

THE  STAR

MODIFICATION 13 PLANNING SUBMISSION

SUSTAINABILITY REPORT

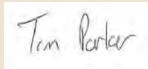
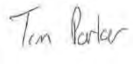
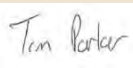
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Date	Revision No.	No. of Pages	Issue/Description of Amendment	Prepared By	Reviewed By	Approved By	Signature
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1 EXECUTIVE SUMMARY

SEGL has commenced a five-year redevelopment journey to create a landmark, exemplar integrated resort. This proposed redevelopment will occur through the lodgement of two s75W modification applications to the original Major Project Approval (MP08_0098) with the Department of Planning and Environment (the Department).

Modification 14 was determined in October 2017 and included approval for a range of upgrades to the existing site. These upgrades included the enclosure of the level 3 terrace to facilitate an expansion in gaming floor area and a new bar and restaurants, expansion of the level 3 pre-function space, changes to the Astral Hotel lobby and retail space, and alterations to internal vertical transportation, services and infrastructure, including the harbour heat rejection system.

Modification 13 is a modification to the development as approved under MP08_0098, up to and including Modification 14. This forms the basis for technical impact assessments.

Modification 13, proposes the development of a new Ritz-Carlton Hotel and Residential Tower in the northern portion of the site with associated podium treatment, as well as other transport, retail, food and beverage improvements across the site. It is Modification 13 that is the subject of this report.

Modification 13 has been assessed against all relevant standards/guidelines, including the following:

- ◆ SEARs requirements as follows:

“1. Relevant EPIs, Strategies, Plans and Guidelines

Address the provisions of State environmental planning policies, strategies, plans and guidelines that would apply as if those provisions applied to the carrying out of the project, including the following:

...

- o State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004;*

...

Demonstrate that the proposal has limited environmental impacts beyond those already assessed for project approval MP 08_0098 and any subsequent modifications to that approval.”

“7. Ecological Sustainable Development (ESD)

Identify how the development will incorporate best practice ESD principles in the design, construction and ongoing operation phases of the development.”

- ◆ “Identify how the development will incorporate best practice ESD principles in the design, construction and ongoing operation phases of the development”, and “Demonstrate that the proposal has limited environmental impacts beyond those already assessed for project approval MP 08_0098 and any subsequent modifications to that approval”;
- ◆ SEARs requirement – “Relevant EPIs, Strategies, Plans and Guidelines
- ◆ State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004;
- ◆ Nationwide House Energy Rating Scheme (NatHERS);
- ◆ Section J1 Building Fabric and Section J2 Glazing, Volume One of the National Construction Code (NCC) Series 2016;
- ◆ National Australian Built Environment Rating System (NABERS) Energy and Water for Hotels; and
- ◆ Green Building Council of Australia (GBCA), Green Star Design and As Built.

This Sustainability Report has identified the following key findings/conclusions and recommendations:

- ◆ The development can achieve Australian Excellence sustainability outcomes;

- ◆ The development achieves BASIX and NatHERS compliance for the residential dwelling components of the development;
- ◆ The development can achieve compliance with NCC Section J1 Building Fabric and Section J2 Glazing through the use of a high thermal performance building envelope for all non-residential component of the development;
- ◆ The Ritz Carlton Hotel has the potential to achieve a NABERS for Hotels energy rating of 5.5 Stars and a NABERS for Hotels water rating of 4 Stars during operation; and
- ◆ The Ritz Carlton Hotel and Residential Tower is targeting a 5 Star Green Star rating through the GBCA's Green Star Design and As Built rating tool, which will provide third party verified sustainability outcomes for the project.

In summary, the development will be achieving sustainability best practice outcomes across the Modification 13 planned works. The development has been benchmarked against the industry recognised sustainability tools to demonstrate that best practice holistic sustainability outcomes can be achieved. Through the strategies, approach and analysis provided within this report, the proposed development would have limited environmental impact within the scope of sustainability.

MODIFICATION 13 PROPOSED WORKS

2 MODIFICATION 13 PROPOSED WORKS

2.1 NEW RITZ CARLTON HOTEL AND RESIDENTIAL TOWER

- ◆ Demolition of part of the existing building in the northern portion of the site, including part of the Pirrama Road façade and part of the Jones Bay Road façade.
- ◆ Construction of a new Tower, 237.0 metres AHD (approximate, 234 metres from Pirrama Road);
- ◆ Residential uses across 35 levels, comprising:
 - A residential vehicular drop off lobby on Level B2
 - A residential lobby on Level 00 to be accessed from Jones Bay Road;
 - Residential communal space on Level 07 to be accessed via Level 08; and
 - 204 residential apartments located from Levels 05 to 06 and from Levels 08 to 38, featuring one-bedroom, two-bedroom and three-bedroom unit types (Note – no Level 13)
- ◆ Hotel uses across 31 levels, comprising:
 - A hotel arrival lobby on Level B2 to be accessed from the new Ritz-Carlton porte-cochere along Pirrama Road;
 - A hotel Sky Lobby for guest check-in on Level 39 and 40, featuring a restaurant, bar and lounge;
 - 220 hotel rooms located from Level 42 to 58 and from Level 60 to 61
 - A hotel spa and gym on Level 07
 - A VIP link to the Sovereign Room on Level 04 and 04 Mezzanine
 - A Ritz-Carlton Club lounge and terrace on Level 59
 - Hotel staff end-of-trip facilities on Level B3
 - Hotel staff arrival point on Level 00
 - Hotel back-of-house and plant on Level B2, 02, 03, 05, 41 and 42
- ◆ A Neighbourhood Centre consisting of the following proposed uses including street level cafe, library, learning / innovation hub, multipurpose function centre, practice rooms (functional use to be finalised in conjunction with a neighbourhood panel)
- ◆ A new car-parking stacker system below the new porte-cochere of the Ritz-Carlton Hotel, with a total capacity of 221 spaces, to serve the new hotel and apartments
- ◆ Vertical transport associated with the tower and podium; and
- ◆ A new drop-off / pick up area (short-term parking) on Jones Bay Road for the proposed apartments.

2.2 LEVEL 07

- ◆ A 'Ribbon' at Level 07 connecting the new Hotel and Residential Tower to the existing building along Pirrama Road, comprising:
 - Two pools and associated pool decks (one for the new Hotel, one for The Star); and
 - Two food and beverage premises with associated store rooms and facilities;
- ◆ Lift access from the Level 05 Terrace to Level 07;
- ◆ Residential communal open space associated with the new residential apartments, comprising pool and landscaped terrace at the base of the Tower adjacent to Jones Bay Road;
- ◆ Gym and associated change rooms and facilities for the residents;
- ◆ Gym and associated change rooms and facilities for hotel guests; and
- ◆ Landscaping treatments.

2.3 LEVEL 05 SKY TERRACE

- ◆ Three food and beverage outlets with external areas;
- ◆ Completion of the Vertical Transportation drum to connect with Level 05 Sky Terrace;
- ◆ Designated event spaces on the Terrace; and
- ◆ Landscaping treatment.

2.4 LEVEL 05 ASTRAL HOTEL POOL AND SPA RECREATIONAL FACILITY UPGRADE

- ◆ New pool deck, pool, spa, gym and amenities upgrade for Astral Hotel and Residences.

2.5 TOWER TO SOVEREIGN LINK BY ESCALATOR AND LIFT

- ◆ Link from the Tower (across Level 04 and Level 04 Mezzanine) to the Sovereign Resort and MUEF at Level 03, connected via Lift G4, Lift VIP 1 and escalators.
- ◆ Extension of the lift service to stop at Level 00, 01 and 05 in addition to Level 3, 4 and 4M.

2.6 LEVEL 03 SOVEREIGN COLUMN FAÇADE TREATMENT ALONG PIRRAMA ROAD

- ◆ New glazed detail to enclose exposed Level 03 Sovereign columns along the Pirrama Road façade.

2.7 VARIOUS RECONFIGURATION WORKS AROUND VERTICAL DRUM LEVEL 00 TO L5

- ◆ Revolving door at L00 main entrance landing Pirrama Road end
- ◆ Sliding door at L00 landing at stairs from Light Rail
- ◆ Reconfiguring of existing L1 and 2 void edge
- ◆ New escalators from L2 to L3 due to revised landing at Level 3
- ◆ Infill of L2 atrium void to main entrance at Pirrama Road

2.8 FAÇADE INTEGRATION WORKS

- ◆ Upgrades to the Pirrama Road and Jones Bay Road façades to integrate the new Ritz Carlton Hotel and Residential Tower with the existing building.

2.9 INFRASTRUCTURE UPGRADES

- ◆ A new plant room located within the podium over Levels 03, 04, 05 and 06 of the proposed Hotel and Residential Tower;
- ◆ Relocation of the current Level 03 cooling towers (adjacent to the MUEF) to the Level 09 plant room above the Level 06 plantroom adjacent to the Astral Hotel;
- ◆ New capstone microturbine units and associated flues in the proposed plant room at Level 03 between the Darling Hotel and the Astral Residence Tower;
- ◆ New capstone microturbine units and associated flues in the new Level 03 plant room at the base of the Tower;
- ◆ Relocation of the existing main switch-room to the new plant room on Level 02, south of the demolition cut line;
- ◆ Relocation of the existing data recovery centre to the new plant room on Level B1 of the Darling Hotel;
- ◆ Relocation of diesel generator flues to the side of the new Level 09 plantroom, adjacent to Astral Hotel

2.10 LEVEL B2 TRANSPORT INTERCHANGE

- ◆ Upgrades to the Event Centre Loading Dock;
- ◆ Entry into Basement car stacker for the Tower apartments and Ritz-Carlton Hotel;
- ◆ New commuter bike parking and hire bike system;
- ◆ Upgrade of finishes to light rail station surrounds (but not within Light Rail corridor) and removal of existing wall barrier to the Pirrama Road frontage;

- ◆ Upgraded taxi-rank arrangements;
- ◆ Designated Star coach parking along Service Road in front of Light Rail station; and
- ◆ Realignment of kerbs and line-marking.
- ◆ *Note – no works within the Light Rail corridor*

2.11 TRANSPORT IMPROVEMENTS- OTHER LOCATIONS

- ◆ Reconfiguration of existing median strips on Jones Bay Road and addition of new median strip on Pymont Street, with associated line-marking to enable a new right-hand turning lane into the Astral Hotel Porte-Cochere;
- ◆ New Pymont Street carpark entry and exit, associated line marking, changes to internal circulation, and reconstruction of the pedestrian footpath along Pymont Street; and
- ◆ Relocation of existing feeder taxi-rank from Jones Bay Road to the Level B2 transport interchange.

2.12 SITE WIDE LANDSCAPE AND PUBLIC DOMAIN UPGRADES

- ◆ Upgrades to street frontages along Pirrama Road (for the Hotel Porte Cochere) and Jones Bay Road (for the residential entry);
- ◆ Upgrades to street frontage to Pymont Street, due to new car parking entry; and
- ◆ Upgrade to the entry forecourt of SELS building at the corner of Jones Bay Road and Pymont Street. (Note: no works within SELS building is proposed)

2.13 LEVEL 00-RESTAURANT STREET

- ◆ Creation of a new destination Restaurant Street by:
 - Incorporating existing Balla & Black Food and Beverage premises on Level 00; and
 - Converting existing retail shops into new Food and Beverage tenancies

2.14 PIRRAMA ROAD AND JONES BAY ROAD - FOOD AND BEVERAGE TENANCIES

- ◆ A revised food and beverage tenancy at the existing Pizzaperta outlet along Pirrama Road;
- ◆ A new food & beverage tenancy at the Marquee street entry; and
- ◆ A small café outlet adjacent to the residential lift lobby at Jones Bay Road.
- ◆ A new food & beverage tenancy accessed off existing walkway from Jones Bay Road

2.15 FOOD AND BEVERAGE – OTHER LOCATIONS

- ◆ Reconfiguration of Harvest Buffet, including new escalators from Level 00 Food Court to Level 01; and
- ◆ Refurbishment of Bistro 80 into the interim Century tenancy. (Note: The Century tenancy post construction is proposed to be at the Jones Bay end of L00 – Restaurant Street)

2.16 DARLING HOTEL CORNERS

- ◆ Upgrade of the corner plaza at the Union/Edward Street property entry to accommodate:
 - A new food and Beverage premises on Level 01 and 02;
 - A new entry foyer leading to the Food Court;
 - A relocated awning enclosure at street level;
- ◆ Upgrade of the corner plaza at the Union/Pymont Street property entry to accommodate:
 - A new awning enclosure at for the existing café;

- New revolving door at entry to Darling Hotel
- Eight (8) luxury display cases at Darling Hotel car park entry; and
- Two car display areas at Darling Hotel car park entry.

2.17 SITE-WIDE ACOUSTIC STRATEGY

- ◆ A site-wide acoustic monitoring strategy applied to assess impact of potential noise generating sources in Mod13.

2.18 SITE-WIDE LIGHTING STRATEGY

- ◆ A site-wide lighting strategy integrating and improving the existing lighting across the precinct, with new lighting the proposed Tower, Podium and Ribbon, including:
 - Internal lighting of Hotel and Residential spaces;
 - Illuminated highlights at the Sky Lobby and Club Lounge levels;
 - Integrated lighting on the eastern and western vertical façade slots and angled roof profile;
 - Podium external illumination from awnings, and under retail and lobby colonnades;
 - Landscape lighting on Level 07 open terraces and pool decks;
 - Feature lighting accentuating the wing-like profile of the Ribbon and vertical element;
 - Internal and external lighting to Food and Beverage outlet at Union/Edward Street corner;
 - Façade LED lighting to the heritage SELS Building

2.19 SPECIAL LIGHTING EVENTS

- ◆ Approval for fifty three (53) Special Lighting Event nights per year for the use of permanent installation of moving projector lights on the rooftop of the Astral Hotel.

2.20 SIGNAGE UPGRADES

- ◆ Consolidation of existing signage approvals and new signage, including:
 - Approved signs
 - Wayfinding signs;
 - Business identification (including for Food and Beverage outlets); and
 - Signage on the Tower and Podium.

2.21 STORMWATER UPGRADES

- ◆ Stormwater upgrade works, including increased pit inlets and pipe capacities at the low points along Pyrmont Street and Edward Street.

THE  STAR

SUSTAINABILITY AT THE STAR

3 SUSTAINABILITY AT THE STAR

Star Entertainment Group Limited (SEGL) is committed to sustainability leadership in energy and waste reduction within the entertainment sector, and greening their footprint in the communities in which they operate. Sustainability is an ongoing and constantly improving process for SEGL at organisational, operational and at individual site levels.

Sustainability opportunities within The Star includes initiatives related to its operations, refurbishments and new building components. SEGL undertook a materiality assessment in 2014 to understand areas for improvement including performance of waste management, water consumption and energy consumption. Following on from this, SEGL launched an Environmental Management Policy, Environmental Principles document and a Sustainable Procurement Policy to constantly improve, manage and measure their performance across key sustainability metrics. SEGL also report annually on their performance against their sustainability performance objectives and present outcomes of the report publicly. In late 2016 SEGL made a significant advancement with the development of a new five year sustainability strategy labelled 'Our Bright Future' which forms the framework for sustainability within the organisation.

SEGL take a broad view of sustainability and focuses on building business capacity and delivering continuous improvement in the management of environmental, societal and governance issues. The Sustainability Strategy is underpinned by a structured materiality assessment process that was conducted over a three month period to identify potential material environmental, social and governance issues relevant to the organisation and industry. Through structured workshops, research and stakeholder consultation, identified sustainability issues were then rated based on their importance.

FIGURE 3.1 "OUR BRIGHT FUTURE" SUSTAINABILITY FRAMEWORK



The proposed works associated with Modification 13 will be designed and delivered in accordance with the guidelines and documents abovementioned, as well as SEGL's Sustainable Design Guideline. The guideline will be used throughout the planning, design, tender, construction and operational phases of the development to ensure sustainability outcomes are achieved. The guideline outlines a holistic approach to sustainability specifically for SEGL's assets and sets out design requirement for project to comply with.

SEGL is proud to be recognised for its sustainability achievements in being named the global leader for the Casinos and Gaming sector in the latest annual assessment of the Dow Jones Sustainability Index. The company is also a member of the FTSE4GOOD and a national member of the CitySwitch energy saving program. SEGL was awarded 'New Signatory of the Year' NSW and national award in 2015 for its involvement in the CitySwitch energy saving program. The Star engaged with the City of Sydney's Smart Green Business Program to audit water consumption and waste generation in 2015. As a result The Star installed 70% of water flow restrictors.

SEGL also conduct rigorous reporting and transparency for sustainability performance. The 2016 Annual Report is publicly available and benchmarked the sustainability performance of the group across the following themes:

- ◆ Managing resources;
- ◆ Energy and carbon emissions;
- ◆ Water management;
- ◆ Recycling and waste diversion; and
- ◆ Sustainable procurement.

The Report demonstrated improvements in operational performance in 2016 across key metrics as shown below in Table 3.1.

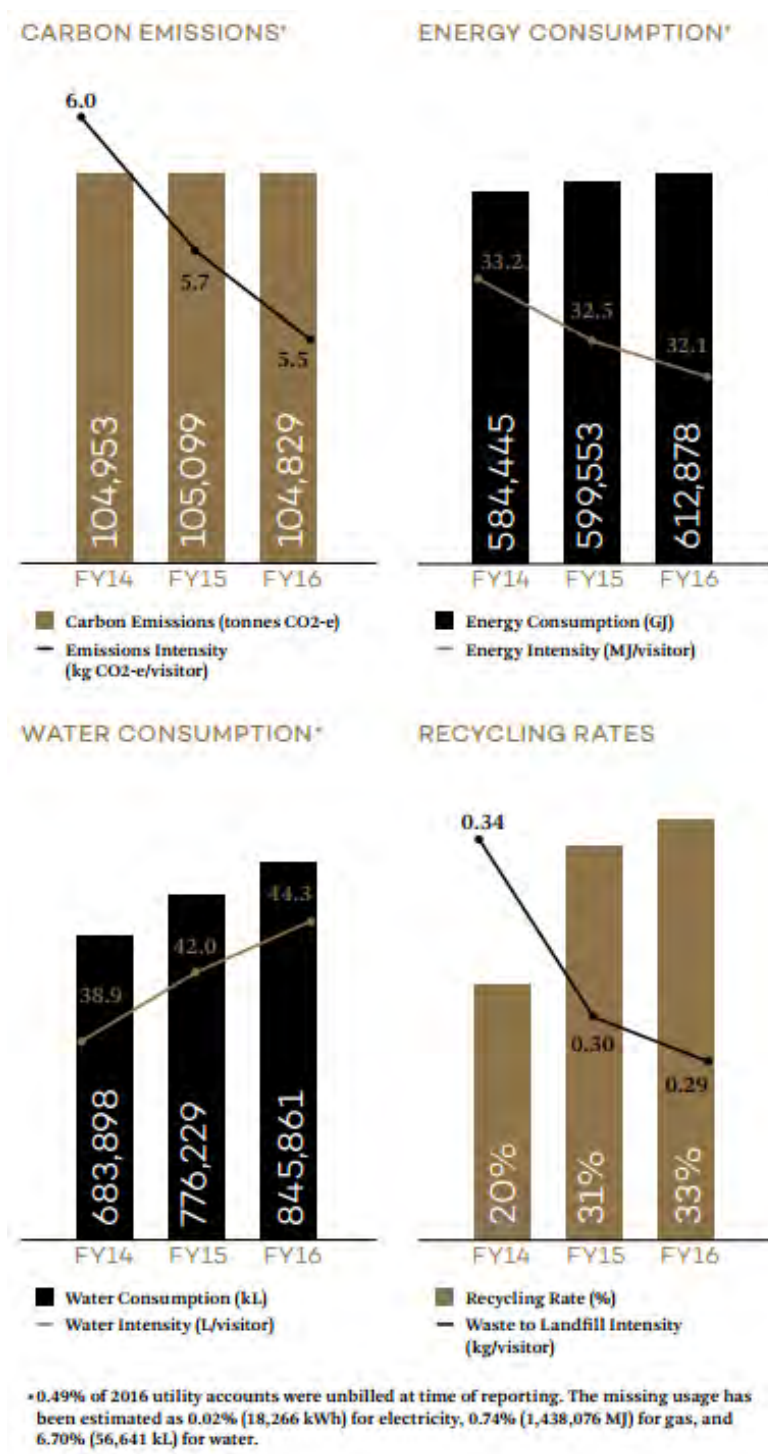


TABLE 3.1 FY2016 SUSTAINABILITY REPORTING

As part of SEGL's commitment to sustainability for Modification 13, and to continue sustainability excellence in operation, SEGL will incorporate ambitious sustainability initiatives for the Modification 13 developments.

THE  STAR

SITE SUSTAINABILITY TARGETS

4 SITE SUSTAINABILITY TARGETS

Buildings can have a significant contribution to environmental impacts including but not limited to global greenhouse gas emissions, water consumption, impacts from material supply chain management, transport to and from buildings and many other issues. Planning tools have been adopted and recognised throughout the industry to manage the impact of buildings and other projects to minimise environmental impacts. SEGL have adopted these tools, both mandatory and voluntary to limit the environmental impact of the project.

SEGL have set ambitious sustainability targets for the project, focusing on achieving Australian best practice sustainability outcomes across the suite of area classifications within the project. With all mixed use developments, complex delineation of sustainability requirements are needed for both compliance and voluntary sustainability initiatives, as such, SEGL proposes the following Sustainability performance requirements for the project:

- ◆ SEARs requirements as follows:

“1. Relevant EPIs, Strategies, Plans and Guidelines

Address the provisions of State environmental planning policies, strategies, plans and guidelines that would apply as if those provisions applied to the carrying out of the project, including the following:

...

o State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004;

...

Demonstrate that the proposal has limited environmental impacts beyond those already assessed for project approval MP 08_0098 and any subsequent modifications to that approval.”

“7. Ecological Sustainable Development (ESD)

Identify how the development will incorporate best practice ESD principles in the design, construction and ongoing operation phases of the development.”

- ◆ NatHERS and BASIX compliance (apartment dwellings only);
- ◆ National Construction Code (NCC) 2016 Section J Energy Efficiency compliance (all non-residential components of the project);
- ◆ Design to achieve a NABERS Energy and Water for Hotels Rating (Ritz-Carlton Hotel Only, rating certification to be considered in operation);
- ◆ Green Star Design and As Built 5 Star Rating (combined Ritz Carlton Hotel and Residential Tower component only); and
- ◆ Designed for compliance with SEGL's Sustainable Design Guidelines (Whole project).

A comprehensive modelling and analysis exercise has been undertaken to ensure the design developed to date is capable of achieving the sustainability targets. The following section of this report outlines the strategy of compliance for each of these sustainability targets, as well as modelling and analysis completed to ensure the design complies with the project requirements. Each of the strategies will be further refined during the detailed design phase.

In addition to the above targets, and further demonstrating SEGL's commitment to sustainability in design, a whole building cradle to grave lifecycle analysis has been complete as well as a Climate Action Plan. The outcomes of these studies are provided in this chapter of the report.

Sustainability compliance and voluntary certification have many pathways and methods for achieving compliance. This report presents what the current strategy is for the project. It is acknowledged that the compliance and certification pathways will likely change as the project enters detailed design phases. The project is committed to achieving the targets set out, and the pathway to achieving these ambitious targets may change in the future. The targets are a mixture of mandatory and voluntarily targets nominated by SEGL with the aim to provide a proposed development with limited environmental impact.

4.1 NATHERS AND BASIX COMPLIANCE

A NatHERS and BASIX strategy and compliance report has been developed for the proposed apartment dwellings within The Star Residential Tower. The report attached in Appendix A demonstrates how the development meets the statutory requirements under NatHERS and BASIX.

BASIX is an online tool that is used to rate the energy and water efficiency of residential dwellings in NSW. The tool sets minimum energy and water reduction targets which must be met through the design of the building and the selection of fixtures and fittings.

Design inputs such as location, size, construction material, water source and fittings are used to determine the potential energy and water consumption of a new home or dwelling, including residential common areas such as landscaped podiums and pools.

BASIX assesses three main categories:

- ◆ Water;
- ◆ Thermal comfort; and
- ◆ Energy.

Thermal comfort is assessed by simulation in accordance with the Nationwide House Energy Rating Scheme (NatHERS) modelling protocol. This requires the modelling of each assessable dwelling by an accredited assessor, working with NatHERS accredited software.

NatHERS modelling assesses the potential of the dwelling to provide thermal comfort passively, thereby reducing energy requirements for heating and cooling. The annual heating and cooling loads calculated are entered into the BASIX tool to determine if the dwelling satisfies the maximum heating and cooling loads set for the dwelling in its climate zone.

The heating and cooling loads also affect the BASIX Energy score, with more efficient dwellings contributing to an improved score in the Energy section. The Energy score is also affected by other inputs such as efficiency of appliances, heating and cooling system performance, hot water systems and factors such as use of renewable and alternative energy systems.

FirstRate5 is provided by Sustainability Victoria and is accredited for simulating the thermal performance of dwellings in Australian climates under the NatHERS software accreditation protocol.

FirstRate5 version 5.2.5(3.13) has been used in the assessment of this project, in accordance with the NatHERS Technical Note and the BASIX Thermal Comfort Protocol.

Inputs including dwelling geometry, space uses, orientation, climate zone, building materials and shading from architectural features, adjacencies and obstructions are used to calculate heating and cooling loads for the dwelling. Resulting loads that are within the heating and cooling thresholds set under the BASIX protocol will satisfy the thermal comfort targets of BASIX.

BASIX requires the following benchmarks to be met:

- ◆ Water—Minimum target of 40% potable water use reduction compared to the NSW average;
- ◆ Thermal comfort—Meeting a set of NatHERS modelled maximum heating and cooling loads determined by the BASIX tool. For this development, they are as follows:
 - Heating 40 MJ/m² maximum average across all units, 45.4 MJ/m² maximum for any individual unit; and
 - Cooling 26 MJ/m² maximum average across all units, 29.5 MJ/m² maximum for any individual unit.
- ◆ Energy—Minimum required target of 25% energy consumption reduction compared to the NSW average.

Water efficiency for the apartment dwellings has been achieved through the following:

- ◆ Rain tank allocation of at least 1kL, collecting from a capture allocation of 600m² and supplying 90m² of landscaping;
- ◆ Fixtures and fittings with the following water efficiencies:
 - Toilets, 4 Star WELS rating

- Bathroom taps, 5 Star WELS rating
- Kitchen Taps, 5 Star WELS rating
- Showers, 3 Star WELS rating (>7.5 but <= 9.0L/min)
- Dishwashers, 3 Star WELS rating (must be provided as part of the project)
- Clothes washers, 3 Star WELS rating (must be provided as part of the project)

Thermal comfort (NatHERS) modelling is employed in accordance with the BASIX protocol, to determine heating and cooling loads attributed to achieving acceptable thermal comfort in each dwelling. The results of NatHERS modelling demonstrate that the architectural design can manage thermal loads within the apartments to meet and exceed the minimum benchmark for this location.

Energy consumption in multi-unit residential buildings is heavily influenced by the utilisation and servicing of the common areas. HVAC and artificial lighting has been carefully designed to reduce energy demands.

Simple energy efficiency measures, such as the provision of efficient fitting and fixtures will deliver energy consumption reductions in the dwellings. These include:

- ◆ All windows double glazed, low solar gain, low-e, clear
- ◆ External Walls - Lightweight Clad Aluminium Composite Panel, R2 added bulk insulation
- ◆ Partition Walls - 100mm Cast Concrete
- ◆ Roof - Suspended Concrete Slab with R3 added bulk insulation
- ◆ Lift motors – Gearless traction with VVVF motors
- ◆ Lighting – LED
- ◆ Cooktop – Electric induction, Oven – Electric
- ◆ Air Conditioning – Central system

A more significant energy efficiency feature of The Star Residential Tower is the provision of a 165kWp photovoltaic system on the site. The photovoltaic system will be installed across suitable roof top areas across the site and connect electrically to The Star Residential Tower, providing zero carbon electricity to the project. Potential benefits of the system are outlined below in table 4.1.

Metric	Benefit
System Capacity	165kWp
Reduced peak demand	~165kW
Annual electricity generated	~231MWh / annum
Carbon offset from grid electricity	~200t CO ₂ / annum

TABLE 4.1 PHOTOVOLTAIC SYSTEM BENEFITS

A detailed report outlining the NatHERS and BASIX compliance is provided in Appendix A.

4.2 NCC SECTION J COMPLIANCE

An NCC Section J strategy for compliance has been developed for the proposed development. Compliance for NCC part J1 Building Fabric and part J2 Glazing. The strategy includes achieving compliance through a Performance Solution (Verification Method JV3) rather than the prescriptive “Deemed to Satisfy” compliance pathway.

The strategy brings the following benefits to the project:

- ◆ Avoids the need to comply with onerous “Deemed to Satisfy” requirements;
- ◆ Provides more flexibility in glass type and system selection;
- ◆ Allows a consistent glass type to be used across the development (consistent with the design intent); and
- ◆ Results in a more energy efficient outcome compared with a “Deemed to Satisfy” building design.

The project includes large areas of glazing, and as such will provide a high performance glazing produce. Currently, the project achieves compliance under verification Method JV3 using the product specified below in table 4.2

Glass Type	Colour	U-Value, W/m ² .K	SHGC	VLT
China southern 6SJ68S-1 on Clear +12A + 6C, Triple Low-E	Neutral	1.6	0.32	64%

TABLE 4.2 JV3 COMPLIANT GLAZING PERFORMANCE DATA (GLASS ONLY)

A detailed report outlining the Performance Solution is provided in Appendix B.

The final glazing product design will need to consider mechanical, acoustic, thermal and visual aspects of the product. This will be developed further during the detailed design phase of the project.

4.3 NABERS ENERGY AND WATER FOR HOTELS RATING (RITZ-CARLTON ONLY)

The National Australian Built Environment Rating System (NABERS) is a national rating system that measures the environmental performance of Australian buildings, tenancies and homes. Put simply, NABERS measures the energy efficiency, water usage, waste management and indoor environment quality of a building or tenancy and its impact on the environment in operation.

The project is benchmarking its performance against the NABERS for Hotels Energy and Water rating tool. The benchmarking is designed to estimate the sustainability outcomes in terms of energy and water efficiency of the hotel in operation. NABERS will drive efficient management practices, procedures and operational strategies during the operational phases of the hotel. The tool rewards designs and operations which allow for efficient energy management for transient environments such as a hotel operation.

Two energy models have been developed for the Ritz-Carlton Hotel and represent the following scenarios:

- ◆ “On Axis” this model represents the building with the construction, commissioning and system efficiencies all working as per the design; and
- ◆ “Off Axis” this model represents the building with inefficiencies and faults incorporated into the model.

The NABERS benchmarking exercise has been completed for the Ritz-Carlton Hotel development. The development has the potential to achieve a NABERS for Hotels energy rating of 5.5 Stars and a NABERS for Hotels water rating of 4 Stars during the “On Axis” scenario.

For this project, the ‘Off Axis’ energy scenario has been modelled based on the tri-generation system not operating, and all resources being meet through traditional grid electricity and gas. Based on the modelling results, the development is predicted to achieve a NABERS for Hotels energy rating of 3 Stars.

The “off axis” scenario for the NABERS for Hotel water rating has had a nominal 10% increase in the modelled water consumption added to the overall consumption. The 10% increase allows for any leaking taps, shower, fittings, and any increase in pool water consumption and excessive cleaning water. Based on the modelling results, the development is predicted to achieve a NABERS for Hotels water rating of 3.5 Stars.

The predicted ratings rely on the implementation of a number of energy and water initiatives including but not limited to the following:

- ◆ Connection to high efficiency central thermal plant;
- ◆ Connection to low carbon tri-generation system;
- ◆ High efficiency fan coil unit air conditioning system, with low static pressures;

- ◆ High efficiency fans and pumps;
- ◆ Full LED lighting system with user control switching;
- ◆ High thermal performance walls and façade system; and
- ◆ Waterless heat rejection system (harbour heat rejection).

A detailed report presenting the results of the NABERS for hotel energy and water rating analysis is provided in Appendix C.

4.4 GREEN STAR DESIGN AND AS BUILT 5 STAR RATING (RITZ CARLTON HOTEL AND RESIDENTIAL TOWER COMPONENT)

Green Star is Australia's mark of quality for the design, construction and operations for sustainable buildings. It is the most recognised certifier of sustainable building within the Australian market.

A Green Star Design and As Built Rating of 5 Stars is targeted for the Ritz Carlton Hotel and Tower component of the project. A 5 Star rating corresponds to 'Australian Excellence' for sustainability within the built environment.

A certified rating represents an ambitious step for the project in terms of holistic sustainability. The project will deliver sustainable outcomes across the 8 impact categories, as well as embed innovation within the design of the project.

A detailed analysis of the initiatives being incorporated into the design is provided in Section 6 of this report. A detailed points pathway, demonstrating how the development would achieve the 5 Star target is provided in Appendix D along with preliminary modelling and reporting to support the strategy.

The project is currently being registered with the Green Building Council of Australia for certification.

4.5 CRADLE TO GRAVE LIFE CYCLE ANALYSIS (RITZ CARLTON HOTEL AND RESIDENTIAL TOWER COMPONENT)

A cradle to grave life cycle assessment of the Ritz Carlton Hotel and Residential Tower has been completed. The assessment aims to drive embodied and operational emission improvements through whole of life based decision making.

The current analysis indicates that the project will achieve up to a 64% reduction on whole of life greenhouse gas (GHG) emissions and a 327% cumulative impact reduction across the 7 impact categories compared to a reference design. The project is predicted to achieve the full 7 credit points available under credit 19A within Green Star Design and As Built. Additional points may also be available for exceeding the LCA benchmark. The predicted Green Star LCA results are shown in Table 4.3.

Impact Category	Unit	Reference Design	Proposed Design	Reduction
Climate change	kg CO ₂ equivalents	449,496,695	160,542,272	64%
Stratospheric ozone depletion	kg CFC-11 equivalents	0.70	0.69	0%
Acidification potential of land and water	kg SO ₂ equivalents	1,832,021	288,412	84%
Eutrophication potential	kg PO ₄₃ - equivalents	165,085	59,767	64%
Photochemical ozone creation potential	kg C ₂ H ₄ equivalents	121,043	45,367	63%
Mineral depletion	kg Sb equivalents	8,014,392	8,014,425	0%
Fossil fuel depletion	MJ net calorific value	5,144,270,345	2,451,498,248	52%
Cumulative Impact Reduction				327%

TABLE 4.3 SUMMARY OF GREEN STAR LCA RESULTS (CREDIT 19A)

The GHG emissions by life cycle stage are shown below in Figure 4.1. Over the 60 years of building life time assessed for the life cycle model, operational energy dominates GHG emissions as well as the other mandatory impact categories. Due to energy efficiency initiatives and supply of low carbon energy through the tri-generation central plant, the proposed building achieves a 69% reduction in operational GHG emissions and a 64% reduction in whole of life GHG emissions, which contributes significantly to the cumulative impact reduction.

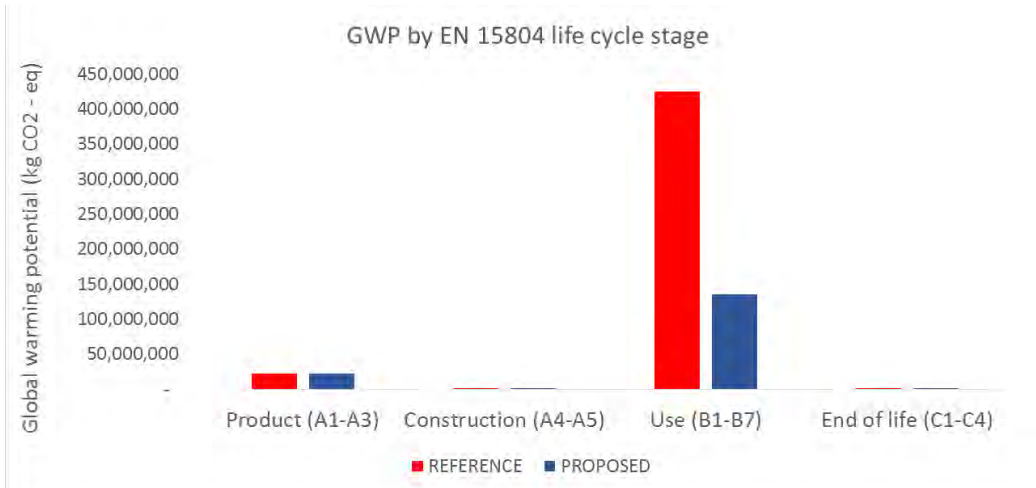


FIGURE 4.1 GREENHOUSE GAS EMISSIONS BY LIFE CYCLE STAGE

4.6 CLIMATE ADAPTATION PLAN (RITZ CARLTON HOTEL AND RESIDENTIAL TOWER COMPONENT)

Climate change is having worldwide impacts on society, the economy and the environment. In Australia the CSIRO Climate Change in Australia 2015 publication, states that: “Observed climate information indicates that Australian average surface air temperature has increased by 0.9°C since 1910, and many heat-related records have been broken in recent years. Sea level has risen about 20cm over the past century.”

A Climate Adaptation Plan (CAP) for the Ritz Carlton Hotel and Residential Tower project is the result of a collaborative and iterative risk management process engaging all relevant areas of the business and project team.

The CAP has followed the guidance of the following standards:

- ◆ Australian Standard AS 5334-2013 ‘Climate change adaptation for settlements and infrastructure’;
- ◆ ISO 31000-2009 – Risk Management – Principles and Guidance; and
- ◆ AGO, Climate Change Risks and Impacts: A Guide for Government and Business.

Table 4.4 provides a climate projection snapshot summary for key climate variables within Sydney.

Climate projections for 2020-2039 (2030) are described in the snapshot below as NEAR FUTURE.

Climate projections for 2060-2079 (2070) are described in the snapshot below as FAR FUTURE.

Projected temperature changes		
	Maximum temperatures are projected to increase in the near future by 0.3–1.0°C	Maximum temperatures are projected to increase in the far future by 1.6–2.5°C)
	Minimum temperatures are projected to increase in the near future by 0.4–0.8°C	Minimum temperatures are projected to increase in the far future by 1.4–2.5°C
	The number of hot days near future and far future will increase	The number of cold nights near future and far future will decrease
	Near future - Average change +3.9 hot days per annum above 35°C (current Sydney average 4.7 days per annum)	Far future - Average change +10.4 hot days per annum above 35°C (current Sydney average 4.7 days per annum)
Projected rainfall changes		
	Rainfall is projected to decrease in spring and winter	Rainfall is projected to increase in summer and autumn
	Peak rainfall intensity and storm volume is projected to increase in the near future	Peak rainfall intensity and storm volume is projected to increase in the far future
Projected sea level rise changes		
	Sea level is projected to increase 0.4 m by 2050, relative to the 1990 mean sea level	Sea level is projected to increase 0.9 m by 2100, relative to the 1990 mean sea level
Projected Forest Fire Danger Index (FFDI) changes		
	Average fire weather is projected to increase in spring by 2070	Severe fire weather days are projected to increase in summer and spring by 2070

Table 4.4 climate projection snapshot

Source: Metropolitan Sydney Climate Change Snapshot, OEH, 2013

Source: NSW Sea Level Rise Policy Statement, NSW Government, 2009

AS 5334 'Climate change adaptation for settlements and infrastructure' outlines a process for the identification and management of risks that infrastructure face from climate change. It provides risk criteria that has been utilised in this risk assessment to determine the potential risks to the project assets from climate change.

The project team have completed a risk workshop, identifying climate risks to the asset within the scope of the CAP. Adaptation actions have been identified to reduce risk ratings on the project. **TABLE 4.5** below summarises the potential climate risks identified on the asset, as well as the reassessed risk following the implementation of adaptation measures. The risks and mitigations are provided in detail in Appendix E.

Risk Rating	E Extreme	H High	M Medium	L Low	Total Risks
Number of Risks	0	3	6	9	18
Number of Reassessed Risks	0	0	7	11	18

TABLE 4.5 SUMMARY OF INITIAL AND REASSESSED RISKS

All eighteen potential climate change risks identified received adaption measures which help to mitigate and reduce the likelihood of that event occurring. All three extreme and high risks have been mitigated to medium level risks and two medium risks have been mitigated to low level risks through adaption measures.

The outcome of this process will result in a more resilient and future proofed asset.

4.7 SEGL SUSTAINABLE DESIGN GUIDELINE

All aspects of the Modification 13 development will be subject to compliance with SEGL's Sustainable Design Guidelines. The guidelines provide a pathway for designers to ensure all SEGL assets are designed to be a world class integrated resort which delivers a memorable guest experience as well as best practice environmentally conscious and sustainable design. The guideline applies to all suppliers, contractors and sub-contractors and requires them to comply with the following while engaged:

- ◆ Operate on sound environmental principles to meet the highest industry standards;
- ◆ Manage their people ethically;
- ◆ Deliver world class projects incorporating best practice in innovation and design; and
- ◆ Ensure all design specifications consider ongoing running costs, energy efficiency and reducing carbon emissions.

SEGL take a holistic approach to sustainability, spanning 8 impact categories which have the most material impact on their asset types. All projects are required to comply with sustainability best practice benchmarks across the following areas:

- ◆ Water;
- ◆ Energy;
- ◆ Waste;
- ◆ Biodiversity;
- ◆ Interiors;
- ◆ Materials;
- ◆ Best practice innovation; and
- ◆ Management of suppliers.

SEGL apply these guidelines to all of their projects, and they will be applied to the Modification 13 works. The guidelines are a strong indicator of SEGL's commitment to ongoing sustainability during design, construction and operational phases of each project, and as an operator of assets overall. The guide provides a framework to ensure all new projects from SEGL consider holistic sustainability aspects and have present a limited environmental impact.

THE  STAR

CURRENT AND FUTURE SITE INITIATIVES

5 CURRENT AND FUTURE SITE INITIATIVES

Throughout the operation of The Star, a number of sustainability initiatives have been implemented on the site and others have been in operation for up to almost 20 years. The Star also has approved modification works which will consider sustainability in Modification 14. The proposed works associated with Modification 13 would utilise and support existing, ongoing and approved sustainability initiatives on the site. Major sustainability initiatives on the site are outlined in this section of the report.

5.1 MECHANICAL SYSTEM OPERATION

Air conditioning and mechanical systems within The Star are constantly being monitored and optimised to improve performance. The following changes are currently being implemented on existing building areas to reduce the site's energy consumption and greenhouse gas emissions whilst not compromising on occupant comfort:

- ◆ Reducing and modulating the outside air volumes across gaming floors to code compliance in order to minimise air conditioning cooling and heating energy consumption;
- ◆ Implementation of an economy cycle on the main gaming floors to minimise air conditioning cooling and heating energy consumption;
- ◆ Reconfiguring chilled water system headers for improved mixing, resulting in both improved conditioning of spaces and minimising air conditioning energy consumption; and
- ◆ Improved efficiency of equipment being upgraded through the use of more modern technology in day to day maintenance and upgrades.

5.2 RAINWATER HARVESTING SYSTEM

The Star has an existing rainwater harvesting system in the form of a bio membrane reactor. The use of the system reduces the reliance on potable water, hence reduces potable water consumption on the site. The system operates by:

- ◆ Capturing rainwater through a rooftop collection system;
- ◆ Stores and filters water for non-potable reuse; and
- ◆ Reuses water for the purposes of bathroom flushing, urinal flushing and landscape irrigation.

The proposed works associated with Modification 13 will be fully integrated with this system.

5.3 HARBOUR HEAT REJECTION SYSTEM

The Star has successfully operated a harbour heat rejection system for almost 20 years. The system includes a water intake point in Jones Bay, a heat exchanger and pumping system within The Star's basement, and a water discharge point in Pyrmont Bay.

The Modification 13 works will be connected into the site's central energy plant, and hence utilise the sites harbour heat rejection system. A heat rejection capacity increase has been approved in Modification 14, which will provide sufficient capacity for the heat rejection requirements for

The harbour heat rejection system forms a major part of The Star's operational sustainability strategy and will provide the following benefits:

- ◆ Significant water efficiency benefits. Up to 50% of a typical building's water consumption can come from cooling tower make-up water. As a 24 hour, 7 day a week operation, this water saving is a significant amount and is estimated to be in the order of 160ML per annum. Any future development, including Modification 13, will increase the potable water savings when connected to this system;
- ◆ Risk of legionella outbreaks. Legionella disease can commonly spread through evaporative heat rejection systems. It has become a health risk to the public with recent deaths occurring in Sydney as a result of Legionella. By utilising a harbour heat rejection system as a primary heat rejection system, rather than the cooling towers on the site, the risk of legionella can be reduced; and
- ◆ Increased rooftop space for patron amenity. Roof top areas within Sydney commonly cannot be accessed by patrons and occupants for outdoor amenity as these areas are used for plant rooms and cooling towers. By utilising the harbour heat rejection system, The Star has reduced the amount of roof top space needed for

plant rooms and cooling towers, instead using basement areas for plant rooms. The Star has therefore activated roof top spaces to create an improved environment for patron usage of roof top spaces.

5.4 VSD UPGRADES

The Star site has been operating continuously since opening in 1997. As such there are some fans and pumps which have reached the end of their service life. The Star will be installing new high efficiency circulating pumps and ventilation fans with integrated variable speed drives (VSD).

The high efficiency pumps and fans will allow energy and greenhouse gas emission savings during operation. As these units typically operate 24 hours a day 7 days a week their upgrade will result in a sizable improvement in the Star's operational efficiency.

The VSDs will allow the fan and pump motors to turn down to match the load on the site at any given time. This can typically save up to 60% energy and greenhouse gas emissions compared with a constant speed traditional fan or pump.

5.5 VERTICAL TRANSPORTATION UPGRADES

SEGL is committed to upgrading the vertical transportation on the existing site including lifts and escalators. The following upgrades are currently planned and will bring the following energy savings:

- ◆ Permanent Magnet, gearless, Variable Voltage Variable Frequency lift drives bringing an energy saving of 20% – 30% compared to business as usual drives;
- ◆ Regenerative drive technology, bringing an additional energy saving of between 5% – 15% compared to business as usual technology; and
- ◆ Lift cars to include LED lighting, bringing an additional energy saving of 50% – 60% compared to business as usual lift car lighting.

5.6 ENERGY SUB-METERING

Energy sub-metering is a key component of ensuring an energy efficient operation at The Star. As part of the ongoing aspirations of SEGL to achieve sustainability leadership, the following key energy consumption equipment will be individually sub-metered as a minimum where new equipment is installed. This will enable SEGL to continue the rigorous energy metering and monitoring program.

- ◆ Chillers;
- ◆ Heating hot water boilers;
- ◆ Chilled water pumps;
- ◆ Heating hot water pumps;
- ◆ Condenser water pumps;
- ◆ Harbour heat rejection pumps;
- ◆ Air handling unit supply fans;
- ◆ Return air fans;
- ◆ Ancillary ventilation fans;
- ◆ Packaged and split AC units;
- ◆ Exterior lighting;
- ◆ General lighting and small power;
- ◆ Vertical transportation;
- ◆ Hydraulic & fire systems;
- ◆ Domestic hot water (DHW) boilers; and
- ◆ Gas engine input and output.

5.7 WATER SUB-METERING

Water sub-metering is a key component of ensuring a water efficient operation at The Star. As part of the ongoing aspirations of SEGL to achieve sustainability leadership, the following key water consumption items will be individually sub-metered as a minimum where new equipment is installed. This will enable The Star to continue the rigorous water sub-metering, monitoring and targeting program, and leak detection activities.

- ◆ Bathrooms;
- ◆ Showers;
- ◆ Landscape irrigation; and
- ◆ Rainwater supply.

THE  STAR

ENVIRONMENTAL SUSTAINABILITY RATING STRATEGY

6 ENVIRONMENTAL SUSTAINABILITY RATING STRATEGY

The Ritz Carlton Hotel and Residential Tower will target a 5 Star rating under the Green Building Council of Australia's Green Star Design and As Built rating tool. This ambitious target demonstrates Australian Excellence in sustainability and is rarely achieved on such a complex, multi-use tower. Initial analysis, modelling, design and planning for the rating has been undertaken, ensuring the ambitious target is achievable and embedded within the design of the project. The following sections summarises the approach to achieving the 5 Star Green Star rating for the development.

The summary presents the current approach to achieving a 5 Star Green Star rating, it is acknowledged that strategies change during design development and construction, and as such, the final pathway to achieving the 5 Star rating may differ from the current strategy, however the Project team are committed to achieving a 5 Star Green Star Rating.

SEGL propose to comply with and in some cases have already complied with, the following clauses.

6.1 MANAGEMENT

6.1.1 Green Star Accredited Professional

- ◆ Engage a Green Star accredited professional to guide and advise the project team on how to achieve holistic sustainable outcomes throughout the design, construction and operational phases of the project.

6.1.2 Commissioning and Tuning

- ◆ Complete a comprehensive services and maintainability review at key stages during the design process to ensure:
 - Commissionability;
 - Controllability;
 - Maintainability;
 - Operability; and
 - Safety.
- ◆ Provide comprehensive pre-commissioning, commissioning, and quality monitoring of all building services and systems in accordance with the CIBSE Commissioning Codes or both AIRAH DA27 & DA28 application manuals. Mechanical services only can choose to provide comprehensive pre-commissioning, commissioning, and quality monitoring in accordance with ASHRAE Guideline 1-1996;
- ◆ Undertake a minimum 12 month commissioning building tuning period on all mechanical, electrical (including lighting) and BMS services after building handover. This requires minimum monthly monitoring, minimum quarterly tuning & reviews & reporting, and a final recommissioning after 12 months of operation. A building tuning report is to be generated for the building owner and reviewed by the relevant member of the design team;
- ◆ Engage an independent commissioning agent to complete the following:
 - Work in collaboration with the contractor appointed by SEGL to provide commissioning advice to The Star and the design team and to monitor and verify the commissioning of all building services and building control systems; and
 - Liaise with the project team to ensure that commissioning is undertaken with a multi-trade approach.

6.1.3 Adaptation and Resilience

- ◆ Develop a site specific climate adaptation plan (project team has completed this already) in accordance with:
 - AS 5334:2013 Climate Change Adaptation for Settlements and Infrastructure; or
 - ISO 31000-2009 – Risk Management – Principles and Guidance and AGO, Climate Change Risks and Impacts: A Guide for Government and Business.
- ◆ Implement the climate adaptation plan (project team has completed this), including:
 - At least two risk items identified in the risk assessment component of the Climate Adaptation Plan must be addressed by specific design responses; and
 - All risk items identified as 'high' or 'extreme' must be addressed by specific design responses.

6.1.4 Building Information

- ◆ Building operations and maintenance manual developed and made available to The Star that includes information relevant for the building facilities management team; and
- ◆ A simple and easy-to-use Building Users' Guide developed and made available to The Star that includes information relevant for the building users, occupants and tenants' representatives. The Building Users' Guide shall include information regarding the building energy & environmental strategy, energy monitoring & targets, building services, transport facilities, materials & waste policy, expansion/re-fit considerations and references, where relevant.

6.1.5 Commitment to Performance

- ◆ A commitment from The Star and Ritz Carlton to set targets, measure results and report quarterly for environmental performance, including:
 - Energy;
 - Water;
 - Operational waste; and
 - Indoor environment.
- ◆ Set targets and measure results of construction waste end of life interior fitouts.

6.1.6 Metering and Monitoring

- ◆ A commitment from The Star to provide individual building energy and water meters to major and common energy and water uses and sources.
- ◆ Implement a comprehensive monitoring strategy, capable of capturing and processing data and accurately and clearly presenting data consumption trends.

6.1.7 Construction Environmental Management

- ◆ Have current and valid ISO-14001 Environmental Management System accreditation prior to and throughout all phases of the project works (including demolition, early works & construction phases). A copy of valid certification shall be made available to The Star.
- ◆ Prepare and implement a comprehensive, project-specific Environmental Management Plan (EMP) for all phases of the works (including demolition, early works & construction phases) in strict accordance with NSW Environmental Management System (EMS) guidelines. The EMP must include the requirement for all sub-contractors to adhere to the ISO14001 requirements.
- ◆ Throughout all phases of the works, maintain and provide copies of all reporting created through the use of the EMP confirming its thorough implementation in accordance with NSW EMS guidelines.

6.1.8 Operational Waste

- ◆ Implement a comprehensive Operational Waste Management Plan (OWMP), prepared by a suitable professional in accordance with best practice approaches, specific to the building design.

6.2 INDOOR ENVIRONMENT QUALITY

6.2.1 Indoor Air Quality

- ◆ Mitigate the entry of outdoor pollutants by designing the system for ease of maintenance and cleaning, and cleaning the system prior to occupation and use.
- ◆ Ensure that the air conditioning system provides outdoor air ventilation at an improvement (up to 100%) over and above the minimum requirements of AS1668.2-1991. Include the provision of filtration meeting the particulate filtration efficiency requirements of AS1668.2-1991 Appendix D for the base rate selected.
- ◆ Ensure pollutants arising from printing equipment, cooking processes and vehicle exhaust are eliminated through removal of the source or exhausting directly to the outside and limiting their entry to the building.

6.2.2 Internal Noise Levels

- ◆ Ensure the internal noise levels are suitable and relevant to the activity in the room, including any building services noise and external noise ingress.
- ◆ Ensure the reverberation levels are reduced to a suitable level for the relevant activity within the room.
- ◆ Ensure enclosed spaces have been built to minimise cross talk between rooms for improved privacy.

6.2.3 Lighting Comfort

- ◆ High frequency ballasts shall be installed for all fluorescent luminaires.
- ◆ Lighting design to provide good maintained illuminance values across entire rooms with suitable colour deviation and eliminated glare.
- ◆ A combination of lighting and surfaces improve lighting uniformity to give visual interest.
- ◆ Where appropriate, provide localised lighting control to occupants within their immediate environment.

6.2.4 Visual Comfort

- ◆ Control glare from sunlight through the use of blinds, screens, fixed devices or other means.
- ◆ Ensure nominated areas receive high levels of natural daylight throughout the day.
- ◆ Ensure nominated areas have a clear line of site to high quality internal or external views.

6.2.5 Indoor Pollutants

- ◆ At least 95% of all internal painted surfaces have low or no Total Volatile Organic Compounds (TVOC) Content.
- ◆ At least 95% of all adhesives and sealants have low or no Total Volatile Organic Compounds (TVOC) Content.
- ◆ All carpet (including underlay) and flooring products have low or no Total Volatile Organic Compounds (TVOC) Content.
- ◆ 95% (by area) of all composite and engineered wood products (including exposed and concealed applications) have low formaldehyde emissions levels.

6.2.6 Thermal Comfort

- ◆ Ensure the air conditioning system achieves Predicted Mean Vote (PMV) levels between -0.5 and +0.5 inclusive shown through Dynamic Thermal Simulation modelling, in accordance with ISO7730, achieved during Standard Operating Hours of Occupancy for 98% of the year using standard clothing and metabolic rate values.

6.3 ENERGY

6.3.1 Greenhouse Gas Emissions

- ◆ Demonstrate that the building achieves a greenhouse gas emission reduction compared to a benchmark building through improved façade performance, high efficiency services and other energy efficiency initiatives.

6.3.2 Peak Electricity Demand Reduction

- ◆ Demonstrate that the building achieves a peak electricity demand reduction compared to a benchmark building through alternative on-site energy generation.

6.4 WATER

6.4.1 Potable Water Reduction

- ◆ Ensure that the predicted potable water consumption for sanitary use within the building has been reduced against a 'best practice' benchmark through the use of water efficient fixtures/fittings and a rainwater capture system.
- ◆ Connection to the existing on-site rainwater collection system. Each flushing device and the landscape irrigation system to be supplied with recycled water.

- ◆ Potable water consumption requirement for the landscaping irrigation to be reduced by no less than 90% through appropriate selection of landscaping species and use of recycled water.
- ◆ Provide sufficient temporary storage and piping to enable recirculating fire system testing so that a minimum of 80% of all routine fire protection system test water and maintenance drain-down water is captured for re-use on site.
- ◆ Each floor fitted with a sprinkler system must have isolation valves or shut-off points for floor-by-floor testing.

6.5 MATERIALS

6.5.1 Comparative Life Cycle Assessment

- ◆ Complete a whole of life, life cycle assessment compared to a reference building, measuring the extent of environmental impacts against a number of environmental categories. Preliminary assessment has been completed.

6.5.2 Responsible Building Materials

- ◆ Ensure steel is sourced from a responsible steel maker and that the steel is produced using energy reducing processes in its manufacture.
- ◆ At least 95% (by cost) of all timber used in the building and construction works have been sourced from any combination of the following:
 - Reused timber;
 - Post-consumer recycled timber;
 - Forest Stewardship Council (FSC) International Certified Timber; and
 - Programme for the Endorsement of Forest Certification (PEFC) Timber.
- ◆ At least 90% (by cost) of the common uses of PVC products in the development must meet best practice guidelines for PVC in the built environment, be products that do not contain PVC or a combination of both.
- ◆ The common uses of PVC in a building development refer to the following:
 - Pipes, conduit and associated fittings;
 - Wire and cable insulation; and
 - Flooring (including vinyl flooring and carpet with PVC backing) and resilient wall covering products that contain PVC.

6.5.3 Sustainable Products

- ◆ Specification of products that meet the following criteria:
 - Reused Products;
 - Recycled Content Products;
 - Environmental Product Declarations;
 - Third-Party Certification; and
 - Stewardship Programs.

6.5.4 Construction and Demolition Waste

- ◆ Construction waste going to landfill should be reduced by 90%.

6.6 LAND USE & ECOLOGY

6.6.1 Ecological Value

- ◆ The ecological value of a development site is to be enhanced beyond its previously existing state through inclusion of landscaping on the site.

6.6.2 Sustainable Sites

- ◆ Reuse of an existing brownfield for the project, using previously developed land.

6.6.3 Heat Island Effect

- ◆ Provide external surfaces with either landscaping or high levels of solar reflectivity in order to reduce heat island effects.

6.7 EMISSIONS

6.7.1 Stormwater

- ◆ The post-development peak event discharge from the site does not exceed the pre-development peak discharge.
- ◆ All stormwater discharge from site meet a high pollution reduction target.

6.7.2 Light Pollution

- ◆ No external luminaire has an upward light output ratio that exceeds 5%.
- ◆ The lighting design complies with AS4282 'Control of the Obtrusive Effects of Outdoor Lighting'.

6.7.3 Microbial Control

- ◆ Eliminate legionella impacts.

6.7.4 Refrigerant Impacts

- ◆ Specify equipment mechanical services with a low Total System Direct Environmental Impact as a result of refrigerant type, mass, ODP and GWP levels.

6.8 INNOVATION

- ◆ Contractor Education – To increase the knowledge of contractors and subcontractors about the benefits and outcomes of sustainable practices, and develop their skills in delivering such benefits.
- ◆ Financial Transparency – Disclose project costs relating to Green Star to increase the amount of information available to industry on the costs and benefits of sustainable building.
- ◆ Community Benefits – To encourage investment by projects in infrastructure for use by the broader neighbourhood, such as the incorporation of spaces that are publically accessible.
- ◆ Energy Metering Integrity – To encourage accuracy of metering over the life of the building to inform energy consumption practices and reduce wasted energy.
- ◆ High Performance Site Office – To improve the sustainability performance of site offices thus increasing health and productivity outcomes of site workers.
- ◆ Local Procurement - To encourage projects that use materials, products or services produced or generated within Australia.
- ◆ Exceeding Green Star Benchmarks – Rewarded for high performance under certain credits, targeted under LCA.

THE  STAR

CONCLUSION

7 CONCLUSION

This report supports planning submission Modification 13, an s75W modification application to the original Major Project Approval (MP08_0098) with the Department of Planning and Environment. The report aims to satisfy the SEARs requirement:

“1. Relevant EPIs, Strategies, Plans and Guidelines

Address the provisions of State environmental planning policies, strategies, plans and guidelines that would apply as if those provisions applied to the carrying out of the project, including the following:

...

o State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004;

...

Demonstrate that the proposal has limited environmental impacts beyond those already assessed for project approval MP 08_0098 and any subsequent modifications to that approval.”

“7. Ecological Sustainable Development (ESD)

Identify how the development will incorporate best practice ESD principles in the design, construction and ongoing operation phases of the development.”

Buildings can have a significant contribution to environmental impacts including but not limited to global greenhouse gas emissions, water consumption, impacts from material supply chain management, transport to and from buildings and many other issues.

Modification 13 has utilised several planning tools to ensure the potential environmental impacts are mitigated. The planning tools which have been used to benchmark the design for Modification 13 include:

- ◆ State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004;
- ◆ Nationwide House Energy Rating Scheme (NatHERS);
- ◆ Section J1 Building Fabric and Section J2 Glazing, Volume One of the National Construction Code (NCC) Series 2016;
- ◆ National Australian Built Environment Rating System (NABERS) Energy and Water for Hotels; and
- ◆ Green Building Council of Australia (GBCA), Green Star Design and As Built.

Through the strategies and initiatives proposed for the development, the environmental impact has been reduced compared to typical buildings projects. The following key findings and conclusions are made:

- ◆ The development can achieve Australian Excellence sustainability outcomes;
- ◆ The development achieves BASIX and NatHERS compliance for the residential dwelling components of the development;
- ◆ The development can achieve compliance with NCC Section J1 Building Fabric and Section J2 Glazing through the use of a high thermal performance building envelope for all non-residential component of the development;
- ◆ The Ritz Carlton Hotel has the potential to achieve a NABERS for Hotels energy rating of 5.5 Stars and a NABERS for Hotels water rating of 4 Stars during operation; and
- ◆ The Ritz Carlton Hotel and Residential Tower is targeting a 5 Star Green Star rating through the GBCA's Green Star Design and As Built rating tool, which will provide third party verified sustainability outcomes for the project.

In summary, the development will be achieving sustainability best practice outcomes across the Modification 13 planned works. The development has been benchmarked against the industry recognised sustainability tools for each element of the development to demonstrate that best practice holistic sustainability outcomes can be achieved.

In particular, a certified Green Star Rating will provide independent, third party verified sustainability performance rating of the project, spanning sustainability aspects including management, indoor environment quality, energy, transport, water, materials, land use and ecology, emissions and innovation. through this rigorous assurance process, the building will be assessed for its sustainability credentials in design, construction and operational phases of the project. Through the provision of a large scale photovoltaic system, supply chain management and improved stormwater management system and many other initiatives, the sustainability initiatives can have positive impacts on areas well outside the physical boundaries of this project and can be beneficial for the surrounding and broader environment.

Through the strategies, approach and analysis provided within this report, the proposed development would have limited environmental impact within the scope of sustainability beyond what has already been assessed in other planning approval submission.

THE  STAR

APPENDICES

APPENDIX A NATHERS AND BASIX

STAR ENTERTAINMENT GROUP LTD

THE STAR MODIFICATION 13 NORTH TOWER RESIDENCES BASIX SUMMARY REPORT

AUGUST 2018





THE STAR MODIFICATION 13 NORTH TOWER RESIDENCES BASIX SUMMARY REPORT

STAR ENTERTAINMENT GROUP LTD

WSP
LEVEL 27, 680 GEORGE STREET
SYDNEY NSW 2000
GPO BOX 5394
SYDNEY NSW 2001

TEL: +61 2 9272 5100
FAX: +61 2 9272 5101
WSP.COM

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	NAME	DATE	SIGNATURE
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AUGUST 2018



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EXECUTIVE SUMMARY

An ESD strategy has been developed for the proposed North Tower Residences development at The Star, Sydney in Pyrmont.

The proposed residential development comprises of:

- A 63 level tower including hotel and entertainment facilities in addition to the residential provisions.
- 204 residential dwellings across 31 floors of the tower.
- Common gymnasium, outdoor deck/landscaped areas and swimming pool facilities for use by residents.
- Entry lobby and access to basement car stacking facility providing space for residential vehicle.
- A 165kW solar photovoltaic solar system

This report demonstrates how the development meets the statutory requirements for single occupancy dwellings under NCC Section J and BASIX.

BASIX requires the following benchmarks to be met:

- Water—Minimum target of 40% potable water use reduction compared to the NSW average
- Thermal comfort—Meeting a set of NatHERS modelled maximum heating and cooling loads determined by the BASIX tool according to the development type and climate zone. For this development, the thresholds are as follows:
 - Heating maximum 40 MJ/m² average across all units, maximum 45.4 MJ/m² for any individual unit
 - Cooling maximum 26 MJ/m² average across all units, maximum 29.5 MJ/m² for any individual unit
- Energy—Minimum required target of 25% energy consumption reduction compared to the NSW average

Water efficiency in the building has been achieved through the following:

- Water efficient fittings
- Water efficient appliances
- Supply of harvested rainwater for use in irrigation.

NatHERS modelling has been conducted to demonstrate thermal comfort performance of the residential dwellings, and the results of this modelling demonstrate that the architectural design is able to manage thermal loads within the apartments to meet and exceed the minimum benchmark in effect for this location.

Energy consumption in multi-unit residential buildings is heavily influenced by the utilisation and servicing of the common areas. HVAC and artificial lighting systems have been carefully designed to reduce energy demands in these areas.

Simple energy efficiency measures, such as the provision of efficient fittings and fixtures will deliver energy consumption reductions in the dwellings. These include:

- Efficient central domestic hot water heating systems
- Lighting will consist of dedicated low energy light fittings with efficient controls to limit unnecessary usage
- High efficiency central heating and cooling system provision
- On site 165kW photovoltaic solar system

1 INTRODUCTION

An ESD strategy has been developed for the proposed North Tower Residences development at The Star, Sydney in Pyrmont.

This report demonstrates how the development meets the statutory requirements for single occupancy dwellings under Section J and BASIX.

1.1 BASIX

BASIX is an online tool that is used to rate the energy and water efficiency and thermal comfort performance of residential dwellings in NSW. The tool sets minimum energy and water reduction targets which must be met through the design of the building and the selection of fixtures and fittings.

BASIX applies to all new dwellings including single dwellings, townhouses and low-rise, mid-rise and high-rise developments in NSW.

Design inputs including location, size, construction and glazing materials, water sources, equipment and fittings are used to determine the potential energy and water consumption of a new home or dwelling.

BASIX assesses three main categories:

- 1 Water;
- 2 Thermal Comfort;
- 3 Energy.

Thermal comfort is assessed by simulation in accordance with the Nationwide House Energy Rating Scheme (NatHERS) modelling protocol. This requires the modelling of each assessable dwelling by an accredited assessor, working with NatHERS accredited software.

NatHERS modelling assesses the potential of the dwelling to provide thermal comfort passively, thereby reducing energy requirements for heating and cooling. The annual heating and cooling loads calculated are entered into the BASIX tool to determine if the dwelling satisfies the maximum heating and cooling loads set for the dwelling in its climate zone.

The heating and cooling loads also affect the BASIX Energy score, with more efficient dwellings contributing to an improved score in the Energy section. The Energy score is also affected by other inputs such as efficiency of appliances, heating and cooling system performance, hot water systems and factors such as use of renewable and alternative energy systems.

1.1.1 SOURCES OF INFORMATION

This BASIX assessment has relied on the following documentation for inputs and methodology

→ Architectural plan drawings from FJMT

Drawing	Date	Revision
Cover Sheet AF000	01.09.17	DA01
General Existing/Proposed Site Plan AF0100	01.09.17	DA01
GA – Basement Car Stacker Extent AF200	01.09.17	DA01

Drawing	Date	Revision
GA – B5 Floor Plan AF201	01.09.17	DA01
GA – B4 Floor Plan AF202	01.09.17	DA01
GA – B3 Floor Plan AF203	01.09.17	DA01
GA – B2 Floor Plan AF204	01.09.17	DA01
GA – Level 00 Residential Entry Ground Floor plan AF1000	01.09.17	DA01
GA – Level 05 Sky Terrace AF2005	01.09.17	DA01
GA – Level 06 Floor Plan AF2006	01.09.17	DA01
GA – Level 07 Floor Plan AF2007	01.09.17	DA01
GA – Level 08 Floor Plan AF2008	01.09.17	DA01
GA – Level 09 Floor Plan AF2009	01.09.17	DA01
GA – Level 10 Floor Plan AF2010	01.09.17	DA01
GA – Level 11 Floor Plan AF2011	01.09.17	DA01
GA – Level 12 Floor Plan AF2012	01.09.17	DA01
GA – Level 14 Floor Plan AF2014	01.09.17	DA01
GA – Level 15 Floor Plan AF2015	01.09.17	DA01
GA – Level 16 Floor Plan AF2016	01.09.17	DA01
GA – Level 17 Floor Plan AF2017	01.09.17	DA01
GA – Level 18 Floor Plan AF2018	01.09.17	DA01
GA – Level 19 Floor Plan AF2019	01.09.17	DA01
GA – Level 20 Floor Plan AF2020	01.09.17	DA01
GA – Level 21 Floor Plan AF2021	01.09.17	DA01
GA – Level 22 Floor Plan AF2022	01.09.17	DA01
GA – Level 23 Floor Plan AF2023	01.09.17	DA01
GA – Level 24 Floor Plan AF2024	01.09.17	DA01
GA – Level 25 Floor Plan AF2025	01.09.17	DA01
GA – Level 26 Floor Plan AF2026	01.09.17	DA01
GA – Level 27 Floor Plan AF2027	01.09.17	DA01
GA – Level 28 Floor Plan AF2028	01.09.17	DA01
GA – Level 29 Floor Plan AF2029	01.09.17	DA01
GA – Level 30-38 Floor Plan AF2030	01.09.17	DA01
GA – Level 65 Roof Plan AF2065	01.09.17	DA01

→ Architectural elevation and section drawings from FJMT

Drawing	Date	Revision
Detail Elevations – North & East Residential Elevation AF4103	01.09.17	DA01
Detail Elevations – South & West Residential Elevation AF4104	01.09.17	DA01
Overall Sections Section 01, Section 02 AF5001	01.09.17	DA01

- Correspondence with FJMT
- Correspondence with Star Entertainment Group Limited.
- NatHERS Technical Note 1 – Principles for Ratings in Regulation Mode Version 1.2 – 2014
- BASIX Thermal Comfort Protocol 01 July 2017

1.1.2 ACCREDITED NATHERS SIMULATION SOFTWARE

FirstRate5 is provided by Sustainability Victoria and is accredited for simulating the thermal performance of dwellings in Australian climates under the NatHERS software accreditation protocol.

FirstRate5 version 5.2.8a has been used in the assessment of this project, in accordance with the NatHERS Technical Note and the BASIX Thermal Comfort Protocol.

Inputs including dwelling geometry, space uses, orientation, climate zone, building materials and shading from architectural features, adjacencies and obstructions are used to calculate heating and cooling loads for the dwelling. Resulting loads that are within the heating and cooling thresholds set under the BASIX protocol will satisfy the thermal comfort targets of BASIX.

1.2 LIMITATIONS

The results from the NatHERS modelling shown within this report are limited in accuracy by factors including the following:

- Actual energy consumption will be affected by variations in the climate, installed equipment, occupants and their behaviour which modelling does not account for;
- Construction details being consistent with the design documentation provided;
- Orientation and apartment layout being as shown on the drawings.

They should not be interpreted for any purpose other than for assessing the thermal comfort section of BASIX.

1.3 APPLICATION OF SECTION J OF THE NATIONAL CONSTRUCTION CODE VOLUME 1

The thermal performance requirements for a building's envelope are addressed through the first three parts of Section J – Energy Efficiency of the National Construction Code (NCC):

- Part J1 – Building Fabric
- Part J2 – Glazing
- Part J3 – Building Sealing

The residential part of this project is regulated under BASIX for energy efficiency.

For each Sole Occupancy Unit (SOU) of a Class 2 building, BASIX satisfies Parts J1, J2 and J3.

The prescriptive provisions of Parts J1, J2 and J3 are therefore not directly applicable to each SOU. The relevant Performance Requirements have been stated as the maximum thermal comfort heating and cooling loads stipulated by BASIX.

The Class 2 parts of the building that are not SOUs must satisfy the prescriptive provisions of Parts J1, J2 and J3.

The architect must take responsibility for specifying the Performance Requirements of the building fabric, glazing and building sealing performance, as required under BASIX, including those non-SOU parts of the building.

The relevant consultant(s) must take responsibility for specifying the Performance Requirements of the mechanical and electrical services design, as required under the relevant parts of Section J.

2 BASIX

The purpose of the BASIX analysis is to benchmark the proposed development against average NSW residential performance parameters, including:

- Water
- Thermal comfort
- Energy

BASIX requires the following benchmarks to be met:

- Water—Minimum target of 40% potable water use reduction compared to the NSW average
- Thermal comfort—Meeting a set of NatHERS modelled maximum heating and cooling loads determined by the BASIX tool. For this development, they are as follows:
 - Heating 40 MJ/m²
 - Cooling 26 MJ/m²
- Energy—Minimum required target of 25% energy consumption reduction compared to the NSW average

The BASIX certificate(s) for the development are included in Appendix A.

2.1 WATER

Water efficiency in the building has been achieved through the following:

- Water efficient fittings as shown in Table 2.1 below.

Table 2.1 Water Fixtures Performance

Fitting	WELS rating	Flow rate
Toilet	4 Star	
Bathroom taps	5 Star	
Kitchen taps	5 Star	
Showers	3 Star	>7.5 but ≤ 9.0L/min
Dishwashers	3 Star	
Washing machines	3 Star	

- Harvested rainwater will provide water for the use of irrigation of the landscaped areas
- Fire sprinkler system test water is to be captured for re-use

2.2 THERMAL COMFORT

Thermal comfort (NatHERS) modelling is employed in accordance with the BASIX protocol, to determine heating and cooling loads attributed to achieving acceptable thermal comfort in each dwelling. The results of NatHERS modelling

demonstrate that the architectural design can manage thermal loads within the apartments to exceed the minimum benchmark for this location.

The maximum allowable thermal loads for a development in this location are shown in Table 2.2. The average thermal loads achieved in this development are shown in the same table for comparison.

Table 2.2 NatHERS Thermal Comfort Performance

	Heating	Cooling
Maximum individual load (set by BASIX)	45.4 MJ/m ²	29.5 MJ/m ²
Average maximum load (set by BASIX)	40 MJ/m ²	26 MJ/m ²
Average load achieved	9.2 MJ/m ²	16.7 MJ/m ²

2.2.1 MODELLING INPUTS

This section identifies the inputs for windows, shading and constructions used for the NatHERS modelling on all the dwellings.

GLAZING

Table 2.3 identifies the glazing properties (window total values only) used in the NatHERS models.

Table 2.3 Glazing properties

Location	Type	U-value	SHGC
All apartments, all fixed external façade glazing	Double glazed Argon Filled Low-e performance clear glass system	2.0	0.31
All apartments, all operable external façade glazing	Double glazed Argon Filled Low-e performance clear glass system	2.5	0.25

Glazing Reductions;

Opaque, insulated panel area is required for dwellings noted in the table below, in place of glazing shown on drawings:

Table 2.4 Required glazing reductions as modelled

Apartment	Wall Panels Replacing Glazed Panels
052	4x 750mm panels
062	4x 750mm panels
064	2x 750mm panels

SHADING

Shading of the external building fabric alters the impact of solar loads on the internal conditions of each dwelling. NatHERS modelling accounts for sources of fixed shading that can impact each dwelling.

Note that models have accounted for the following:

- The overhang of any balconies and floor plate above each dwelling;
- Overshadowing from adjacent buildings; and
- Projecting balcony separator walls and other 'wing-wall'-type geometry between dwellings.

Holland blinds have been modelled as required by the NatHERS protocol, but are not required to be installed as part of the development. Blinds can be installed by the occupants retrospectively as required.

CONSTRUCTIONS

Table 2.5 identifies the wall, floor, ceiling and roof construction properties used as part of the NatHERS models.

Table 2.5 Construction Properties

Element	Construction	Insulation provision	Detail
External walls	Aluminium composite cladding panels with plasterboard lining on studs	R2.0 bulk added insulation	
Party walls (walls between dwellings)	Precast concrete, plasterboard lining	No added insulation	
Internal walls (Walls between dwellings and common areas)	Precast concrete, plasterboard lining	No added insulation	
Internal walls (Walls within dwellings)	Lightweight plasterboard stud walls	No added insulation	
Walls to stairwells and lift core	Precast concrete, plasterboard lining	No added insulation	
Roof	Suspended slab roof for any exposed sections of apartment ceiling.	R3 added insulation	Apartments with other above have no roof but a neighbouring adjacency
Floors	Suspended concrete slab	No added insulation	
Suspended floors	Suspended concrete slab	R1 added insulation	
Ceilings	Plasterboard lined	No added insulation	Ceiling between levels have neighbouring adjacencies and are not insulated.

2.2.2 MODELLING RESULTS

This section describes the results from NatHERS modeling. In summary, the dwelling design identified in the stamped drawings can achieve the minimum thermal comfort requirements of BASIX without amendments.

Area adjusted average heating and cooling loads and star ratings for the development are identified in Table 2.6.

Table 2.6 Area adjusted heating and cooling average loads for the development

North Tower Residences	Heating Load (MJ/m ²)	Cooling Load (MJ/m ²)	Total Load (MJ/m ²)	Star Rating
AVERAGE	9.2	16.7	25.9	8.0

2.2.3 MODELLING CONCLUSION

The results of NatHERS modelling demonstrate the apartments can meet the minimum requirements of the Thermal Comfort section of BASIX.

The NatHERS group Universal certificate and stamped plans have been attached and confirm the construction and design details that have been supplied and modelled.

2.3 ENERGY

2.3.1 COMMON AREAS

Energy consumption in multi-unit residential buildings is heavily influenced by the utilisation and servicing of the common areas. HVAC and artificial lighting systems in car parks, and lobbies need to be carefully designed to reduce energy demands.

The common areas will use:

- Efficient mechanical ventilation systems with appropriate controls to avoid overuse
- Natural ventilation where possible
- High efficacy light fittings
- Lighting control systems in all spaces such as motion sensors where appropriate, or timeclock and BMS control

Car park mechanical ventilation controlled by carbon monoxide sensors and VSD fans

Further details of the proposed energy strategy for the common areas of the residential portion of the building are summarised in Table 2.7.

Table 2.7 Energy strategies for the common areas

Energy Item	Strategy
Lift motors	Gearless traction with VVVF motors
Lighting	Car stacker and access—light emitting diode; Zoned switching with motion sensor Lifts—light emitting diode; Connected to lift call button Storage service areas—light emitting diode; motion sensors Hallways, Lobbies—light emitting diode; motion sensors Gym—fluorescent or light emitting diode; time clocks
Ventilation	Basement —ventilation (supply + exhaust); carbon monoxide monitor + VSD fan Storage service areas—no mechanical ventilation Plant areas—ventilation exhaust only; Interlocked to light Hallways, Lobbies, Gym – air conditioning system; time clock/BMS controlled

2.3.2 DWELLINGS

Domestic hot water (DHW), space heating and comfort cooling account for up to 60% of the energy use of an average residential dwelling. Targeting these systems as a priority will support the greatest energy consumption reductions. Simple energy efficiency measures, such as the provision of efficient fittings and fixtures can deliver energy consumption reductions.

The dwellings will include the following initiatives:

- Efficient central domestic hot water heating systems
- Lighting will consist of dedicated low energy light fittings with efficient controls to limit unnecessary usage
- High efficiency central heating and cooling system provision
- On-site alternative energy provisions

Table 2.8 Energy strategies for the dwellings

Energy Item	Strategy
Central DHW heating system	High efficiency plant
Lift motors	Gearless traction with VVVF motors
Appliances	All appliances to meet the following Energy Star ratings: → Cooktop – Induction → Oven – Electric → 3 Star Refrigerator → 3.5 Star Dishwasher → 4 Star Clothes Washer → 3.5 Star Dryer
Heating and cooling	Centralised air conditioning plant, chilled water and heated water fan coil units
Lighting	Dedicated low energy light fittings to limit lighting energy usage
Ventilation	Bathroom ventilation - into a central duct with VSD and damper, interlocked to light Laundry ventilation - into a central duct with VSD and damper, manual switched on and timer off Kitchen ventilation - into a central duct with VSD and damper, Manual switched on/off

2.3.3 ALTERNATIVE ENERGY SOURCES

The utilisation of an alternative energy source within the proposed development will drastically reduce the overall demand for energy supplied by an external provider.

The alternative energy sources will include:

→ Photovoltaic (PV) System

The inclusion of a photovoltaic (PV) system as a means of providing an alternative energy source allows the development to capitalise on a zero carbon renewable energy source and reduce the reliance on grid electricity.

Further details of the proposed alternative energy strategy for the building are summarised in Table 2.7.

Table 2.9 Energy strategies for the common areas

Energy Source	Strategy
Photovoltaic System	165 peak kW rated electrical output

APPENDIX A

BASIX CERTIFICATE

BASIX[®]Certificate

Building Sustainability Index www.basix.nsw.gov.au

Multi Dwelling

Certificate number: 794694M_02

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 06/10/2017 published by the Department. This document is available at www.basix.nsw.gov.au

Secretary

Date of issue: Friday, 03 August 2018

To be valid, this certificate must be lodged within 3 months of the date of issue.



Project summary		
Project name	The Star Sydney - Mod 13 Residential_02	
Street address	80 Pyrmont Street Pyrmont 2009	
Local Government Area	Sydney City Council	
Plan type and plan number	deposited 1161507	
Lot no.	500	
Section no.	-	
No. of residential flat buildings	1	
No. of units in residential flat buildings	204	
No. of multi-dwelling houses	0	
No. of single dwelling houses	0	
Project score		
Water	 44	Target 40
Thermal Comfort	 Pass	Target Pass
Energy	 25	Target 25

Certificate Prepared by
Name / Company Name: WSP Australia Pty Ltd
ABN (if applicable): 80078004798

Description of project

Project address

Project name	The Star Sydney - Mod 13 Residential_02
Street address	80 Pyrmont Street Pyrmont 2009
Local Government Area	Sydney City Council
Plan type and plan number	deposited 1161507
Lot no.	500
Section no.	-

Project type

No. of residential flat buildings	1
No. of units in residential flat buildings	204
No. of multi-dwelling houses	0
No. of single dwelling houses	0

Site details

Site area (m²)	793
Roof area (m²)	611
Non-residential floor area (m²)	2620.0
Residential car spaces	204
Non-residential car spaces	20

Common area landscape

Common area lawn (m²)	0.0
Common area garden (m²)	90.0
Area of indigenous or low water use species (m²)	0.0

Assessor details

Assessor number	BDAV/16/1712
Certificate number	GAD1RM2336
Climate zone	56

Project score

Water	✓ 44	Target 40
Thermal Comfort	✓ Pass	Target Pass
Energy	✓ 25	Target 25

Description of project

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

Residential flat buildings - The Star North Tower, 204 dwellings, 38 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
051	1	52.7	0.0	0.0	0.0
061	1	52.7	0.0	0.0	0.0
081	1	52.7	0.0	0.0	0.0
085	1	64.6	0.0	0.0	0.0
094	1	60.6	0.0	0.0	0.0
102	1	60.5	0.0	0.0	0.0
106	1	52.5	0.0	0.0	0.0
114	1	60.6	0.0	0.0	0.0
122	1	72.3	0.0	0.0	0.0
126	1	52.3	0.0	0.0	0.0
144	1	63.1	0.0	0.0	0.0
152	2	80.7	0.0	0.0	0.0
156	1	53.4	0.0	0.0	0.0
164	2	77.0	0.0	0.0	0.0
172	2	87.7	0.0	0.0	0.0
176	1	58.5	0.0	0.0	0.0
184	1	73.8	0.0	0.0	0.0
192	2	109.6	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
052	1	60.5	0.0	0.0	0.0
062	1	60.5	0.0	0.0	0.0
082	1	60.5	0.0	0.0	0.0
091	1	52.7	0.0	0.0	0.0
095	1	64.6	0.0	0.0	0.0
103	2	83.6	0.0	0.0	0.0
111	1	59.7	0.0	0.0	0.0
115	1	64.6	0.0	0.0	0.0
123	2	83.6	0.0	0.0	0.0
141	1	62.6	0.0	0.0	0.0
145	1	67.3	0.0	0.0	0.0
153	1	59.5	0.0	0.0	0.0
161	1	74.2	0.0	0.0	0.0
165	2	73.0	0.0	0.0	0.0
173	1	62.5	0.0	0.0	0.0
181	2	77.5	0.0	0.0	0.0
185	2	79.9	0.0	0.0	0.0
193	1	72.2	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
053	1	55.7	0.0	0.0	0.0
063	1	55.7	0.0	0.0	0.0
083	2	55.7	0.0	0.0	0.0
092	1	60.5	0.0	0.0	0.0
096	1	52.5	0.0	0.0	0.0
104	1	60.6	0.0	0.0	0.0
112	1	69.1	0.0	0.0	0.0
116	1	55.4	0.0	0.0	0.0
124	1	63.1	0.0	0.0	0.0
142	1	72.3	0.0	0.0	0.0
146	1	52.3	0.0	0.0	0.0
154	2	81.6	0.0	0.0	0.0
162	2	87.7	0.0	0.0	0.0
166	1	58.5	0.0	0.0	0.0
174	2	77.0	0.0	0.0	0.0
182	2	96.6	0.0	0.0	0.0
186	1	62.8	0.0	0.0	0.0
194	1	75.4	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
054	1	88.6	0.0	0.0	0.0
064	1	88.6	0.0	0.0	0.0
084	1	60.6	0.0	0.0	0.0
093	2	83.6	0.0	0.0	0.0
101	1	52.7	0.0	0.0	0.0
105	1	64.6	0.0	0.0	0.0
113	2	83.6	0.0	0.0	0.0
121	1	62.6	0.0	0.0	0.0
125	1	67.3	0.0	0.0	0.0
143	2	83.6	0.0	0.0	0.0
151	1	67.9	0.0	0.0	0.0
155	1	55.1	0.0	0.0	0.0
163	1	62.5	0.0	0.0	0.0
171	1	74.2	0.0	0.0	0.0
175	2	73.0	0.0	0.0	0.0
183	1	66.2	0.0	0.0	0.0
191	2	86.0	0.0	0.0	0.0
195	2	87.1	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
196	1	75.1	0.0	0.0	0.0
204	1	60.6	0.0	0.0	0.0
212	3	117.1	0.0	0.0	0.0
216	2	81.7	0.0	0.0	0.0
224	1	60.6	0.0	0.0	0.0
231	2	98.9	0.0	0.0	0.0
235	2	90.5	0.0	0.0	0.0
242	3	125.3	0.0	0.0	0.0
246	1	64.0	0.0	0.0	0.0
253	2	91.6	0.0	0.0	0.0
257	1	66.4	0.0	0.0	0.0
264	1	66.7	0.0	0.0	0.0
271	2	98.9	0.0	0.0	0.0
275	2	102.5	0.0	0.0	0.0
282	3	125.3	0.0	0.0	0.0
286	2	96.3	0.0	0.0	0.0
293	2	100.5	0.0	0.0	0.0
297	2	93.2	0.0	0.0	0.0
304	1	72.5	0.0	0.0	0.0
311	2	98.9	0.0	0.0	0.0
315	2	110.3	0.0	0.0	0.0
322	3	125.3	0.0	0.0	0.0
326	2	94.4	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
201	2	89.1	0.0	0.0	0.0
205	2	92.5	0.0	0.0	0.0
213	2	88.0	0.0	0.0	0.0
221	2	98.8	0.0	0.0	0.0
225	2	81.2	0.0	0.0	0.0
232	3	125.3	0.0	0.0	0.0
236	1	60.1	0.0	0.0	0.0
243	2	91.6	0.0	0.0	0.0
247	2	83.9	0.0	0.0	0.0
254	1	66.7	0.0	0.0	0.0
261	2	98.9	0.0	0.0	0.0
265	2	102.5	0.0	0.0	0.0
272	3	125.3	0.0	0.0	0.0
276	2	96.3	0.0	0.0	0.0
283	2	91.6	0.0	0.0	0.0
287	1	66.4	0.0	0.0	0.0
294	1	72.5	0.0	0.0	0.0
301	2	98.9	0.0	0.0	0.0
305	2	110.3	0.0	0.0	0.0
312	3	125.3	0.0	0.0	0.0
316	2	94.4	0.0	0.0	0.0
323	2	100.5	0.0	0.0	0.0
327	2	93.2	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
202	3	117.1	0.0	0.0	0.0
206	2	81.7	0.0	0.0	0.0
214	1	60.6	0.0	0.0	0.0
222	3	125.3	0.0	0.0	0.0
226	1	58.8	0.0	0.0	0.0
233	2	91.6	0.0	0.0	0.0
237	1	71.6	0.0	0.0	0.0
244	1	64.7	0.0	0.0	0.0
251	2	98.9	0.0	0.0	0.0
255	2	102.5	0.0	0.0	0.0
262	3	125.3	0.0	0.0	0.0
266	2	96.3	0.0	0.0	0.0
273	2	91.6	0.0	0.0	0.0
277	1	66.4	0.0	0.0	0.0
284	1	66.7	0.0	0.0	0.0
291	2	98.9	0.0	0.0	0.0
295	2	110.3	0.0	0.0	0.0
302	3	125.3	0.0	0.0	0.0
306	2	94.4	0.0	0.0	0.0
313	2	100.5	0.0	0.0	0.0
317	2	93.2	0.0	0.0	0.0
324	1	72.5	0.0	0.0	0.0
331	2	98.9	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
203	2	88.0	0.0	0.0	0.0
211	2	89.1	0.0	0.0	0.0
215	2	92.5	0.0	0.0	0.0
223	2	91.6	0.0	0.0	0.0
227	1	65.9	0.0	0.0	0.0
234	1	63.1	0.0	0.0	0.0
241	2	98.9	0.0	0.0	0.0
245	2	94.1	0.0	0.0	0.0
252	3	125.3	0.0	0.0	0.0
256	2	96.3	0.0	0.0	0.0
263	2	91.6	0.0	0.0	0.0
267	1	66.4	0.0	0.0	0.0
274	1	66.7	0.0	0.0	0.0
281	2	98.9	0.0	0.0	0.0
285	2	102.5	0.0	0.0	0.0
292	3	125.3	0.0	0.0	0.0
296	2	94.4	0.0	0.0	0.0
303	2	100.5	0.0	0.0	0.0
307	2	93.2	0.0	0.0	0.0
314	1	72.5	0.0	0.0	0.0
321	2	98.9	0.0	0.0	0.0
325	2	110.3	0.0	0.0	0.0
332	3	125.3	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
333	2	100.5	0.0	0.0	0.0
337	2	93.2	0.0	0.0	0.0
344	1	72.5	0.0	0.0	0.0
351	2	98.9	0.0	0.0	0.0
355	2	110.3	0.0	0.0	0.0
362	3	125.3	0.0	0.0	0.0
366	2	94.4	0.0	0.0	0.0
373	2	100.3	0.0	0.0	0.0
377	2	93.2	0.0	0.0	0.0
384	1	72.5	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
334	1	72.5	0.0	0.0	0.0
341	2	98.9	0.0	0.0	0.0
345	2	110.3	0.0	0.0	0.0
352	3	125.3	0.0	0.0	0.0
356	2	94.4	0.0	0.0	0.0
363	2	100.3	0.0	0.0	0.0
367	2	93.2	0.0	0.0	0.0
374	1	72.5	0.0	0.0	0.0
381	2	98.9	0.0	0.0	0.0
385	2	110.3	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
335	2	110.3	0.0	0.0	0.0
342	3	125.3	0.0	0.0	0.0
346	2	94.4	0.0	0.0	0.0
353	2	100.3	0.0	0.0	0.0
357	2	93.2	0.0	0.0	0.0
364	1	72.5	0.0	0.0	0.0
371	2	98.9	0.0	0.0	0.0
375	2	110.3	0.0	0.0	0.0
382	3	125.3	0.0	0.0	0.0
386	2	94.4	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
336	2	94.4	0.0	0.0	0.0
343	2	100.3	0.0	0.0	0.0
347	2	93.2	0.0	0.0	0.0
354	1	72.5	0.0	0.0	0.0
361	2	98.9	0.0	0.0	0.0
365	2	110.3	0.0	0.0	0.0
372	3	125.3	0.0	0.0	0.0
376	2	94.4	0.0	0.0	0.0
383	2	100.3	0.0	0.0	0.0
387	2	93.2	0.0	0.0	0.0

Description of project

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

Common areas of unit building - The Star North Tower

Common area	Floor area (m²)
Gym	128.0
Lift car (No.2)	-
Residence Corridor L00	132.0

Common area	Floor area (m²)
Car Stacker Cabins and Valet Corridor	187.0
Lift car (No.3)	-
Residential Lift Lobby L00	96.0

Common area	Floor area (m²)
Lift car (No.1)	-
Storage Cages B3 B4	830.0
Hallways	2442.0

Schedule of BASIX commitments

1. Commitments for Residential flat buildings - The Star North Tower

(a) Dwellings

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

(b) Common areas and central systems/facilities

- (i) Water
- (ii) Energy

2. Commitments for multi-dwelling houses

3. Commitments for single dwelling houses

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

- (i) Water
- (ii) Energy

Schedule of BASIX commitments

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

1. Commitments for Residential flat buildings - The Star North Tower

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✓	✓	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✓	✓
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✓	✓
(e) The applicant must install:			
(aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and		✓	✓
(bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✓	✓
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✓	✓	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✓	
(g) The pool or spa must be located as specified in the table.	✓	✓	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✓	✓	✓

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
All dwellings	3 star (> 7.5 but <= 9 L/min)	4 star	5 star	6 star	no	3 star	3 star	-	-	-	-	-	-	-

	Alternative water source							
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up
None	-	-	-	-	-	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✓	✓	✓
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✓	✓
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✓	✓
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✓	✓

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

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	central hot water system 1	motorised damper into central duct + VSD	interlocked to light	motorised damper into central duct + VSD	manual switch on/off	motorised damper into central duct + VSD	manual on / timer off

Dwelling no.	Cooling		Heating		Artificial lighting						Natural lighting	
	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
384	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	1 (dedicated)	1	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no
352, 362, 372, 382	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	3 (dedicated)	1	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no

Dwelling no.	Cooling		Heating		Artificial lighting						Natural lighting	
	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
051, 052, 053, 054, 061, 062, 063, 064, 081, 082, 084, 085, 091, 092, 094, 095, 096, 101, 102, 104, 105, 106, 111, 112, 114, 115, 116, 124, 125, 126, 144, 145, 146, 153, 155, 163, 173, 204, 214,	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	1 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
224, 226, 227, 234, 236, 237, 354, 364, 374												

Dwelling no.	Cooling		Heating		Artificial lighting						Natural lighting	
	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
182, 192, 201, 202, 203, 211, 212, 221, 222, 223, 231, 232, 233, 235, 241, 243, 245, 251, 253, 255, 261, 263, 265, 271, 273, 275, 281, 283, 285, 291, 293, 295, 301, 303, 305, 307, 311, 313, 315,	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	3 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
317, 321, 323, 325, 327, 331, 333, 335, 337, 341, 343, 345, 347, 351, 353, 355, 357, 361, 363, 365, 367, 371, 373, 375, 377, 381, 383, 385, 387												
All other dwellings	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	2 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no

	Individual pool		Individual spa		Appliances & other efficiency measures							
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	induction cooktop & electric oven	3 star (new rating)	no	3.5 star	4 star	3.5 star	no	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.	✓		
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.		✓	
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✓	✓
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✓	✓	✓
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✓	✓	✓

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
051	11.9	25.0
052	9.2	27.9
053	6.8	28.7
054	22.0	28.3
061	15.3	28.7
062	9.4	27.9
063	6.8	27.7
064	4.2	27.5
081	13.1	16.2
082	26.5	21.2
083	25.8	20.9
084	3.9	17.7
085	21.0	18.1
091	15.1	17.3
092	7.4	21.4
093	3.7	26.9
094	3.0	14.6
095	16.8	14.3
096	17.0	16.4
101	9.9	15.3
102	8.2	20.6
103	5.5	17.9
104	14.7	19.0
105	16.6	14.7
106	18.0	19.3
111	13.6	16.3
112	7.7	19.7

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
113	4.7	22.5
114	4.4	15.6
115	17.2	15.0
116	18.3	18.3
121	13.6	15.2
122	10.9	21.3
123	4.9	22.2
124	4.5	16.8
125	17.3	13.4
126	17.2	23.0
141	12.9	15.0
142	8.3	18.7
143	4.7	23.8
144	4.0	14.6
145	17.8	13.0
146	18.0	27.4
151	12.2	25.0
152	7.1	17.8
153	2.5	16.8
154	3.5	16.3
155	17.3	13.1
156	16.9	16.7
161	12.2	17.2
162	8.2	25.2
163	4.2	18.5
164	3.7	23.2
165	17.7	13.9

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
166	17.6	18.1
171	9.5	11.1
172	12.5	26.1
173	3.9	16.4
174	3.2	15.7
175	15.3	11.6
176	17.9	17.7
181	10.2	10.8
182	8.0	20.2
183	5.2	17.6
184	5.0	16.5
185	16.5	10.9
186	20.5	23.3
191	8.8	13.2
192	7.8	16.2
193	4.7	17.0
194	5.2	17.3
195	10.4	16.1
196	19.9	22.1
201	8.8	12.9
202	4.6	21.5
203	6.5	28.6
204	5.8	17.8
205	7.8	16.5
206	16.3	16.0
211	9.2	15.4
212	4.6	18.2

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
213	25.75	14.3
214	7.1	19.0
215	22.4	14.4
216	17.6	7.9
221	31.29	15.3
222	5.0	27.9
223	5.9	14.4
224	6.0	17.8
225	22.4	14.5
226	12.4	7.0
227	22.7	22.1
231	10.2	16.5
232	5.5	15.5
233	5.4	13.3
234	4.2	13.8
235	7.5	14.0
236	7.4	6.9
237	18.2	22.2
241	9.4	16.2
242	5.5	15.2
243	5.3	13.1
244	4.5	13.7
245	7.3	12.7
246	8.4	6.0
247	10.4	13.8
251	9.9	18.6
252	4.7	21.4

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m ² /yr)	Area adjusted cooling load (in mJ/m ² /yr)
253	3.5	24.2
254	4.1	13.2
255	7.7	12.6
256	13.2	7.7
257	7.0	14.6
261	10.5	17.1
262	6.0	15.9
263	4.8	15.5
264	4.5	14.7
265	9.5	19.2
266	16.5	11.9
267	6.8	12.7
271	10.3	17.7
272	6.0	16.1
273	4.7	15.2
274	4.7	12.9
275	8.4	14.9
276	12.5	7.8
277	6.4	12.7
281	10.0	19.4
282	6.2	15.9
283	5.1	14.8
284	4.9	13.7
285	7.6	14.4
286	10.3	8.4
287	5.9	11.2
291	10.8	16.9

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
292	9.2	21.7
293	15.1	22.8
294	4.6	12.7
295	8.1	14.4
296	11.7	7.9
297	9.3	16.6
301	10.1	18.9
302	5.8	17.0
303	4.6	16.5
304	4.3	15.1
305	7.2	17.0
306	13.0	8.6
307	7.7	16.4
311	10.3	20.3
314	4.3	14.6
315	7.1	16.9
317	7.7	16.2
321	10.2	19.5
324	4.3	14.8
325	7.1	16.8
326	13.1	8.5
327	7.7	16.0
334	4.7	16.5
335	7.2	16.7
337	7.8	15.6
344	4.7	16.0
345	7.6	18.4

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
346	12.1	9.1
347	8.0	15.8
351	10.3	19.0
352	5.9	16.9
354	4.7	16.2
355	7.7	18.5
357	8.4	17.0
361	10.3	19.1
362	5.9	16.8
364	4.8	15.7
365	7.8	18.2
367	8.1	16.6
371	10.3	19.2
372	5.9	16.6
373	4.8	16.3
374	4.8	15.6
375	7.8	18.1
376	12.2	9.0
377	8.1	17.1
381	10.3	18.3
382	3.8	16.6
383	2.5	14.1
384	3.5	11.8
385	6.5	14.9
386	10.9	7.8
387	5.7	15.0
312, 322	5.4	15.9

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m ² /yr)	Area adjusted cooling load (in mJ/m ² /yr)
313, 323	4.7	16.4
316, 336	13.1	8.6
331, 341	10.2	19.3
332, 342	5.8	16.9
333, 343	4.6	16.8
353, 363	4.7	16.6
All other dwellings	12.2	9.1

(b) Common areas and central systems/facilities

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

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	3 star (> 6 but <= 7.5 L/min)	5 star	6 star	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 1)	1000.0	To collect run-off from at least: - 600.0 square metres of roof area of buildings in the development - 0.0 square metres of impervious area in the development - 0.0 square metres of garden/lawn area in the development - 0.0 square metres of planter box area in the development (excluding, in each case, any area which drains to, or supplies, any other alternative water supply system).	- irrigation of 90.0 square metres of common landscaped area on the site - car washing in 0 car washing bays on the site
Pool (No. 2)	Volume: 441.0 kLs	Location: The Star North Tower Pool shaded: no	-

Central systems	Size	Configuration	Connection (to allow for...)
Fire sprinkler system (No. 1)	-	So that fire sprinkler test water is contained within the fire sprinkler system for re-use, rather than disposed.	-

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

	Common area ventilation system		Common area lighting		
Common area	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/BMS
Gym	air conditioning system	time clock or BMS controlled	fluorescent	time clocks	No
Car Stacker Cabins and Valet Corridor	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	light-emitting diode	motion sensors	No
Lift car (No.1)	-	-	light-emitting diode	connected to lift call button	No
Lift car (No.2)	-	-	light-emitting diode	connected to lift call button	No
Lift car (No.3)	-	-	light-emitting diode	connected to lift call button	No
Storage Cages B3 B4	no mechanical ventilation	-	light-emitting diode	motion sensors	No
Residence Corridor L00	air conditioning system	time clock or BMS controlled	light-emitting diode	motion sensors	No
Residential Lift Lobby L00	air conditioning system	time clock or BMS controlled	light-emitting diode	motion sensors	No
Hallways	air conditioning system	time clock or BMS controlled	light-emitting diode	motion sensors	No

Central energy systems	Type	Specification
Central hot water system (No. 1)	gas-fired boiler	Piping insulation (ringmain & supply risers): (b) Piping internal to building: R0.45 (~20 mm)
Central cooling system (No. 1)	chilled water fan coil units	Energy source: electric driven compressor Heat rejection method: cooling tower Unit efficiency (min): high - COP > 4.5
Central heating system (No. 1)	fan coil + heated water	Energy source: gas boiler
Lift (No. 1)	gearless traction with V V V F motor	Number of levels (including basement): 39
Lift (No. 2)	gearless traction with V V V F motor	Number of levels (including basement): 39
Lift (No. 3)	gearless traction with V V V F motor	Number of levels (including basement): 39
Pool (No. 2)	Heating source: gas	Pump controlled by timer: yes

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

(b) Common areas and central systems/facilities

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

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	3 star (> 6 but <= 7.5 L/min)	5 star	6 star	no common laundry facility

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

Central energy systems	Type	Specification
Alternative energy supply	Photovoltaic system	Rated electrical output (min): 165.0 peak kW
Other	Building management system installed?: yes Active power factor correction installed?: yes	-

Notes

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

Legend

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

APPENDIX B

NATHERS GROUP UNIVERSAL CERTIFICATE

Nationwide House Energy Rating Scheme* — Class 2 summary



Certificate Number: **GAD1RM2336**

Date of Certificate: **2 Aug 2018**

★ Average star rating: **8.0**

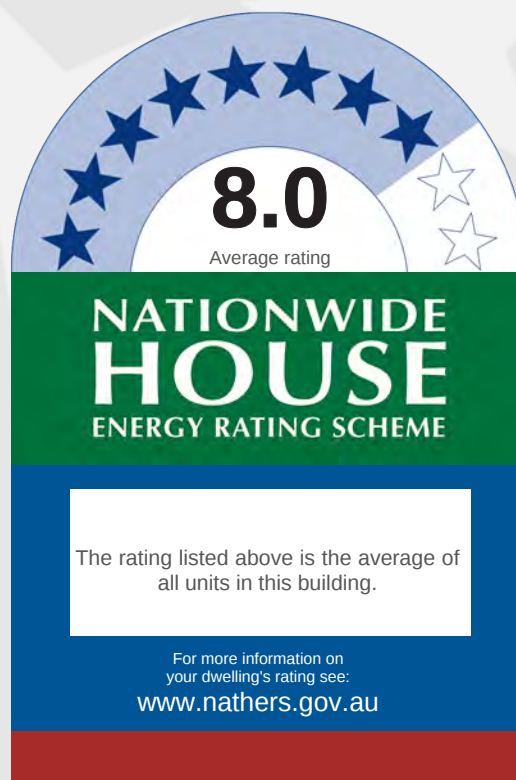
Assessor details

Accreditation number: **VIC/BDAV/16/1712**
Name: **Nicholas Asha**
Organisation: **WSP Australia**
Email: **nick.asha@wsp.com**
Phone: **+61418434221**
Declaration of interest: **No potential conflicts of interest to declare**
Software: **FirstRate5 v5.2.8a**
AAO: **BDAV**

Dwelling details

Address: **20-80 Pyrmont St**
Suburb: **Pyrmont**
State: **NSW**
Postcode: **2009**

Summary of all dwellings



Certification details

Certificate number	Unit number	Annual thermal performance loads (MJ/m2)			Star rating
		Heating load	Cooling load	Total load	
KAK6V2M4GM	051	11.9	25	36.9	7.1
7QN7K1576M	052	9.2	27.9	37.1	7.1
WZYZI975C	053	6.8	28.7	35.5	7.3
UPRKX7FKRW	054	22	28.3	50.3	6.1
S5ZN7FUL1S	061	15.3	28.7	44	6.6
P3X16VLUYL	062	9.4	27.9	37.3	7.1
3O8E2S8CKN	063	6.8	27.7	34.5	7.3
WVQJ419K2C	064	4.2	27.5	31.7	7.5
ZXGNW110OC	081	13.1	16.4	29.5	7.7
VUVF2D6VVO	082	26.5	21.2	47.7	6.3
HRBN64NN6E	083	25.8	20.9	46.7	6.4
VB1VWFIVRB	084	3.9	17.7	21.6	8.4
0IYH1B9KR0	085	21	18.1	39.1	6.9
5OYN5HW2R2	091	15.1	17.3	32.4	7.4
NO3KRU39TX	092	7.4	21.4	28.8	7.8
5LEUX933V4	093	3.7	26.9	30.6	7.6

continued

Nationwide House Energy Rating Scheme* — Class 2 summary



Certificate Number: **GAD1RM2336**

Date of Certificate: **2 Aug 2018**

★ Average star rating: **8.0**

Summary of all dwellings continued

Certification details continued

Certificate number	Unit number	Annual thermal performance loads (MJ/m2)			Star rating
		Heating load	Cooling load	Total load	
4C6GIGMO0O	094	3	14.6	17.6	8.7
TPDYXMON0H	095	16.8	14.3	31.1	7.6
I9144UKDZ6	096	17	16.4	33.4	7.4
O2GW7LSXBK	101	9.9	15.3	25.2	8.1
HPJEDPHP7L	102	8.2	20.6	28.8	7.8
UPDOW4LCLY	103	5.5	17.9	23.4	8.2
6JY4A0JR1L	104	14.7	19	33.7	7.4
41MQA30W0P	105	16.6	14.7	31.3	7.6
N5GOL8Z29C	106	18	19.3	37.3	7.1
AQLNN81PEN	111	13.6	16.3	29.9	7.7
GZXVR3DWO3	112	7.7	19.7	27.4	7.9
EYM6LBCJSB	113	4.7	22.5	27.2	7.9
ARRYLOP8CB	114	4.4	15.6	20	8.5
BLSMJXHU6R	115	17.2	15	32.2	7.4
4DOF8LDOCM	116	18.3	18.3	36.6	7.2
5R6CNZH9KD	121	13.6	15.2	28.8	7.8
NFTM13F9XX	122	10.9	21.3	32.2	7.4
3SNBG6CM09	123	4.9	22.2	27.1	7.9
KA60GUPP9T	124	4.5	16.8	21.3	8.4
FE1OSNE55Q	125	17.3	13.4	30.7	7.6
N0ADIVIT7R	126	17.2	23	40.2	6.9
QTUS7U8991	141	12.9	15	27.9	7.8
FU8ODV7YQX	142	8.3	18.7	27	7.9
XIUFAWF14O	143	4.7	23.8	28.5	7.8
WKSXL0FSQ7	144	4	14.6	18.6	8.6
QF3CWSOJZ3	145	17.8	13	30.8	7.6
QWK7EOD3C0	146	18	27.4	45.4	6.4
L62XYJVXQ6	151	12.2	25	37.2	7.1
OUH96OIC8U	152	7.1	17.8	24.9	8.1
VTQQ01Z30K	153	2.5	16.8	19.3	8.6
AHYEQ8HBP1	153	3.5	16.3	19.8	8.5

continued

Nationwide House Energy Rating Scheme* — Class 2 summary

Certificate Number: **GAD1RM2336**

Date of Certificate: **2 Aug 2018**

★ Average star rating: **8.0**



Summary of all dwellings continued

Certification details continued

Certificate number	Unit number	Annual thermal performance loads (MJ/m2)			Star rating
		Heating load	Cooling load	Total load	
5VE68M3CWG	155	17.3	13.1	30.4	7.6
6WPSAO5MA2	156	16.9	16.7	33.6	7.4
DFKAUBKZKG	161	12.2	17.2	29.4	7.7
QQC3XGV8TN	162	8.2	25.2	33.4	7.4
DFB3V13UDH	163	4.2	18.5	22.7	8.3
PLG7LIKMD	164	3.7	23.2	26.9	7.9
NB5MECCCL6	165	17.7	13.9	31.6	7.5
RQL9LTF975	166	17.6	18.1	35.7	7.2
MK05O706AU	171	9.5	11.1	20.6	8.4
5CXJT6CND	172	12.5	26.1	38.6	7
ODTGMH8RZF	173	3.9	16.4	20.3	8.4
3IQRR2KD6C	174	3.2	15.7	18.9	8.6
8UX8S6IDSS	175	15.3	11.6	26.9	7.9
65UX81QI38	176	17.9	17.7	35.6	7.2
6GP548QVH3	181	10.2	10.8	21	8.4
6X6LVPLXC5	181	10.2	10.8	21	8.4
QAKUGYIHAQ	182	8	20.2	28.2	7.8
195B44HUF2	183	5.2	17.6	22.8	8.3
23Q7H9NYOZ	184	5	16.5	21.5	8.4
2K7TF7T834	185	16.5	10.9	27.4	7.9
PXK6HE1IZI	186	20.5	23.3	43.8	6.6
FLIVP82ITU	192	7.8	16.2	24	8.2
YFB5BJ5R81	193	4.7	17	21.7	8.4
FICWMWUQR1	194	5.2	17.3	22.5	8.3
CLK1EUYYJG	195	10.4	16.1	26.5	7.9
YP9G5373S6	196	19.9	22.1	42	6.8
86HLRQY297	201	8.8	12.9	21.7	8.4
654GRXMD6L	202	4.6	21.5	26.1	7.9
X4FM4ZGYMI	203	6.5	28.6	35.1	7.3
R350Q2IYYO	204	5.8	17.8	23.6	8.2

continued

Nationwide House Energy Rating Scheme* — Class 2 summary



Certificate Number: **GAD1RM2336**

Date of Certificate: **2 Aug 2018**

★ Average star rating: **8.0**

Summary of all dwellings continued

Certification details continued

Certificate number	Unit number	Annual thermal performance loads (MJ/m2)			Star rating
		Heating load	Cooling load	Total load	
FE3VAP0C1G	205	7.8	16.5	24.3	8.1
S4OHED04Q1	206	16.3	16	32.3	7.4
K9P0PC9EZZ	211	9.2	15.4	24.6	8.1
PXORFTAUMO	212	4.6	18.2	22.8	8.3
9D7G0WOYWM	213	5.8	14.3	20.1	8.4
BNH7EGYDF7	214	7.1	19	26.1	7.9
PVMB14P7BV	215	22.4	14.4	36.8	7.2
DGSC1GBJA3	216	17.6	7.9	25.5	8
DDL2U07Z8Y	221	9.2	15.3	24.5	8.1
ZFJ71CTFRO	222	5	27.9	32.9	7.4
3U48GPH4MZ	223	5.9	14.4	20.3	8.4
JIZ6RERJTT	224	6	17.8	23.8	8.2
Z6T42L2MXZ	225	22.4	14.5	36.9	7.1
Z523VTINVE	226	12.4	7	19.4	8.5
SDNIPRQMPW	227	22.7	22.1	44.8	6.5
UKW8Y7A9G4	231	10.2	16.5	26.7	7.9
W5HX9OP5L7	232	5.5	15.5	21	8.4
5EXOAWTKPL	233	5.4	13.3	18.7	8.6
5P6AEOI3EX	234	4.2	13.8	18	8.7
TJH0RX5ZJA	235	7.5	14	21.5	8.4
BUAS0QXI7C	236	7.4	6.9	14.3	8.9
NZT59H9GTU	237	18.2	22.2	40.4	6.9
FW1XOW776N	241	9.4	16.2	25.6	8
03BOJKOOJX	242	5.5	15.2	20.7	8.4
1A5CK3ZL0K	243	5.3	13.1	18.4	8.6
XZGY4P3NDE	244	4.5	13.7	18.2	8.6
SZLULTYFVY	245	7.3	12.7	20	8.5
2V652F0YNU	246	8.4	6	14.4	8.9
6VGVBZBXT4	247	10.4	13.8	24.2	8.1
RBKFFBYL10	251	9.9	18.6	28.5	7.8

continued

Nationwide House Energy Rating Scheme* — Class 2 summary

Certificate Number: **GAD1RM2336**

Date of Certificate: **2 Aug 2018**

★ Average star rating: **8.0**



Summary of all dwellings continued

Certification details continued

Certificate number	Unit number	Annual thermal performance loads (MJ/m2)			Star rating
		Heating load	Cooling load	Total load	
FU0BSC2L6Z	252	4.7	21.4	26.1	7.9
ZE9TI6T04J	253	3.5	24.2	27.7	7.9
6LV1H0K1Z0	254	4.1	13.2	17.3	8.7
RP7XOL5ECW	255	7.7	12.6	20.3	8.4
JLQ4EMC07I	256	13.2	7.7	20.9	8.4
S7QR349842	257	7	14.6	21.6	8.4
1AVFHJHME6	261	10.5	17.1	27.6	7.9
BPXI4V50W4	262	6	15.9	21.9	8.3
YU4RIT8P3U	263	4.8	15.5	20.3	8.4
L6JK5IZKX4	264	4.5	14.7	19.2	8.6
FZVAHDJIRI	265	9.5	19.2	28.7	7.8
8JMAEHGE7Y	266	16.5	11.9	28.4	7.8
L2TUVEFNN1	267	6.8	12.7	19.5	8.5
5UD1Z884JE	271	10.3	17.7	28	7.8
J07VVCUJFX	272	6	16.1	22.1	8.3
CVN9TMGBOC	273	4.7	15.2	19.9	8.5
8550NOGUKF	274	4.7	12.9	17.6	8.7
JM42OV588T	275	8.4	14.9	23.3	8.2
T5IZYJHDIM	276	12.5	7.8	20.3	8.4
26PHGN4GHH	277	6.4	12.7	19.1	8.6
5A89O00UU8	281	10	19.4	29.4	7.7
RHC5SCXFBD	282	6.2	15.9	22.1	8.3
GCM8NM6XVA	283	5.1	14.8	19.9	8.5
0Y00XT6IL8	284	4.9	13.7	18.6	8.6
SWTJ5U3TYE	285	7.6	14.4	22	8.3
0ZEEA3YAWB	286	10.3	8.4	18.7	8.6
3D9UH2RMI9	287	5.9	11.2	17.1	8.7
FP4DUUTCC2	291	10.8	16.9	27.7	7.9
SN8RKBUVZ4	292	9.2	21.7	30.9	7.6
56VJEOX9BC	293	15.1	22.8	37.9	7.1

continued

Nationwide House Energy Rating Scheme* — Class 2 summary

Certificate Number: **GAD1RM2336**

Date of Certificate: **2 Aug 2018**

★ Average star rating: **8.0**



Summary of all dwellings continued

Certification details continued

Certificate number	Unit number	Annual thermal performance loads (MJ/m2)			Star rating
		Heating load	Cooling load	Total load	
DRLZ8L4BTQ	294	4.6	12.7	17.3	8.7
KV74TQFSJG	295	8.1	14.4	22.5	8.3
I5WNDJ3U8F	296	11.7	7.9	19.6	8.5
7UAAZABIS9	297	9.3	16.6	25.9	8
GSBJUJ81ZY	301	10.1	18.9	29	7.7
JEZ54H57WY	302	5.8	17	22.8	8.3
RKDOTZV7FS	303	4.6	16.5	21.1	8.4
O79KAZ3N34	304	4.3	15.1	19.4	8.6
KB4J624FFR	305	7.2	17	24.2	8.1
FEW3R6PXZ4	306	13	8.6	21.6	8.4
YBWHKLFO4E	307	7.7	16.4	24.1	8.2
NSD1OQP3R0	311	10.3	20.3	30.6	7.6
4P1XNKKF2E	312	5.4	15.9	21.3	8.4
KGX9FJXPX9V	313	4.7	16.4	21.1	8.4
XPKBWEWA4PB	314	4.3	14.6	18.9	8.6
QWVG89IJ839	315	7.1	16.9	24	8.2
A9W04H4EWE	316	13.1	8.6	21.7	8.4
A136DOF0T0	317	7.7	16.2	23.9	8.2
JQZ1XYAY96	321	10.2	19.5	29.7	7.7
9R49UX3UG6	322	5.4	15.9	21.3	8.4
16IKAY2J4U	323	4.7	16.4	21.1	8.4
DSPC0UJ4CF	324	4.3	14.8	19.1	8.6
HGEZFT74MQ	325	7.1	16.8	23.9	8.2
VUTW8NIP08	326	13.1	8.5	21.6	8.4
603O3QB1J9	327	7.7	16	23.7	8.2
N9SBZV1SFR	331	10.2	19.9	30.1	7.7
187O9T82DN	332	5.8	17.1	22.9	8.3
L4EDJRNZ6Y	333	4.7	16.8	21.5	8.4
RFUMDWCS6N	334	4.7	16.5	21.2	8.4
VZJJH72PPK	335	7.2	16.7	23.9	8.2

continued

Nationwide House Energy Rating Scheme* — Class 2 summary



Certificate Number: **GAD1RM2336**

Date of Certificate: **2 Aug 2018**

★ Average star rating: **8.0**

Summary of all dwellings continued

Certification details continued

Certificate number	Unit number	Annual thermal performance loads (MJ/m2)			Star rating
		Heating load	Cooling load	Total load	
RJX6YS4O1I	336	13.1	8.6	21.7	8.4
IBWR9VNVLN	337	7.8	15.6	23.4	8.2
QQ601WV56L	341	10.2	19.3	29.5	7.7
1X1XEUD2JV	342	5.8	16.9	22.7	8.3
79SPUK1AK1	343	4.6	16.8	21.4	8.4
DY70W2YIVH	344	4.7	16	20.7	8.4
S2VK1R3I3E	345	7.6	18.4	26	7.9
5VTWW1FLD4	346	12.1	9.1	21.2	8.4
3DRRR5JNPA	347	8	15.8	23.8	8.2
WHN2UV99QU	351	10.3	19	29.3	7.7
710LYF11IG	352	5.9	16.9	22.8	8.3
ILTUQZPYP1	353	4.7	16.6	21.3	8.4
QGLD52PQZ2	354	4.7	16.2	20.9	8.4
Q2L2E2OIWU	355	7.7	18.5	26.2	7.9
354VVKX2L4	356	12.2	9.1	21.3	8.4
FKUYE0QWP6	357	8.4	17	25.4	8
0KBQZQA1PY	361	10.3	19.1	29.4	7.7
KHB47UMZSU	362	5.9	16.8	22.7	8.3
EXE5WGIWXO	363	4.7	16.6	21.3	8.4
L1204T4O5E	364	4.8	15.7	20.5	8.4
K5MXU8IZ1T	365	7.8	18.2	26	8
O0E41CFG3T	366	12.2	9.1	21.3	8.4
IOBMTOL9O	367	8.1	16.6	24.7	8.1
074NKJKRKX	371	10.3	19.2	29.5	7.7
7S5EAVW792	372	5.9	16.6	22.5	8.3
OXUM661LKA	373	4.8	16.3	21.1	8.4
U7ZM2Q61US	374	4.8	15.6	20.4	8.4
2X5GWZT9B1	375	7.8	18.1	25.9	8
6QMHACMRQO	376	12.2	9	21.2	8.4
R9HKD92SLT	377	8.1	17.1	25.2	8.1

continued

Nationwide House Energy Rating Scheme* — Class 2 summary

Certificate Number: **GAD1RM2336**

Date of Certificate: **2 Aug 2018**

★ Average star rating: **8.0**



Summary of all dwellings continued

Certification details continued

Certificate number	Unit number	Annual thermal performance loads (MJ/m2)			Star rating
		Heating load	Cooling load	Total load	
Z5NQA02O0G	381	10.3	18.3	28.6	7.8
M2KTEDVRMZ	382	3.8	16.6	20.4	8.4
DOKFA2QVCW	383	2.5	14.1	16.6	8.8
6AXSBAD5HJ	384	3.5	11.8	15.3	8.9
K81JBYZYF9	385	6.5	14.9	21.4	8.4
NKFPVPLVHPH	386	10.9	7.8	18.7	8.6
KGLDKLE1RD	387	5.7	15	20.7	8.4

This building achieves an average star rating of: **8.0**

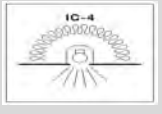
APPENDIX C

BASIX STAMPED PLAN SET



- GENERAL NOTES**
- ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR BEFORE PROCEEDING WITH THE WORK
 - ALL LEVELS RELATIVE TO 'AUSTRALIAN HEIGHT DATUM'
 - DO NOT SCALE DRAWINGS
 - USE FIGURED DIMENSIONS ONLY

legend

BASIX Commitments	
Element	Material / Parameter
Construction and Insulation Details	
Floors	Concrete suspended slab
Exposed floors	Slab floors above open and/or non-conditioned space. R1.0 added insulation to soffit or within cavity
External walls	Aluminium composite panel cladding MEDIUM wall colour R2.0 added insulation
Party walls	Cast concrete, plasterboard lined
Internal partition walls	Lightweight cavity stud, plasterboard lining
Ceilings/Roof	Any exposed roof sections: MEDIUM roof colour R3.0 added insulation
Floor coverings	-Kitchen - tile floors -Entry/Living/Dining - carpet -Bedrooms, Study, Hall - carpet -Wet areas - tiles
Window coverings	Holland blinds (by occupant)
Shading	All shade louvers, eaves, balconies, balustrades, wall extensions/wing walls and window reveals as shown on plans and elevations.
Exhaust Fans	Provision for exhaust fans - 1 per kitchen, laundry, bathroom and ensuite. 150x150 opening, sealed. No downlights
Downlights	Downlights if fitted are to be sealed, with approved non-ventilated downlight covers, allowing for continuous installation of insulation over the fitting without resultant penetrations in the insulation or air transfer to ceiling cavity. An IC-4 fitting rating should be sought in accordance with AS/NZS 60598.2.2.
	
Glazing Details	
All Dwellings, all façade glazing	Double glazed w/Argon, aluminium frame windows, low-e performance glass Whole of window system performance parameters: *Fixed external façade glazing: U=2.0, SHGC=0.31 *Operable external façade glazing: U=2.5, SHGC=0.25
<i>Note on colours and solar absorbance (SA) - LIGHT: SA < 0.48, MEDIUM SA 0.48 - 0.6, DARK SA > 0.7 Any substitution of building construction materials needs to ensure required total R-value of the construction meets or exceeds that of the constructions and added insulation described above. Any substitution of glazing needs to ensure required U-value and SHGC of the glazing system matches that described above. Insulation must be installed in accordance with the thermal construction requirements of part J1.2 of the NCC. Downlights have not been modelled</i>	
BASIX Commitments	
Element	Parameter
Dwellings - Water	
Landscaping	No individual landscaping
Swimming pool / spa	No individual swimming pool / spa
Alternative water source	No alternative water source for any individual dwelling
Fixtures	All Showerheads 3 Star (>7.5 but <=9L/min)
	All toilet flushing systems 4 star
	All kitchen taps 5 star
Appliances	All bathroom taps 6 star
	No HW recirculation or diversion
	All clothes washers 3 star
Dwellings - Energy	
Hot Water	Central Hot Water system
Bathroom ventilation system	Each Bathroom - motorised damper into central duct + VSD Operational control - interlocked to light
Kitchen ventilation system	Each Kitchen - motorised damper into central duct + VSD Operational Control - manual switch on/off
Laundry ventilation system	Each Laundry - motorised damper into central duct + VSD Operational control - manual on / timer off
Cooling	Living areas and bedroom areas - central cooling system
Heating	Living areas and bedroom areas - central heating system
Common Area and Central Systems/Facilities - Water	
Fixtures and Appliances	All Showerheads 3 Star (>6 but <=7.5L/min)
	All toilet flushing systems 5 star
	All taps 6 star
Central Systems	No common laundry facility
	Central Rainwater Tank - size: 1000L - collect from run off from at least 600sqm of roof area of buildings in the development - connection to irrigation of 90sqm of common landscaped area
	Pool - Volume 441kL Fire sprinkler system - configuration so that test water is contained within the fire sprinkler system for re-use, rather than disposed
Common Area and Central Systems/Facilities - Energy	
Common area ventilation system	Gym - System type: air conditioning - Efficiency measure: time clock or BMS controlled
	Car stacker cabins and valet corridor - System type: ventilation (supply + exhaust) - Efficiency measure: carbon monoxide monitor + VSD
	Storage cages B3 B4 - System type: no mechanical ventilation Residence corridor, residential lift lobby, hallways - System type: air conditioning - Efficiency measure: time clock or BMS controlled
Common area lighting system	Gym - Lighting system type: fluorescent - Lighting efficiency measure: time clocks - Lighting control system: no
	Car stacker cabins and valet corridor - Lighting system type: light-emitting diode - Lighting efficiency measure: motion sensors - Lighting control system: no
	Lift car - Lighting system type: light-emitting diode - Lighting efficiency measure: connect to lift call button - Lighting control system: no
Central energy systems	Storage cages B3 B4, residence corridor, residential lift lobby, hallways - Lighting system type: light-emitting diode - Lighting efficiency measure: motion sensors - Lighting control system: no
	Central hot water system: gas fired boiler with piping internal to building with R0.45 (~20mm) insulation Central cooling system: chilled water fan coil units, electric driven compressor, cooling towers, COP > 4.5 Central heating system: fan coil + heated water, gas boiler
	Lift: gearless traction with VVVF motor Pool: gas heating source Alternative energy supply: 165kW peak photovoltaic system Other: Building management system to be installed, active power factor correction to be installed

DA Drawing List				DA Drawing List			
	Drawing Number	Drawing Name	Drawing Scales		Drawing Number	Drawing Name	Drawing Scales
AF0000 General	AF0000	Cover Sheet	1:1.0311	AF8000 ADG Compliance Diagrams	AF7000	External Finishes Board	
AF1000 General Arrangement Plans	AF100	B4 Car Stacker Floor Plan	1:300	AF8001	Bicycle Storage Diagram & Schedule		
	AF101	B3 Floor Plan	1:300	AF8002	Communal Open Space Area	1:150	
	AF102	B2 Hotel Entry Ground Floor Plan	1:300				
	AF1000	Level 00 Residential Entry Ground Floor Plan	1:300	AF8101	June 21st 9am		
	AF1001	Level 01 + 02 Floor Plan	1:300	AF8102	June 21st 10am		
	AF1003	Level 03 Floor Plan	1:300	AF8103	June 21st 11am		
	AF1004	Level 04 + 04 Mezz Floor Plan	1:300	AF8104	June 21st 12pm		
	AF1005	Level 05 Sky Terrace	1:300	AF8105	June 21st 1pm		
	AF1006	Level 06 + 07 Pool Terrace Floor Plan	1:300	AF8106	June 21st 2pm		
	AF1008	Level 08 Pool Terrace Roof Plan	1:300	AF8107	June 21st 3pm		
AF2000 General Arrangement Plans	AF201	B5 Floor Plan	1:150	AF8108	March 21st 9am (Equinox)		
	AF202	B4 Floor Plan	1:150	AF8109	March 21st 10am (Equinox)		
	AF203	B3 Floor Plan	1:150	AF8110	March 21st 11am (Equinox)		
	AF204	B2 Floor Plan	1:150	AF8111	March 21st 12pm (Equinox)		
	AF2000	Level 00 Residential Entry Ground Floor Plan	1:150	AF8112	March 21st 1pm (Equinox)		
	AF2001	Level 01 Floor Plan	1:150	AF8113	March 21st 2pm (Equinox)		
	AF2002	Level 02 Floor Plan	1:150	AF8114	March 21st 3pm (Equinox)		
	AF2003	Level 03 Floor Plan	1:150	AF8115	December 21st 9am		
	AF2004	Level 04 Floor Plan	1:150	AF8116	December 21st 10am		
	AF2004	Level 04 Mezz Floor Plan	1:150	AF8117	December 21st 11am		
AF3000 Fit Out Plans	AF2005	Level 05 Sky Terrace	1:150	AF8118	December 21st 12pm		
	AF2006	Level 06 Floor Plan	1:150	AF8119	December 21st 1pm		
	AF2007	Level 07 Floor Plan	1:150	AF8120	December 21st 2pm		
	AF2008	Level 08 Floor Plan	1:150	AF8121	December 21st 3pm		
	AF2009	Level 09 Floor Plan	1:150				
	AF2010	Level 10 Floor Plan	1:150	AF8150	June 21st 9am		
	AF2011	Level 11 Floor Plan	1:150	AF8151	June 21st 10am		
	AF2012	Level 12 Floor Plan	1:150	AF8152	June 21st 11am		
	AF2014	Level 14 Floor Plan	1:150	AF8153	June 21st 12pm		
	AF2015	Level 15 Floor Plan	1:150	AF8154	June 21st 1pm		
AF4000 Overall Elevations	AF2016	Level 16 Floor Plan	1:150	AF8155	June 21st 2pm		
	AF2017	Level 17 Floor Plan	1:150	AF8156	June 21st 3pm		
	AF2018	Level 18 Floor Plan	1:150	AF8157	March 21st 9am (Equinox)		
	AF2019	Level 19 Floor Plan	1:150	AF8158	March 21st 10am (Equinox)		
	AF2020	Level 20 Floor Plan	1:150	AF8159	March 21st 11am (Equinox)		
	AF2021	Level 21 Floor Plan	1:150	AF8160	March 21st 12pm (Equinox)		
	AF2022	Level 22 Floor Plan	1:150	AF8161	March 21st 1pm (Equinox)		
	AF2023	Level 23 Floor Plan	1:150	AF8162	March 21st 2pm (Equinox)		
	AF2024	Level 24 Floor Plan	1:150	AF8163	March 21st 3pm (Equinox)		
	AF2025	Level 25 Floor Plan	1:150	AF8200	Ventilation Diagrams	1:150	
AF4100 Detail Elevations	AF2026	Level 26 Floor Plan	1:150	AF8201	Ventilation Diagrams	1:150	
	AF2027	Level 27 Floor Plan	1:150	AF8202	Ventilation Diagrams	1:150	
	AF2028	Level 28 Floor Plan	1:150	AF8203	Ventilation Diagrams	1:150	
	AF2029	Level 29 Floor Plan	1:150	AF8204	Ventilation Diagrams	1:150	
	AF2030	Level 30 - 38 Floor Plan	1:150	AF8205	Ventilation Diagrams	1:150	
	AF2039	Level 39 Hotel Sky Lobby Floor Plan	1:150	AF8300	Typical Tower Facade Details	1:20	
	AF2040	Level 40 Hotel Sky Lobby Mezzanine Floor Plan	1:150	AF8301	Typical Wintergarden Facade Details	1:20	
	AF2041	Level 41 Mid Level Plant Floor Plan	1:150	AF8302	Western Seam Planter Details	1:50, 1:25	
	AF2042	Level 42 Hotel BOH Floor Plan	1:150				
	AF2043	Level 43 - 45 Typical Hotel Floor Plan	1:150				
AF4200 Signage Elevations	AF2044	Level 46 - 57 Typical Hotel Floor Plan	1:150				
	AF2058	Level 58 Typical Hotel Floor Plan	1:150				
	AF2059	Level 59 Club Lounge + Terrace Floor Plan	1:150				
	AF2060	Level 60 Sky Villa Floor Plan	1:150				
	AF2061	Level 61 Sky Villa Floor Plan	1:150				
	AF2062	Level 62 Roof Plant Floor Plan	1:150				
	AF2063	Level 63 Roof Plant Floor Plan	1:150				
	AF2064	Level 64 Roof Plant Floor Plan	1:150				
	AF2065	Level 65 Roof Plan	1:150				
	AF2501	Adaptable Apartments Typical 1 Bed	1:50				
AF5000 Overall Sections	AF2502	Adaptable Apartments Typical 2 Bed	1:50				
	AF2503	Adaptable Apartments Typical 3 Bed	1:50				
	AF3000	B2 FFE Floor Plan	1:100				
	AF3001	Level 00 FFE Ground Floor Plan	1:100				
	AF3002	Level 03 FFE Expansion Sovereign Room Link	1:100				
	AF3003	Level 05 FFE Sky Terrace	1:100				
	AF3004	Level 05 FFE Sky Terrace	1:100				
	AF3005	Level 07 FFE Pool Deck	1:100				
	AF3006	Level 07 FFE Pool Deck	1:100				
AF5100 Detail Sections	AF3100	Level 00 Social Enterprise Cafe	1:100				
	AF3101	Level 01 Pirrama Reading Room	1:100				
	AF3102	Level 02 Darling Collaborative Hub	1:100				
	AF3103	Level 03 Pymont Forum	1:100				
	AF3104	Level 04 Pymont Forum Terrace	1:100				
AF6000 GFA Plans	AF4001	Pirrama Road Elevation	1:500				
	AF4002	Northern Elevation	1:500				
	AF4003	Jones Bay Road Elevation	1:500				
	AF4004	Southern Elevation	1:500				
	AF4101	Pirrama Road Street Elevation	1:300				
	AF4102	Jones Bay Road Street Elevation	1:300				
	AF4103	North & East Residential Elevations	1:200				
	AF4104	South & West Residential Elevations	1:200				
AF6300 Tower Hotel GFA Plans	AF4201	Signage Eastern Elevation	1:500				
	AF4202	Signage Western Elevation	1:500				
	AF4203	Signage Detail Elevation - Tower East	1:50				
	AF4204	Signage Detail Elevation - Tower West	1:50				
	AF4205	Signage Detail Elevation - Podium East	1:50				
	AF4206	Signage Detail Elevation - Pirrama Road	1:50, 1:20				
	AF4207	Signage Detail Elevation - Jones Bay Road	1:50				
	AF4208	Signage Detail Elevation - Pirrama Rd Tenancies	1:50				
AF7000 Material Schedules							



8.0
Average star rating

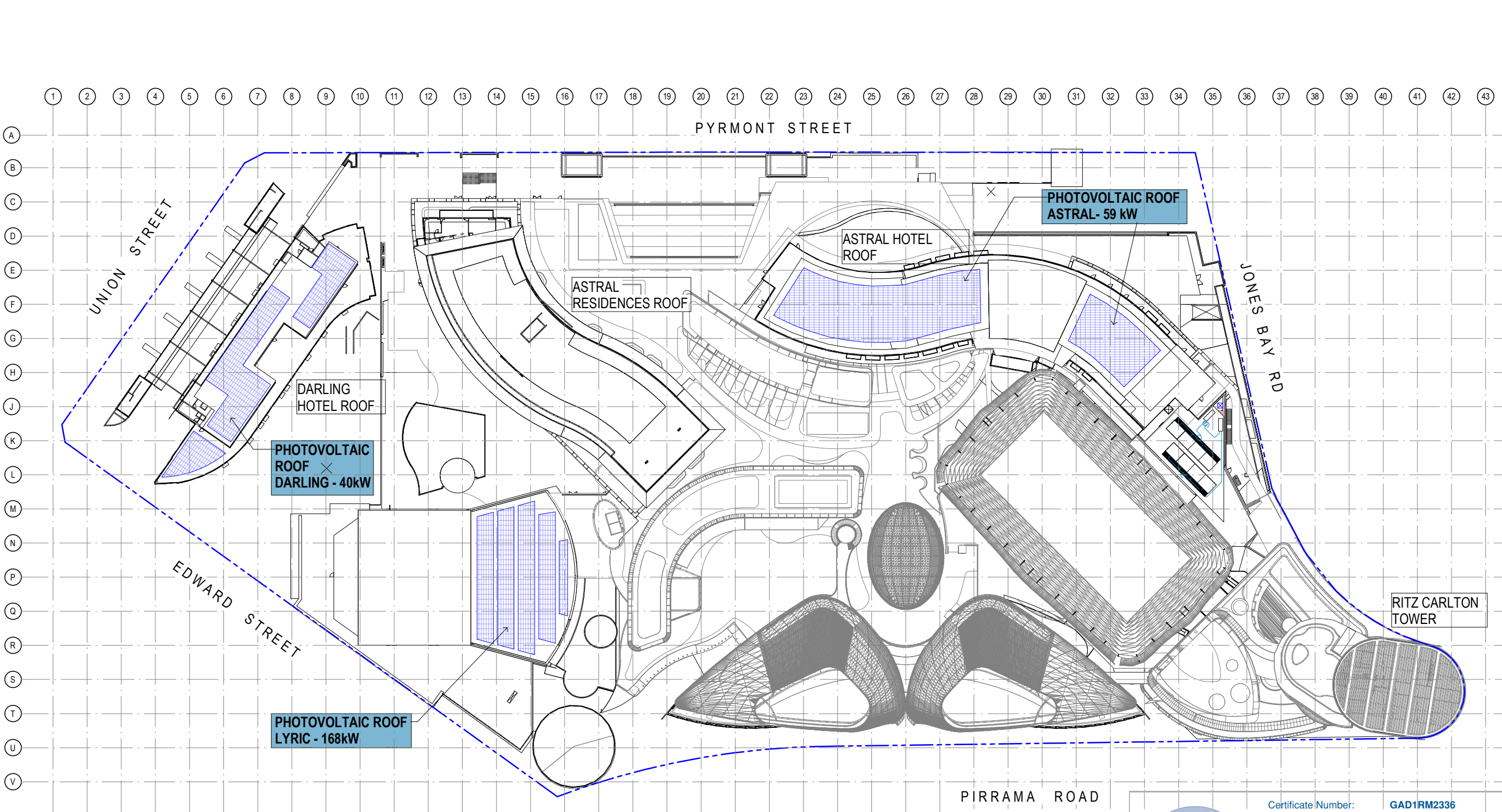
NATIONWIDE HOUSE
www.nathers.gov.au

Certificate Number: GAD1RM2336
Assessor Name: Nicholas Asha
Accreditation number: VIC/BD/AV161712
Certificate date: 2 Aug 2018
Dwelling address: 20-80 Pymont St, Pymont NSW 2009
www.nathers.gov.au

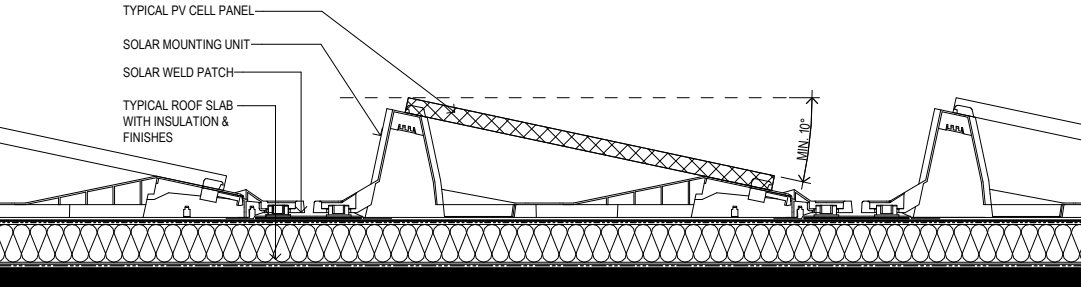


https://www.ncc.gov.au/qcr/GAD1RM2336/GC/161712

DA02	2/11/18	Response to Submissions	JRS	SMP
DA01	1/9/17	DEVELOPMENT APPLICATION	NY	SMP
rev	date	name	by	chk



1 PROPOSED SITE PLAN - ROOF_PV CELL LOCATION
1: 500



2 TYPICAL PHOTOVOLTAIC CELL FIXING DETAIL
1: 10

Notes
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Registered Business Name dwp Australia ABN 37 169 328 018
David Rose Nominated Architect NSW APR 4882

Consultants

Planner, Heritage & Social
URBIS

Structural & Civil Engineer
TAYLOR THOMSON WHITTING **TTW** Taylor Thomson Whitting

Structural, Mechanical & Fire
Protection Engineer
WSP PARSONS BRINCKERHOFF **WSP** Parsons Brinckerhoff

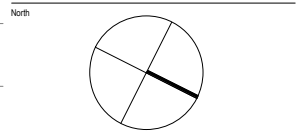
Electrical, Communications &
Hydraulic Engineer
UMOW LAI **umow** lai

BCA Consultant
McKenzie Group **mckenzie group**

GENERAL LEVELS NOTE:
RLs SHOWN ON
ARCHITECTURAL DRAWINGS
ARE 100m ABOVE AHD
(AUSTRALIAN HEIGHT DATUM).

LEGEND
PROPOSED PV CELL PANELS

GENERAL NOTE:
- ZONES FOR FLAT BED PV PANELS,
NOT VISIBLE FROM THE PUBLIC DOMAIN.



DA - RESPONSE TO SUBMISSION
NOT TO BE USED DURING CONSTRUCTION



Certificate Number:
Assessor Name:
Accreditation number:
Certificate date:
Dwelling address:
www.nathers.gov.au

GAD1RM2336
Nicholas Asha
VIC/BDV/16/1712
2 Aug 2018



<https://www.nathers.gov.au/QRCodeLanding?PublicId=GAD1RM2336&GrpCert>

RESPONSE TO SUBMISSIONS		02.11.2018	
Issue	Description	Date	CHK Auth
1	As Issued		
2	As Issued		
3	As Issued		
4	As Issued		
5	As Issued		
6	As Issued		
7	As Issued		
8	As Issued		
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40	As Issued		
41	As Issued		
42	As Issued		
43	As Issued		



- ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR BEFORE PROCEEDING WITH THE WORK
- ALL LEVELS RELATIVE TO 'AUSTRALIAN HEIGHT DATUM'
- DO NOT SCALE DRAWINGS.
- USE FIGURED DIMENSIONS ONLY

BUILDING USE

	HOTEL
	HOTEL FACILITIES
	LOADING, PLANT
	LIFTS, FIRE STAIRS, SERVICES
	ANCILLARY, BOH
	CIRCULATION
	NEIGHBOURHOOD CENTRE
	RETAIL
	FOOD & BEVERAGE
	RESIDENTIAL
	RESIDENTIAL FACILITIES

SITE BOUNDARY

EXISTING BUILT FORM

EXISTING BUILT FORM

EXTENT OF CAR STACKER BELOW

EXTEND OF MODIFICATION 13 WORK AS
SHOWN ON FJMT DOCUMENT. RIFER TO
DWP DRAWING FOR FULL EXTEND &
DEMARICATION OF MODIFICATION 13 WORK.

NOTE: SPATIAL PROVISION INCLUDED TO ACCOMMODATE AS1428.1, UPDATES AS REQUIRED AT DETAILED DESIGN



DA02	2/11/18	Response to Submissions	JRS	SMP
DA01	1/9/17	DEVELOPMENT APPLICATION	NY	SMP
rev	date	name	by	chk

fjmt studio architecture interiors landscape urban community
sydney melbourne uk
Level 5, 70 King Street t +61 2 9261 7077 w fjmtstudio.com

project

Modification 13
80 PYRMONT STREET
PYRMONT NSW 2009

General Arrangement Plans
B4 Car Stacker Floor Plan

scale	1:300 @ A1	first issued	1/9/17
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project code	sheet no.	revision
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SM13 AF100 DA02