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Central Coast Quarter North Tower

26-30 Mann Street Gosford NSW

ESD Report

For

SH Gosford Residential Pty Ltd

Revision B | 1 September 2021

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Revision	Date	Description	Author	Reviewer
A	16/04/2021	DA Issue	FH	SG
B	1/09/2021	Revised DA Issue	FH	LV

1. INTRODUCTION

1.1. Aim of Report

S4B has reviewed and identified the design initiatives and features of the development that have the potential to reduce the environmental impact for the North Tower of Central Coast Quarter complex. This development consists of a 25 storey residential tower located on Northern portion of 26-30 Mann Street in Gosford NSW. This report also aims to address the requirements of Clause C20 of the F.E.A.R. in the approved Masterplan SSD 10114:

Environmental performance

C20. Future development application(s) for new built form must address the National Construction Code of Australia 2019 and demonstrate how the principles of Ecologically Sustainable Development have been incorporated into the design, construction and on-going operation of the new buildings. The development must meet or exceed environmental standards including those equivalent to the following:

a) 4-star Green Star Design and As Built rating
b) 4-star NABERS Energy and Water rating
c) BASIX certification.

The Secretary's Environmental Assessment Requirements (SEARs) Application Number SSD-10114 issued for the Central Coast Quarter State Significant Development Application (SSDA) Item 7 - Ecologically Sustainable Development (ESD) requires that the environmental impact statement shall:

+ Detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation 2000) will be incorporated in the design, construction and ongoing operation of the development; and
+ Demonstrate how future buildings would meet or exceed minimum building sustainability and environmental performance standards; and
+ Demonstrate how the proposal meets the Water Sensitive Urban Design principles and incorporates Water Sensitive Urban Design practices

S4B has reviewed and identify the design initiatives and features of the development that have the potential to reduce the environmental impact for the North Tower of Central Coast Quarter complex.

Consideration will be given to the following areas with regards to energy and water consumption and building amenity;

+ Building Envelope
+ Air Conditioning
+ Lighting
+ Water
+ Noise
+ Waste and Recycling

Although the scheme is still relatively undeveloped. We believe that with the current proposed ESD initiatives and a continuation of the materiality refinement, North Tower can achieve the equivalent of the environmental performance benchmarks sought under Clause C20.

1.2. Limitations

The assessment of compliance is based on the current design approach for the building as of 13th April 2021 and its services which are subject to change.

Some compliance items relate to construction or items of detailed design. In these instances, the requirements for the builder, contractor or detailed design have been highlighted.

1.3. Sources of Information

- Architectural DA set dated 13th of April 2021;
- Workshops with St Hilliers, DKO and other relevant consulting teams;
- Building Services Concepts to suit the building with consideration of future staging

2. BUILDING DESCRIPTION

2.1. The Site

The proposal comprises the construction of a residential tower consisting of a 24 storey residential building, retail tenancies on the ground floor, level 2 and level 3, 4 levels of carparking and residential units from level 2 to level 24.

The building will be located on the Northern part of the site, where the overall site is bounded by Mann Street to the East, Baker Street to the West, Vaughan Street to the South and the ATO building on Georgiana Terrace to the North.

The building is located in Gosford, NSW which is within climate zone 5 in accordance with the National Construction Code.

Figure 2.1 - Site of North Tower for Central Coast Quarter at 26-30 Mann Street, Gosford

3. ENVIRONMENTAL DESIGN STANDARDS

3.1. Benchmarks

The design will be benchmarked to aim to achieve a 20% reduction in greenhouse gas use per person compared to the benchmark rate of 3,292 kgCO2 per annum. The benchmark rate is the average greenhouse gas emissions per capita for the current building stock. The benchmark is determined from utility consumption and ABS population density data.

The building will be designed to meet the BASIX targets. The common areas will be designed to meet BASIX targets as a minimum in conjunction with an intent to meet 4 Star NABERS and Green Star benchmark.

3.2. Summary of features

The Central Coast Quarter North Tower Residential development will target this improvement on the benchmark by incorporating the following features;

- High performance façade
- Mixed mode air conditioning system utilise natural ventilation as well as ceiling fans and air conditioning
- Individual 'demand based' ventilation for kitchens and bathrooms
- High efficiency individual DX air conditioning
- Demand control of VSD fans for carpark ventilation
- Centralised hot water system featuring instantaneous gas hot water units and demand based reticulation
- Centralised Photovoltaic (PV) system serving all the building house services, - lifts, carpark and corridor lighting, carpark ventilation, miscellaneous ventilation systems, and Electric Vehicle chargers
- Use of zoned high efficiency, LED lighting
- Natural lighting

3.3. BASIX

BASIX is a scheme introduced by the NSW Government to regulate the energy efficiency of residential buildings. Central Coast Quarter North Tower will be designed to meet the minimum BASIX requirements by considering water and energy provisions not limiting to water and energy efficiency as well as thermal comfort.

3.4. NABERS

NABERS is a performance based rating system for buildings. It measures and rates a building's environmental performance during operation. NABERS rates a building on the basis of its measured operational impacts that include energy, water, waste and indoor environment. NABERS is managed by the NSW Office of Environment and Heritage throughout Australia.

The scheme provides an accredited comparison between the greenhouse intensity of commercial buildings by awarding a star rating on a scale of zero to six. A building with a higher star rating will be energy efficient and therefore emit low levels of greenhouse gases. It will have a competitive advantage in the real estate market resulting from ongoing cost savings for building owners and tenants.

Central Coast Quarter North Tower is a residential building and would not be subject to a NABERS rating, however the development's environmental standards will be designed to meet or exceed benchmark requirements equivalent to a 4-star NABERS Energy and Water rating.

3.5. Green Star

Green Star evaluates the green attributes of building projects based on nine categories, including energy and water efficiency, indoor environment quality and materials. It is a holistic rating tool evaluating not only environmental attributes, but also features that affect occupant health and wellbeing, such as indoor environment quality and access to transport. Green Star rating tools can be used to rate environmental attributes of a building at the design phase as well as at the end of construction.

Central Coast Quarter North Tower will aim to meet or exceed benchmark requirements equivalent to a 4-star Green Star design and as built rating through the use of energy efficient lighting and appliances, heating and cooling, water efficient fittings and fixtures, as well as the reuse of rainwater.

4. BUILDING SITING

4.1. Orientation

The winds experienced at the building are typical of a land breeze / sea breeze wind cycle.

This Residential Tower for the Central Coast Quarter development can expect predominately North Easterly winds from the Rumbalara Reserve foothills and South Westerly winds from Brisbane Water and the Broken Bay inlet from Hawksbury River. The East/West orientation of the buildings on the site provides the perfect opportunity to harness these breezes for natural ventilation. The details of how natural ventilation will be implemented in the building are presented later in this report.

Figure 4.1 – South Westerly sea breeze

The air quality will be very high as a result of the winds delivered from Rumbalara Reserve which will be oxygen rich from the large natural rainforest like habitat while the ocean breezes from the Brisbane Water frontage of the development will offer a temperate sea breeze atmosphere.

4.2. Solar Control

The project team have strategically incorporated building planning to provide shading through overhanging balconies on the residential building which provide shading in peak solar conditions.

During the detailed design of the residential building, façade treatment with combination of solar control glazing and shading elements has been carefully considered to provide both radiant and solar control. This has been balanced with the provision of vision glazing to improve passive heating of spaces and optimise the availability of natural light. This was undertaken during the BASIX modelling to optimise the design.

The culmination of these measures will result in the reduced energy consumption and superior seasonal comfort control and passive performance of the building.

4.3. Construction Thermal Properties

The building façade is proposed to utilise a thermally efficient glazing system, reducing the thermal load in the occupied spaces and therefore reducing the capacity of the apartment cooling and heating systems.

Portions of the residential / retail podiums are landscaped to improve the occupant amenity of the space. The landscaping also maximises the thermal efficiency of the podium.

In addition to the thermal load reduction offered by the glazing system, operable portions will provide the option to naturally ventilate the spaces within the residential building.

4.4. Urban Heat

Urban heat and /or heat island effects will be reduced using the following measures:

+ Green roof added to the podium rooftop
+ Vegetation and planters located along all the lower podium level perimeter spaces of the building
+ Vegetation planted along the verge on Baker Street

Vegetation and the green roof will assist in moderating ambient temperatures. This reduces the urban heat island effect which is caused by pavements and buildings absorbing heat. Trees and shrubs will also be carefully selected to:

+ Reduce glare
+ Reduce penetrating winds
+ Improve air quality
+ Sustain a viable ecosystem for birds, small animals and insects

5. BUILDING AMENITY

5.1. Natural Ventilation

The residential building form is designed to perform well when naturally ventilated. The operable façade windows in the rooms all encourage natural ventilation throughout each individual apartment based on the availability of natural breeze airflow surrounding the building. The floor plate provides reasonably shallow spaces between ventilation openings, promoting good airflow and has the potential to provide simple and good cross ventilation within each apartment.

The detailed design of each apartment has optimised the percentage of the façade being operable to optimise the effectiveness of the natural ventilation. Open doors will allow air to flow in the window, through the rooms and throughout the apartments.

As a result, the ADG cross ventilation calculations shows 91% of apartments meeting the cross ventilation criteria which exceeds the compliance benchmark by over 50%. This does not take into account the high quality of the ventilation achieved on the site due to the fresh southerly sea breeze or the oxygen rich north easterly breezes.

5.2. Heating & Cooling

The extent of heating and cooling in the residential building shall be reduced by operating the building as a mixed mode system whereby thermal conditions are maintained with limited use of electrically driven systems.

The passive building design will minimise the need for mechanical heating and cooling including the provision of ceiling fans to living and bedrooms for cooling.

The apartment mechanical heating and cooling will be provided by the way of efficient reverse cycle split air conditioning systems operated individually by each occupant according to their needs. This efficient individual control will minimise the electrical heating and cooling requirements.

5.3. Domestic Hot Water

Domestic hot water will be provided through centralised gas hot water system located on the roof.

This helps lowers the building's greenhouse gas emissions as natural gas has a lower greenhouse gas coefficient than grid electricity.

The detailed requirements have been developed in conjunction with the BASIX requirement for the building.

The gas fired booster heating will have a minimum energy rating of 3.5 stars.

5.4. Communal Open Space

Central Coast Quarter North Tower will include communal open space equal to 39% of the total site area for enhanced occupant amenity and promoting healthy living. This exceeds the minimum ADG requirement of 25%.

5.5. Lighting

Controlled daylighting provides an opportunity to reduce energy consumption needed for artificial lighting and can improve occupant satisfaction.

Occupant comfort will be improved through the use of glare control measures such as curtains and blinds and the selection of solar control glazing.

The use of natural lighting can reduce the operation of artificial lighting which can represent a significant proportion of the building's energy use.

Artificial lighting will consider appropriate colour perception and lighting levels, reduced glare from lamps and uniformity.

Luminaire selection will be based on minimising energy consumption and potential hazard associated with disposal of lamps.

Light fittings will be selected in coordination with the architect to complement the building.

Energy efficient sources such as LED will be predominantly used unless a more appropriate alternative exists.

Daylight and Façade

Daylight has been linked to higher levels of occupant comfort and productivity. It is a free source of lighting for the building, reducing the building's overall electrical load. It is important to maximise the availability of daylight for building occupants while ensuring good glare control through the internal and external shading devices.

High performance glazing has been selected as part of the façade development to reduce solar loads reaching the internal space (improving thermal comfort and reducing the loads on the HVAC split system) and to improve daylight levels transmitted to the space (increased natural light levels).

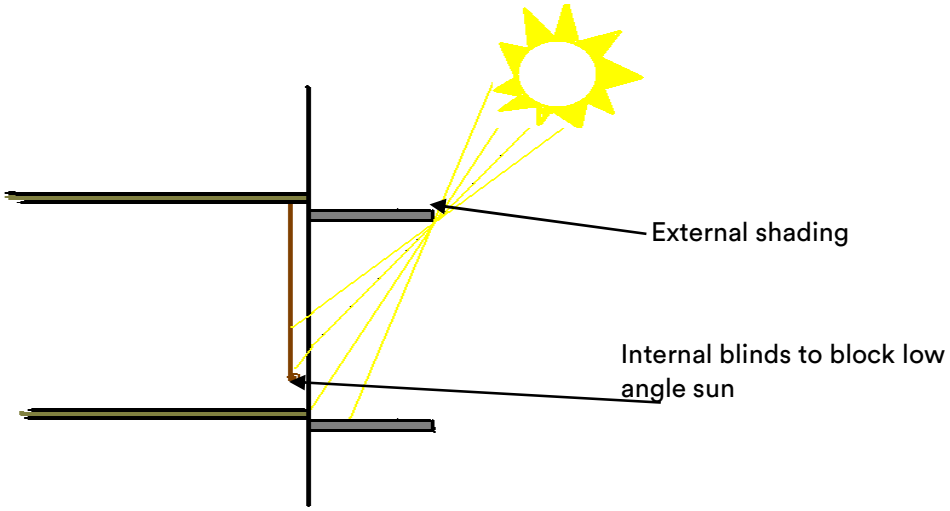

Figure 5.1 - Daylight and Shading

The efficient façade design has also been optimised to maximize external views improving the indoor environmental quality of the building.

The façade has been designed with high visual light transmittance (VLT) glazing to maximise daylight penetration. Engineered shading on selected façades will reduce direct sunlight penetration thereby reducing solar gain and HVAC energy requirements. Blinds can be installed by tenants to prevent glare from low angle winter sun.

6. INDOOR ENVIRONMENT QUALITY

6.1. Outside Air

The apartments have been designed to operate effectively with natural ventilation when external conditions permit and an occupant desires no air conditioning.

This mixed mode operation not only reduces energy consumption but also provides greater indoor environment quality to all the occupants through the provision of outdoor air to the spaces. 91% of apartments meet the ADG cross ventilation design criteria and the building's location and associated prevailing sea and bushland breezes provides the highest levels of ventilation possible in a building of this context.

6.2. Thermal Comfort

Overall, people give off heat in three ways: convection from air movement over the skin (36%), evaporation of moisture from the skin (18%), and direct radiation to the surrounding environment (46%). For this reason, comfort in air conditioned spaces should be examined from a holistic thermal comfort perspective rather than dry-bulb temperature alone. Thermal comfort is defined by a number of parameters including;

- Dry-Bulb Temperature – the actual temperature of the space
- Relative Humidity – a measure of the moisture in the air
- Air Velocity – a measure of the draft experienced by occupants
- Mean Radiant Temperature – a measure of the amount of radiant heat an occupant experiences
- Metabolic Rate – a person's activity level has large impact on whether they feel hot or cold
- Clothing Level – the amount of clothing a person wears has a large impact on whether they feel hot or cold

Systems which aim to control the three forms of heat transfer are likely to provide a more comfortable environment than traditional systems that only control dry-bulb temperature.

Control of radiant temperature requires a system capable of radiant cooling which is not always a feasible solution. However, the design of the building also contributes to this parameter due to factors such as control of exposure to direct solar radiation on an occupant with the use of individually controllable blinds and consideration for the use of the thermal mass of the structure.

The thermal comfort performance of the residential dwellings is assessed by NaTHERS accredited software and input into a BASIX rating. The computer model of the dwelling incorporates the following passive features;

- Orientation
- Construction of walls, floor and roof
- Insulation
- Glazing
- Ceiling fans
- Shading
- Openings for natural ventilation

The model is simulated with a weather file which provides a measure of the energy that will be required to heat and cool the home throughout the year. The energy required is converted into a star rating. The higher the star rating, the less energy required to provide thermal comfort to occupants.

This building achieves an average rating of 6.6 stars, this would represent a circa 60% improvement over the minimum performance requirements.

7. WATER

Water and energy are the two primary resources used within buildings; as such, they both impact directly on comfort, health and achieving a sustainable development. By focusing on reducing water consumption in buildings, there are many benefits available such as lower water charges, reduced stress on current water infrastructure, reduced pressure to construct new reservoirs and water mains and reduced energy use in the treating and pumping of water supplies and sewerage.

7.1. Water Efficiency

The design will incorporate efficient WELS rated fixtures and fittings suitable for their specific application. These fixtures and fitting include basin taps, toilets, urinals & shower heads.

The air conditioning heat rejection is achieved through the use of air cooled plant rather than water cooled equipment such as cooling towers to mitigate water consumption and prevent the risk of water borne bacteria.

Refer compliant BASIX pathway and BASIX certificate provided by Northrop Consulting Engineers.

7.2. Rainwater Harvesting

As a sustainable water re-use initiative we propose to collect and retain 76kL of rainwater on the project to be used for the landscape irrigation predominantly on the podium.

This will also be used for the residential car washing.

8. NOISE

An assessment of the existing acoustic environment, including roads and land uses has been conducted by Acoustic Logic and noise impacts have been assessed in accordance with:

+ State Environment Planning Policy SEPP (Infrastructure) 2007
+ Environment Protection Authority (EPA) Noise Policy for Industry
+ The EPA Interim Construction Noise Guidelines and the Assessing Vibration: A Technical Guideline document

In addition and as part of the acoustic analysis, traffic noise intrusion assessment has been conducted based off the requirements of the following acoustic noise criteria/standards:

+ Gosford City Council Development Control Plan (2013)
+ NSW Department of Planning and Environment's document – 'State Environmental Planning Policy (Infrastructure) 2007

An acoustic assessment of potential noise sources associated with the development (including building services, pedestrian noise and car/tram movements) has been conducted. The assessment details the relevant acoustic criteria for noise impacting on surrounding receivers based on the EPA and council requirements. Where required, suitable acoustic treatments have been specified such that noise levels at surrounding receivers will comply with the relevant noise level criteria.

Construction noise emission modelling and associated management is proposed in the report.

9. WASTE AND RECYCLING

Statistics indicate that construction and demolition waste accounts for up to 40% of the waste generated within Australia. The majority of this waste may be recycled or may have been minimised initially, without ever reaching the site. The major benefits of recycling are a reduction in the demand for new resources, reduced energy costs of production and transport and a reduction in the amount of waste going to landfill.

The waste management plan applies not only during construction but also whilst the buildings are operational. In this regard it is important that suitable facilities are provided to deal with the waste while the residential tower is operational.

- Waste minimisation must be dealt with at both the design and construction stages of the project
- Materials specified are to have low wastage rates, using minimal packaging.
- Where possible, materials are to be re-used on the site.
- Materials with a recycled content are to be specified in preference to those from non-renewable sources.
- A waste management plan shall be developed prior to construction.
- A separated waste recycling facility shall be provided on the site.
- During the design and when specifying materials, full consideration must be given to products with a recycled content.
- Consideration must be given to the future recyclability of proposed materials.

An operational waste management plan has been developed by Elephants Foot recycling solutions to address the above items.

10. TRANSPORT

Low-impact transport will be addressed by the design as well as the site. Bicycle and motorcycle facilities will be provided for residence and visitors, while access to existing public transport networks and pedestrian infrastructure is well established surrounding the site. Most streets have footpaths, particularly oriented towards Gosford town centre.

The site is located close to numerous amenities where most errands can be accomplished on foot with many nearby public transportation options. Nearby parks include Kibble Park, Waterview Park and Fagan Park.

Central Coast Quarter North Tower is being designed to optimise pedestrian links for enhanced walkability and access to nearby public transport to improve amenity, promote health and reduce transport related GHG emissions. The site will provide an attractive links from the CBD (Mann Street) through to Baker Street, the Gosford City Park and the waterfront.

The site is well-serviced by public transport. TfNSW's Future Transport Plan outlines that Gosford will continue to establish itself as a satellite city. Future connections to the Greater Sydney should be established through 'fast transit' and potentially high speed rail. Rail services are expected to operate at a 'turn up and go' frequency, indicating that customers can reasonably expect services without looking at timetables. Furthermore, the Gosford City Centre TMAP outlines the intent to improve the bus network east-west connectivity in Gosford and surrounding areas.

A Green Travel Plan has been developed for the site that encourages the use of sustainable transport choices. This plan can be found within the Transport Impact Assessment Report.

11. OTHER MARKET DRIVERS AND TRENDS

There are a number of market and industry drivers that will influence the building design and operation. Decisions can be made in the current pre-approval and future planning stages to pre-emptively neutralise perceived risks and turn them into opportunities to maximise sustainable outcomes for the Central Coast Quarter. These anticipated changes are listed below.

11.1. Electric Vehicle Uptake

Electric vehicles (EV) have rapidly developed from concept to market emergence, with prices declining every year. It is anticipated that the sale of electric vehicles will increase sharply in coming years as cost of production declines, along with the improvements in availability and range capacity of EVs, and developments in public charging infrastructure.

The development will include Ten EV chargers incorporating universal charging outlets with multiple billing options such as EFTPOS. These will be placed in visitor parking spots and managed by the body corporate to allow residents and visitors with EV's to utilise the facility.

The chargers are electrically fed from the PV system to provide the power sustainably during the daytime usage.

11.2. Solar Photovoltaic System

Solar PV systems are relatively low infrastructure impact technologies able to be installed on suitable roof types. Solar power contributes positively to the residential building as a whole directly offsetting power drawn from the power grid.

A Centralised PV array circa 25-30kW will be provided on the roof of the building including installation of reputable high end inverters to offset common plant equipment such as lifts, carpark ventilation, common area lighting, EV chargers and other miscellaneous ventilation.

11.3. Community and Social Sustainability

With global urbanisation taking place at a rapid rate, governments and cities are starting to pay more attention to the sustainability attributes of the planning, design and construction of new projects. This involves the delivery of projects that offer diverse, affordable, inclusive, well connected and healthy places to live, work and play as well as encourage opportunities for business diversity, efficiency, innovation and economic development.