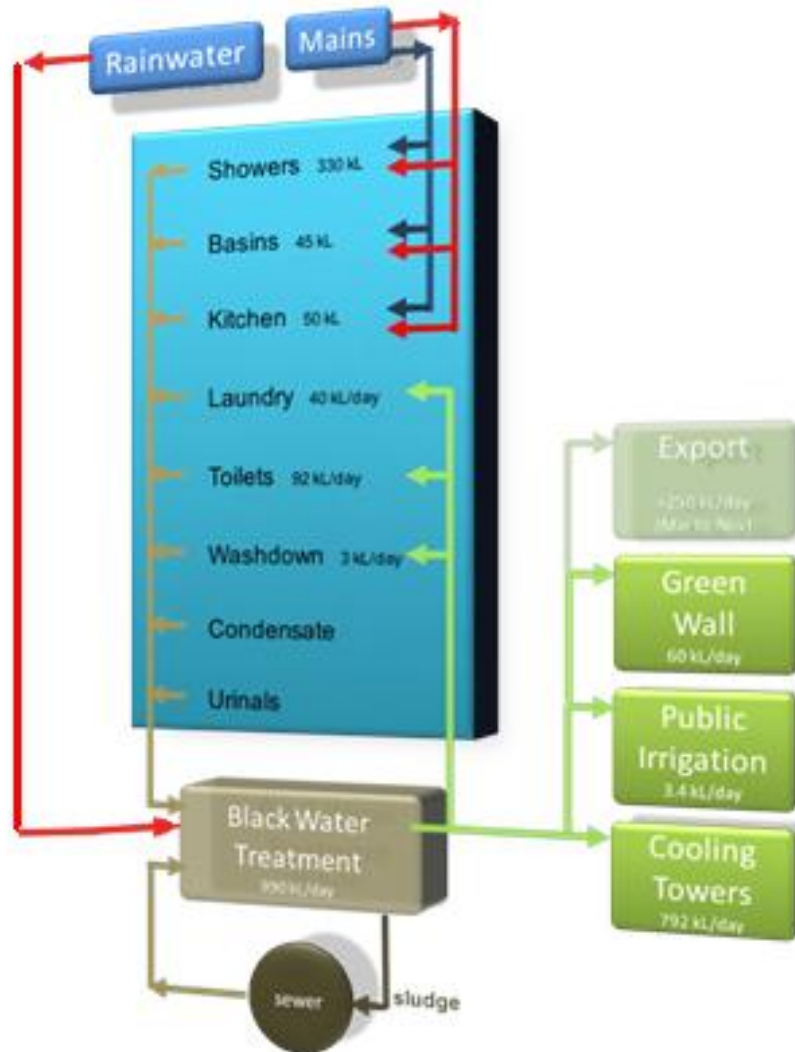


Figure 2: Recycled water flow chart

The RWTP is designed to produce 1ML per day of recycled water to meet the demands detailed in Figure 2. The operational strategy and design characteristics of the plant have been driven by the following water use benchmarks:

- Treating 100% of the precinct wastewater;
- Meeting a minimum 90% of the cooling tower make-up water consumption;
- Meeting a minimum 90% of the irrigation water consumption; and
- Supplying all sanitary flushing, residential washing machines and washdown requirements.

By connecting to this system, Block 4S will dramatically reduce potable water demands and minimise wastewater discharged to sewer.

Figure 3 demonstrates the potential savings in potable water consumption.

- Standard practice represents water consumption based on current market standard practice fitting efficiencies:
  - Toilets 2 Star WELS rated
  - Taps 3 Star WELS rated
  - Showers 2 Star WELS rated
  - Washing Machines 2.5 Star WELS rated
- Best practice represents the fitting efficiencies used in Block 4S
  - Toilets 4 Star WELS rated
  - Taps 6 Star WELS rated
  - Showers 3 Star WELS rated
  - Washing Machines 4 Star WELS rated
- RWTP connection represents the savings associated with the non-potable water supply for toilet flushing, clothes washing, etc.

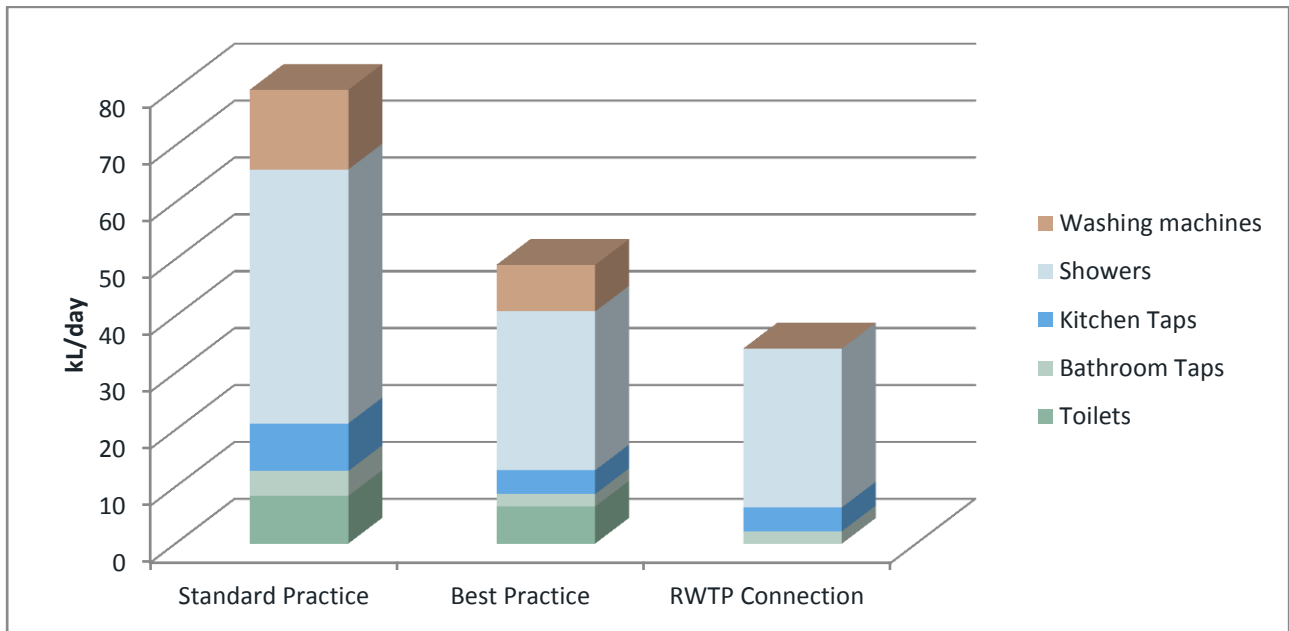


Figure 3: Potable water savings achieved in Block 4S

## 6 Section J Compliance

The objective of Section J of the NCC (National Construction Code) is to achieve greenhouse gas emissions savings by ensuring buildings are capable of using energy efficiently. For Class 1 and 2 buildings in NSW, this is demonstrated using the BASIX online tool. For Class 3 to 9 buildings, compliance with Section J is demonstrated by meeting the DTS (Deemed-to-Satisfy) Provisions of Parts J1-J8, or via the alternative compliance path, Verification Method JV3.

In the past, BASIX certificates have been requested by the regulatory authority for Class 3 developments to demonstrate the environmental performance of the building. However, the NSW Department of Planning has recently provided clarification that NatHERS certificates cannot be produced for Class 3 dwellings (see Appendix A). As a NatHERS certificate is required to demonstrate compliance with the thermal comfort section of BASIX, this means that BASIX certificates cannot be produced for Class 3 accommodation. Therefore, the provisions of Section J of the NCC apply to Block 4S.

However, although a formalised certificate cannot be produced, the project is still aiming to achieve BASIX compliance. In order to optimise the design and ensure the best outcome in terms of energy efficiency, as well as occupant comfort and cost-effectiveness in design, the following will be used to demonstrate Block 4S meets the intent of BASIX and the requirements of Section J:

- The building envelope will be assessed against Parts J1 and J2 of the NCC. This will ensure the building envelope support the efficient use of energy for comfort cooling and space heating;
- Water efficiency in Block 4S will be assessed using the BASIX online tool with an aim of meeting the minimum 40% BASIX water efficiency benchmark. It is expected that the building will achieve a significantly higher score due to the provision of recycled water from the RWTP; and
- Energy efficiency in Block 4S will be assessed using the BASIX online tool with an aim of meeting the minimum 20% BASIX energy efficiency benchmark. It is expected that the building will achieve a higher score due to the good design of the common areas, efficient appliance selection and nominal basement/car park provision.

### 6.1 Building Fabric

Part J1 Building Fabric outlines the thermal performance required for external walls, floors, roofs and roof lights.

Table 1 outlines the thermal performance requirements for Block 4S.

**Table 1: Section J DTS compliant construction details**

Building Fabric Element	DTS Provisions
<b>External Walls</b>	R2.8
<b>Roof</b>	R3.2
<b>Floors – slab on-ground</b>	Nil
<b>Exposed suspended floor (enclosed)</b>	R1.0
<b>Exposed suspended floor (open)</b>	R2.0

### 6.2 Glazing

Due to the complex nature of the façade treatment, compliance with Section J will be demonstrated via a JV3 modelled solution in the detailed design stage. However, a preliminary assessment against the DTS Provisions of Part J2 Glazing has been conducted in order to provide guidance as to the type of façade treatment that may be required. The following images provide details of the façade design which lead to enhanced thermal performance of the spaces.

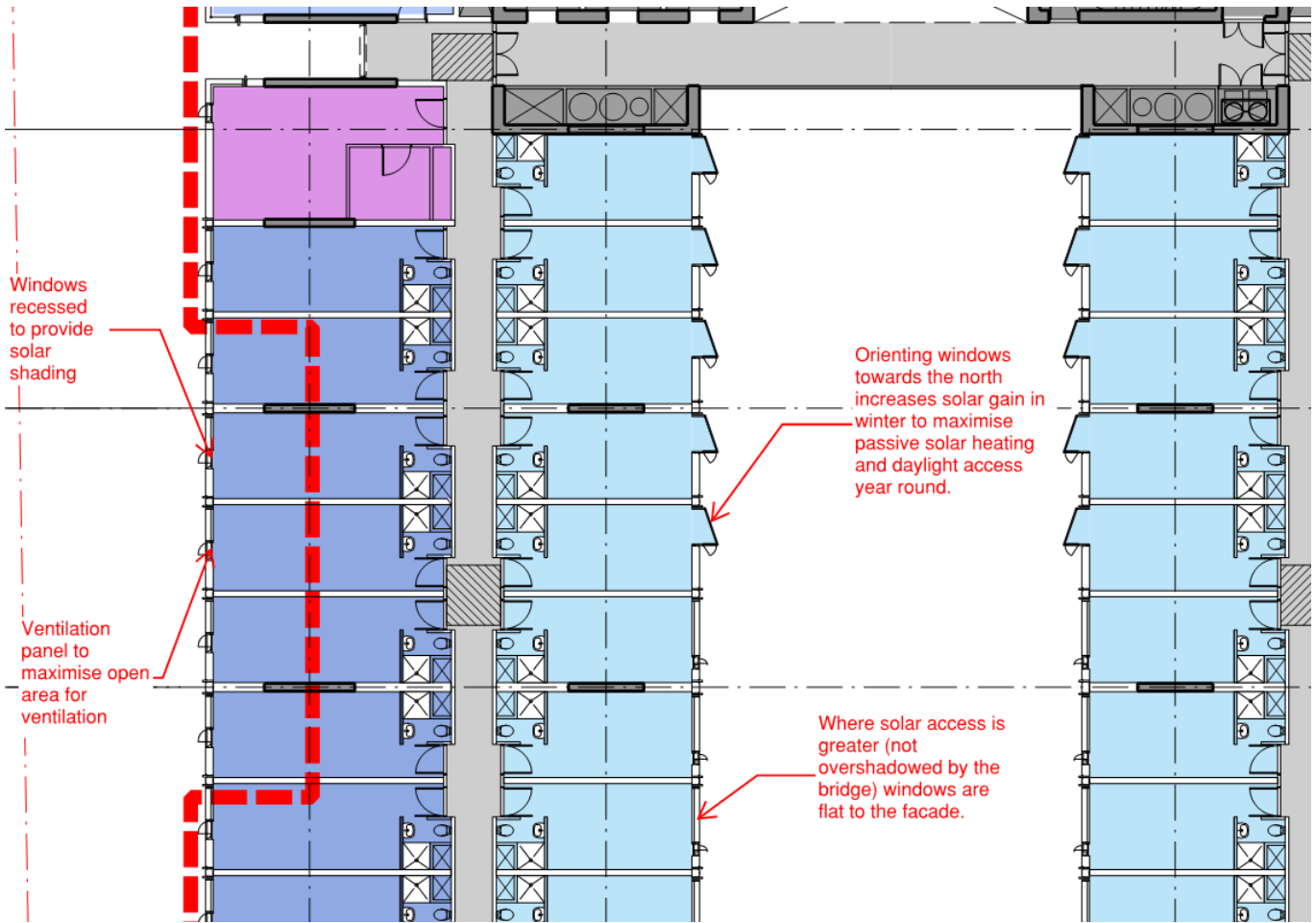
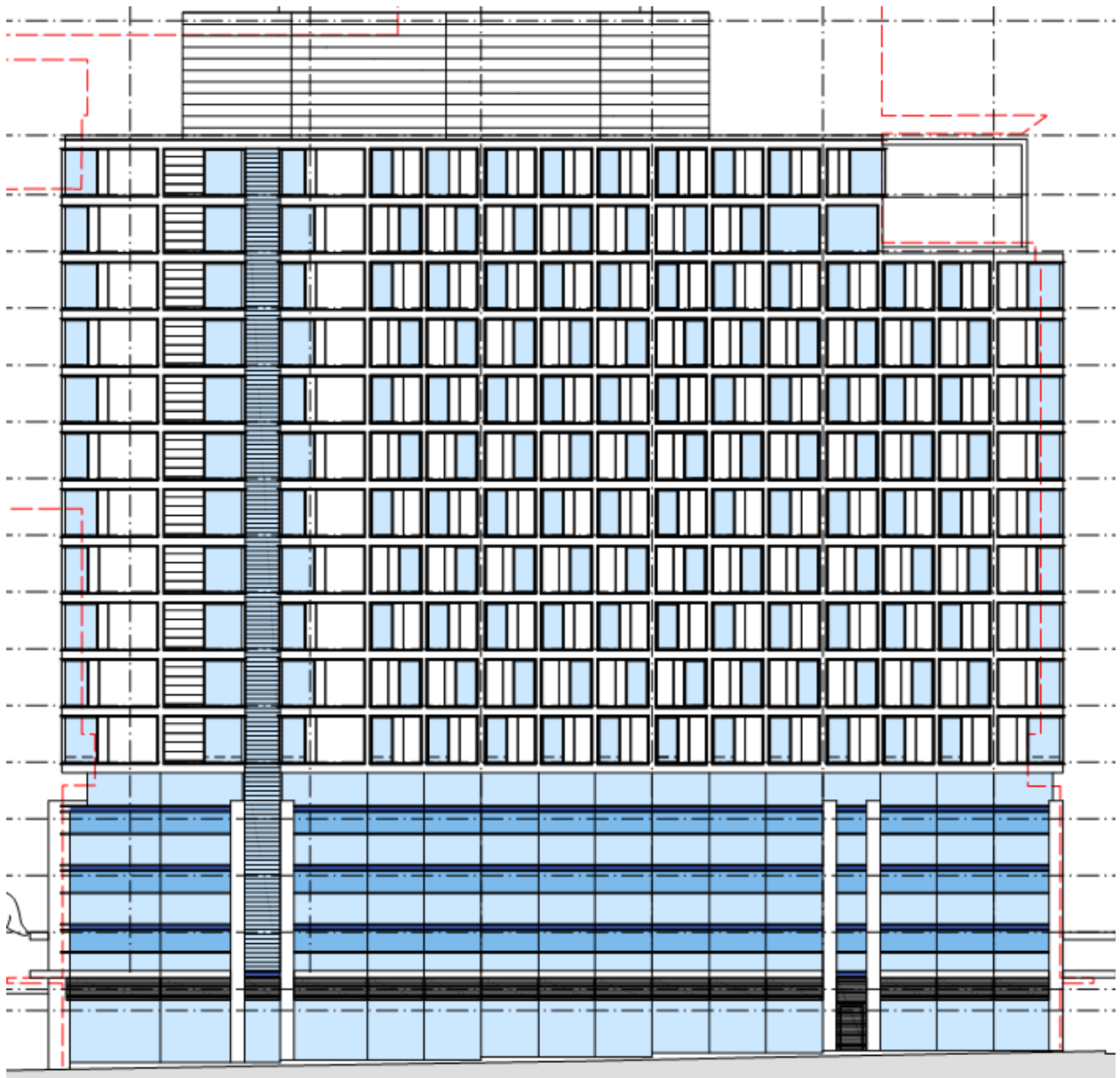


Figure 4: Window design on inner and outer facing wings



**Figure 5: Typical outer facing facades**

On the “outer facing” facades (the east and west facades that do not face the inner courtyard) solar exposure is greater. A review of the design against the DTS provisions of Part J2 of the NCC has led to the development of recessed, narrow windows on these elevations to reduce unwanted direct solar gain in winter.

By contrast, the “inner facing” facades (those facing the courtyard) will contain larger windows to maximise solar gain in these heavily overshadowed spaces. This is shown in figure 6. Figure 6 demonstrates that on the upper levels where solar exposure is greater, the windows are smaller to minimise unwanted solar gain in winter.

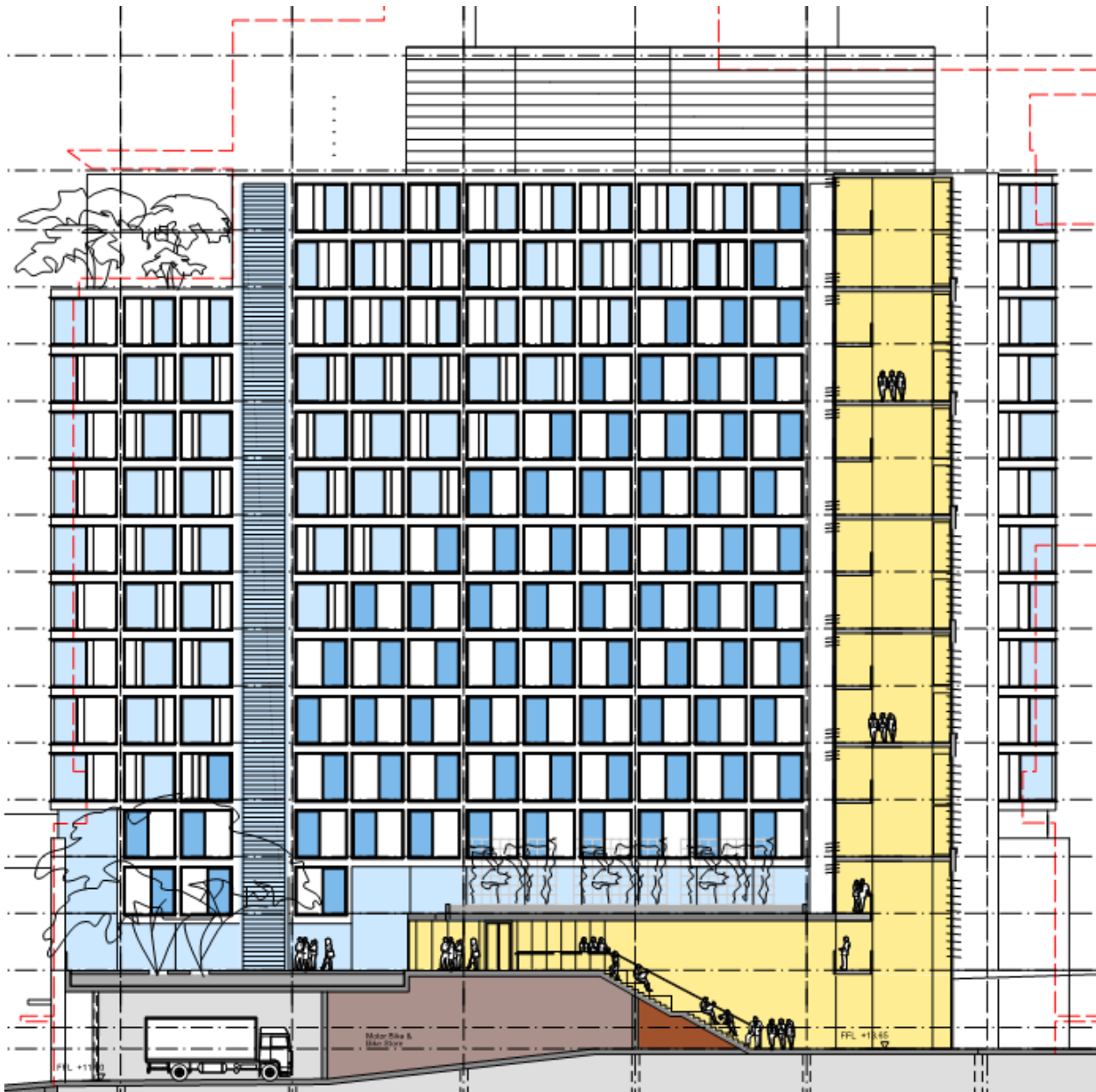


Figure 6: Elevation of the inner facing facades

The design of the façade will be progressed throughout the design development stage to fine tune the ability of the façade to meet the requirements of the NCC. The design will be optimised through a JV3 alternative solutions approach which will assess the performance of the proposed building and compare it to the energy performance of reference building, which meets the DTS Provisions of the NCC.

### 6.3 BASIX

BASIX is an online tool that is used to rate the energy and water efficiency of residential dwellings in NSW and consists of three sections – Water, Thermal Comfort and Energy. The tool sets minimum energy and water efficiency benchmark targets, which must be met through the design of the building and the selection of fixtures, fittings and appliances. In addition, the building must be designed in such a way that the heating and cooling demands for the dwellings are below a certain threshold in order to pass the thermal comfort section of BASIX.

As discussed above, BASIX does not strictly apply to Class 3 accommodation, and therefore a formalised BASIX certificate cannot be generated. However, we will demonstrate through a sample BASIX report that the

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building meets the requirements of the energy and water sections of the BASIX tool. This will highlight the high environmental performance achieved by the building.

The improvement benchmarks are based on the project location, size and number of levels. For Block 4S, the relevant improvement benchmarks are as follows:

- Water – 40% reduction in use when compared to the current state average; and
- Energy – 20% reduction in use when compared to the current state average.

A draft BASIX report is provided in Appendix B. Note that this report is based on 100 apartments as this is the maximum number of apartments that can be included in one certificate. Therefore all areas have been pro-rated according to the number of apartments on the certificate.

### 6.3.1 Water

Water efficiency for Block 4S is significantly improved through the connection to the RWTP. Recycled water will be supplied for non-potable uses such as sanitary flushing, laundry use and irrigation. In addition, the following water efficient fittings, fixtures and appliances will be specified:

- Toilets – 4 Star WELS;
- Taps – 6 Star WELS; and
- Showers – 3 Star WELS, between 7.5L and 9L per minute.

Through this water strategy, the building is able to meet and exceed the BASIX water efficiency benchmark.

### 6.3.2 Energy

Energy consumption in multi-unit residential buildings is heavily influenced by the utilisation and servicing of the common areas. Ventilation, air conditioning and lighting in car parks, lobbies, common hallways and other common spaces needs to be carefully designed to mitigate any impact to BASIX compliance.

Block 4S does not contain basement car parking facilities.

The lobbies and common hallways are all naturally ventilated and provided with daylight access to reduce the demand on artificial lighting. Common areas, such as the studies, lounges and common rooms will be provided with controls, including occupancy sensors and timer switches to reduce unnecessary use of air conditioning and lighting, as well as being provided with the option for natural ventilation. This servicing strategy ensures the common areas do not adversely affect the energy performance.

In addition, energy efficiency has been promoted through the following ESD initiatives:

- The comfort cooling, space heating and DHW heating demands are being met by the CTP, taking advantage of a lower greenhouse gas emission factor than conventional gas or electric systems and significantly more efficient central services;
- Light fixtures will all be dedicated fluorescent or LED fittings;
- Efficient air conditioning systems; and
- Outdoor clothes drying lines in common laundries to reduce dryer energy consumption.

Through this energy strategy, Block 4S will meet and exceed the BASIX energy efficiency benchmark.

# 7 Ventilation

To minimise the reliance on artificial heating, cooling and ventilation, natural ventilation will be used throughout the building wherever possible. The design and location of openings has been optimised to promote effective natural ventilation.

## 7.1 Apartment ventilation

Cross ventilation will be utilised to promote natural ventilation in the cluster apartments, as shown in Figure 7.

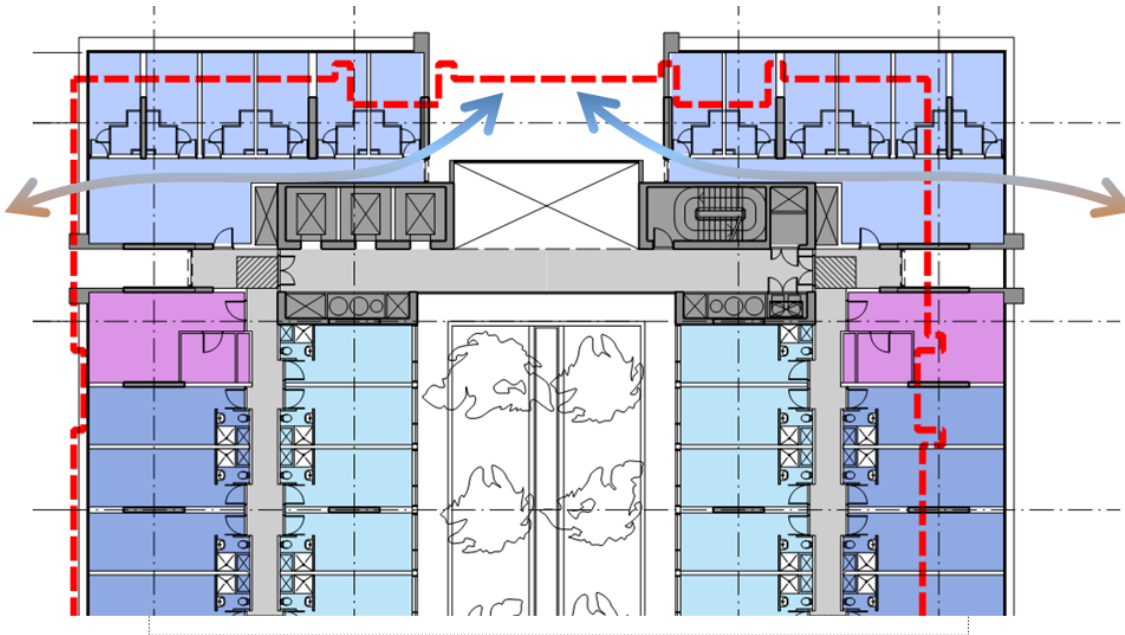


Figure 7: Cross ventilation through the cluster apartments

In the studio apartments however, the depth of the apartment is small enough that single sided ventilation is considered adequate for ventilating the apartment.

To boost this natural ventilation scenario, the bathroom ventilation will provide additional “pull” to circulate air through to the back of the apartment. When the ventilation is running, air will be pulled through the apartment and out through the bathroom ventilation via mechanical means. When the ventilation is not operating, the stack effect created by running bathroom ventilation to the roof will encourage a continual flow of air through the apartment from the façade and out through the bathroom exhaust. This is demonstrated in Figure 8.

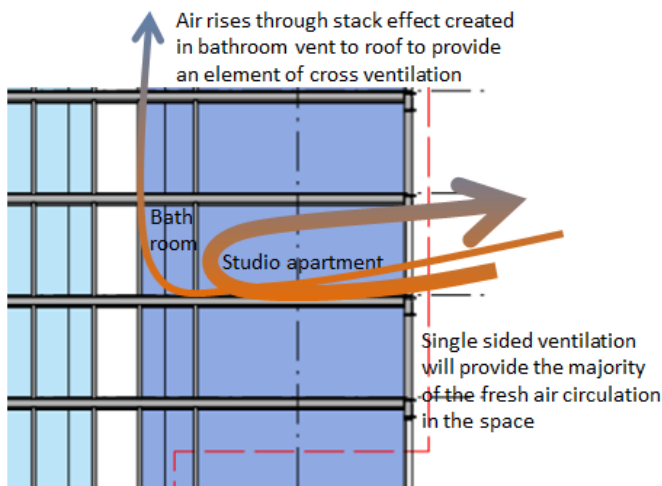


Figure 8: Section showing ventilation of a typical studio apartment

Modelling has been conducted which demonstrates that this ventilation strategy is able to maintain appropriate levels of CO<sub>2</sub> in the space. CO<sub>2</sub> levels are an indicator of the amount of air movement through the space, as high levels of CO<sub>2</sub> indicates the air is stale. ASHRAE Standard 62.1-2007 states that the carbon dioxide levels should not exceed 700ppm in an occupied space.

The results of the model demonstrated that the CO<sub>2</sub> levels in the space will only exceed the 700ppm benchmark if the window is closed. This would be expected in any occupied space regardless of the number of windows or their location. With the window completely open, the CO<sub>2</sub> levels remain below 700ppm.

Figure 9 demonstrates the levels of CO<sub>2</sub> in a typical studio apartment throughout the day in a worst case scenario.

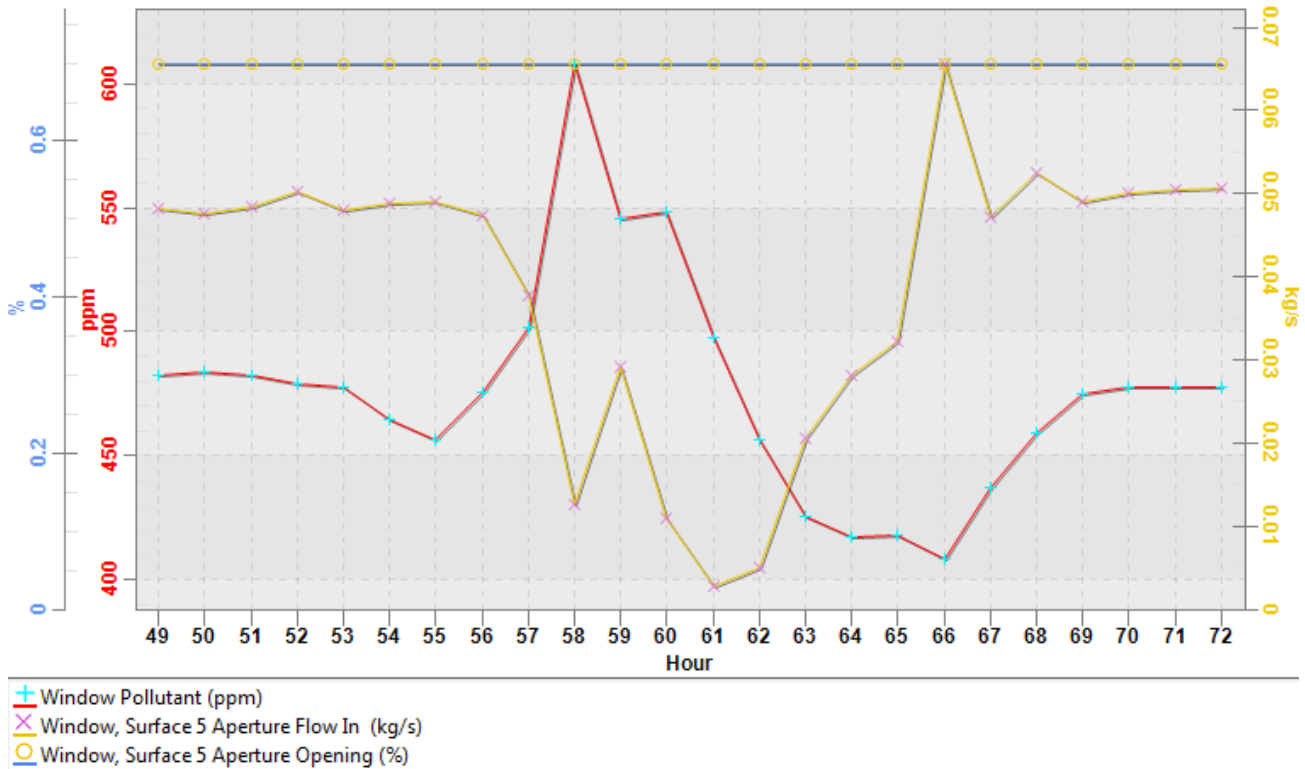


Figure 9: CO<sub>2</sub> levels in the room (ppm) and air flow through the window

## 7.2 Corridor ventilation

Naturally ventilating the corridors and the common areas located in the bridge is a key initiative in reducing energy consumption in the building.

The location of openings in the corridors and the bridge has been optimised to promote air flow through these spaces to ensure fresh air in the spaces and to encourage natural cooling of the space in summer.

Figure 10 shows the flow of air through the corridors. Openings are provided at the ends of the corridors and in the fire stairs. The doors to the fire stairs will remain open on magnetic catches – so that they close only in event of fire. This allows the openings in the stair will to be used to increase ventilation of the corridors.

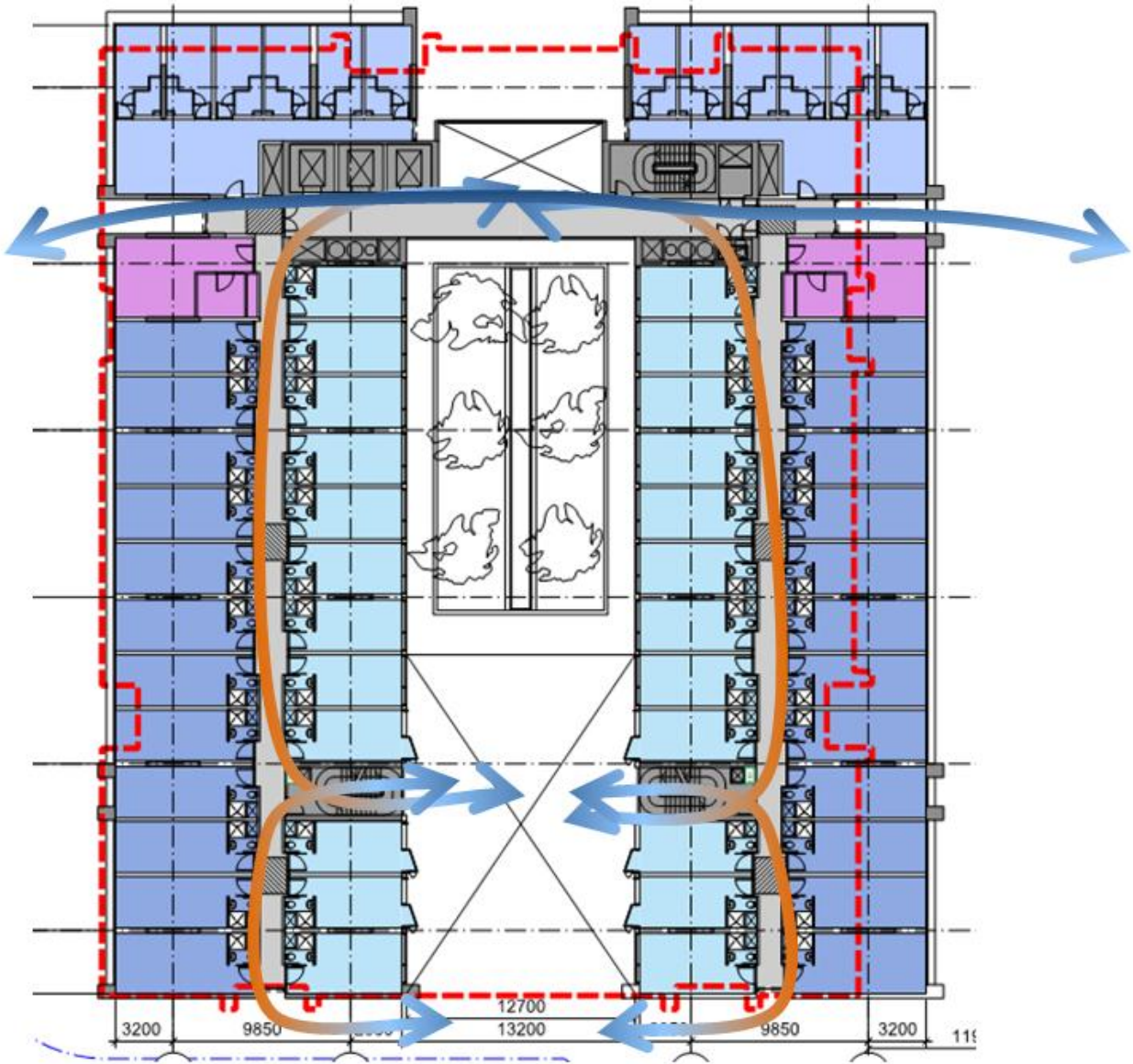


Figure 10: Natural ventilation through the corridors

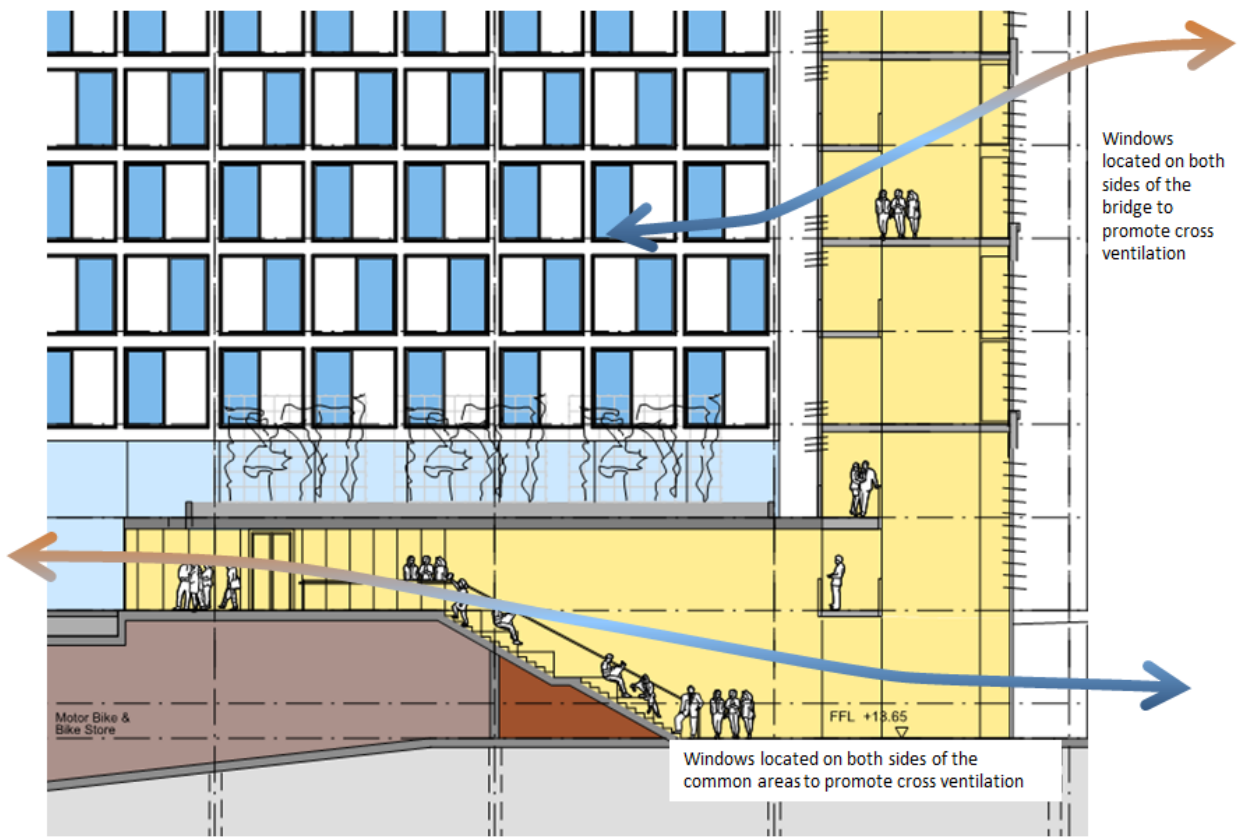


Figure 11: Natural ventilation through the ground and level 1 common areas

## 8 Green Star

Block 4S is classified as Class 3, which does not meet the eligibility criteria of any pre-existing Green Star tools. A formalised ineligibility ruling from the GBCA is provided in Appendix A. Therefore, in order to demonstrate the sustainability aspirations of the project, a 5 star Green Star “principle led” pathway has been established using the Green Star Multi Unit Residential v1 tool to support the application of ESD initiatives across a full range of environmental categories.

Green Star Multi Unit Residential v1 Design 5 Star Pathway - Block 4S						
	Title	Credit No.	Points Available	Points Target	Weighted Points	Notes
Management	Green Star Accredited Professional	Man - 1	2	2	0.89	WSP BE on the design team
	Commissioning Clauses	Man - 2	2	2	0.89	Good design
	Building Tuning	Man - 3	1	1	0.44	Good design
	Independent Commissioning Agent	Man - 4	1	0	0.00	
	Building Users' Guide	Man - 5	1	1	0.44	Information on building use, services, nearby amenities, and transport
	Environmental Management	Man - 6	3	3	1.33	ISO certification of builder and preparation of an EMS for construction
	Waste Management	Man - 7	2	2	0.89	Recycling 80% of construction and demolition waste
	Metering	Man - 16	6	2	0.89	Water and energy metering for all major uses.
Management	SUB-TOTAL		18	13	5.8	
Indoor Environment Quality	Daylight	IEQ - 4	2	0	0.0	
	Thermal Comfort	IEQ - 5	2	0	0.0	
	Hazardous Materials	IEQ - 6	1	1	1.0	Already achieved by site
	Internal Noise Levels	IEQ - 7	2	2	2.0	
	Volatile Organic Compounds	IEQ - 8	4	4	4.0	Low VOC levels in paints, flooring, adhesives, sealants, walls and ceilings
	Formaldehyde Minimisation	IEQ - 9	1	1	1.0	low formaldehyde wood products
	Electric Light Levels	IEQ - 13	1	1	1.0	300lux to be achieved on kitchen sinks, cooktops and ensuites
	Private External Space	IEQ - 20	n/a	0	0.0	Not applicable to student accommodation
	Dwelling Ventilation	IEQ - 21	3	3	1.0	Separate kitchen exhaust. Extra 2 points for trickle ventilators in all rooms
Natural Ventilation	IEQ - 22	3	1	1.0	Natural ventilation to all common hallways.	
Indoor Environment Quality	SUB-TOTAL		19	13	13.7	
Energy	Conditional Requirement	Ene -		Yes		
	Greenhouse Gas Emissions	Ene - 1	20	8	6.7	Based on connection to the CTP for chilled and hot water
	Unoccupied Areas	Ene - 7	2	2	1.9	controls on lighting and HVAC in all common areas. Master switch for lighting and HVAC in dwellings

Green Star Multi Unit Residential v1 Design 5 Star Pathway - Block 4S						
Title	Credit No.	Points Available	Points Target	Weighted Points	Notes	
Energy Efficient Appliances	Ene - 11	2	0	0.0	Difficult to get small fridges that meet the criteria. Also requires 7.5m of internal clothes hanging line	
Peak Electricity Demand Reduction	Ene - 12	2	2	1.9	depends on connection to CTP	
<b>Energy</b>	<b>SUB-TOTAL</b>	<b>26</b>	<b>12</b>	<b>11.5</b>		
Transport	Provision of Car Parking	Tra - 1	2	2	1.7	No car parking
	Fuel-Efficient Transport	Tra - 2	na			
	Cyclist Facilities	Tra - 3	3	3	2.5	Requires one bike rack per dwelling.
	Commuting Mass Transport	Tra - 4	5	5	4.2	Due to proximity to central station
	Trip Reduction Mixed Use	Tra - 5	2	2	1.7	Due to proximity to Broadway shopping centre
<b>Transport</b>	<b>SUB-TOTAL</b>	<b>12</b>	<b>12</b>	<b>10.0</b>		
Water	Occupant Amenity Water	Wat - 1	5	5	7.5	Efficient fittings and recycled water connection
	Landscape Irrigation	Wat - 3	1	1	1.5	All landscaping to be irrigated with recycled water
	Heat Rejection Water	Wat - 4	2	2	3.0	recycled water used for heat rejection
	Fire System Water	Wat - 5	1	1	1.5	reuse of fire system water
	Water Efficient Appliances	Wat - 7	1	1	1.5	High WELS rating for washing machines and dishwashers
	Swimming Pool/Spa Water Efficiency	Wat - 8	na			
<b>Water</b>	<b>SUB-TOTAL</b>	<b>10</b>	<b>10</b>	<b>15.0</b>		
Materials	Recycling Waste Storage	Mat - 1	2	2	1.1	Adequate storage for recycling, recycling disposal as easy as general rubbish. Composting.
	Building Re-use	Mat - 2	na	na	0.0	
	Recycled Content & Re-used Products & Materials	Mat - 3	1	0	0.0	
	Concrete	Mat - 4	3	1	0.5	reduction in the quantity of portland cement in concrete and use of recycled aggregate
	Steel	Mat - 5	2	0	0.0	Use of High steel strength grades
	PVC Minimisation	Mat - 6	2	0	0.0	use of best practice PVC or no PVC
	Sustainable Timber	Mat - 7	1	1	0.5	use of FSC, PEFC or recycled timber
	Design for Disassembly	Mat - 8	1	0	0.0	
	Dematerialisation	Mat - 9	2	1	0.5	exposed ceilings, small apartments
	Flooring	Mat - 11	1	1	0.5	Flooring has reduced environmental impact
	Joinery	Mat - 12	1	0	0.0	
	Internal Walls	Mat - 14	2	1	0.5	Internal walls have reduced environmental impact
	Universal Design	Mat - 15	1	0	0	10% of dwellings must be adaptable
	<b>Materials</b>	<b>SUB-TOTAL</b>	<b>19</b>	<b>7</b>	<b>3.7</b>	
	8 Conditional Requirement	Eco -	0	Yes		

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Green Star Multi Unit Residential v1 Design 5 Star Pathway - Block 4S						
Title	Credit No.	Points Available	Points Target	Weighted Points	Notes	
Topsoil	Eco - 1	na			No topsoil on site prior to development	
Re-use of Land	Eco - 2	1	1	0.7	Site was previously built on	
Reclaimed Contaminated Land	Eco - 3	2	2	1.4	site was contaminated and remediated	
Change of Ecological Value	Eco - 4	4	1	0.7	No significant impact to ecological value	
Outdoor Communal Facilities	Eco - 5	3	1	0.7	The following communal facilities are included: active play area, sun-shaded area, dining area, bbq area	
Land Use & Ecology	SUB-TOTAL	10	5	3.5		
Emissions	Refrigerant ODP	Emi - 1	1	1	0.3	low ODP refrigerant
	Refrigerant GWP	Emi - 2	2	0	0.0	
	Refrigerant Leaks	Emi - 3	1	1	0.3	depends on final HVAC selection
	Insulant ODP	Emi - 4	1	1	0.3	No ODP in insulation
	Stormwater	Emi - 5	3	3	1.0	already achieved for site
	Discharge to Sewer	Emi - 6	5	5	1.7	Connection to RWTP
	Light Pollution	Emi - 7	1	1	0.3	No light directed towards the sky
	Legionella	Emi - 8	1	0	0.0	Dependant on HVAC selection
Emissions	SUB-TOTAL	15	12	4.0		
SUB-TOTAL CATEGORY WEIGHTING SCORE		130	87	67		
Innovation	Innovative Strategies and Technologies	Inn - 1	2	0	0.0	
	Exceeding Green Star Benchmarks	Inn - 2	2	0	0.0	
	Environmental Design Initiatives	Inn - 3	1	0	0.0	
Innovation	SUB-TOTAL	5	0	0.0		
TOTAL CATEGORY WEIGHTING SCORE		135	87	67		

Category	NSW Weighting	1 point =
Management	8%	0.44
Indoor Environment Quality	20%	1.00
Energy	25%	0.96
Transport	10%	0.83
Water	15%	1.50
Materials	10%	0.53
Land Use & Ecology	7%	0.70
Emissions	5%	0.33

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## 9 Conclusions

As part of Central Park, Block 4S endeavours to deliver a high standard of ecologically sustainable development. This report outlines the ESD initiatives that have been promoted in the concept design of the building and addresses the relevant DGRs for the project.

The ESD initiatives to be implemented for the building include:

- Connection to the CTP to meet the comfort cooling, space heating and domestic hot water (DHW) heating demands: It is expected that this will provide significant environmental benefit through GHG emissions savings (see above);
- Connection to the RWTP for wastewater treatment and recycled water supply: All wastewater from Block 4S will be treated by the RWTP. Recycled water will be supplied to the block for non-potable water uses, such as sanitary flushing, laundry use and irrigation;
- Meeting the Deemed-To-Satisfy (DTS) Provisions of Part J1 Building Fabric and Part J2 Glazing of Section J Energy Efficiency of the National Construction Code (NCC) 2012;
- Demonstrating alignment with the BASIX energy and water efficiency benchmark targets. Fittings, fixtures and appliances have been specified, where provided, to maximise water and energy efficiency. Connection to the CTP and RWTP further improves the water and energy efficiency of the building; and
- As per concept plan requirements, the project meets the principles of a 5 star Green Star rating: due to the space use of the building (Class 3) the building does not meet the eligibility criteria of any pre-existing Green Star tools. Therefore, in order to demonstrate the sustainability aspirations of the project, a 5 star Green Star “principle led” pathway using the Green Star Multi Unit Residential v1 tool has been established to support the application of ESD initiatives across a full range of environmental categories.

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## **APPENDIX A**

**NSW Department of Planning clarification on BASIX, NatHERS and Class 3 accommodation**

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# **APPENDIX B**

## **Draft BASIX Report**

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