



NABERS Energy for Hotels Assessment
135 Badgerys Creek Road, Bradfield, NSW 2556
Stage 2 Hotel
Creative Vision

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Document History

Issue	Project	Description	Author	Checked	Date
NEHS2_1.0	P220001	NABERS Energy for Hotels Estimation	SB	LW	29 th September 2025

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1. Executive Summary

Aspire Sustainability Consulting has been engaged to complete a NABERS for Hotels Energy Estimation and report for the proposed Stage 2 hotel development at 135 Badgerys Creek Road, Bradfield, NSW 2556. The project will enter either a 'Commitment Agreement' or 'Agreement to Rate' with the NABERS department prior to DA Lodgement committing to achieving a 4 Star NABERS Energy Rating in accordance with the Sustainable Buildings SEPP.

Table 1 below contains a summary of the estimated NABERS Energy Rating.

Table 1: Estimated NABERS for Hotels Energy Results

Parameter	Value	Comment
Postcode	2556	
Hotel AAA Star Rating	4	Assumed, TBC by client
Number of Rooms in the Hotel	200	Counted from Architectural Plan dated 22/09/25
Number of Rooms with Full-Service Laundering	30	Assumed, TBC by client
Number of Function Room Seats	0	No Function Rooms present.
Surface Area of Heated Pools	0	No Pool present.
Electricity (kWh/annum)	1,402,950	
Natural gas (MJ/annum)	0	
Diesel (L/annum)	2,000	
Energy Intensity	25,639 MJ/Room/Year	
NABERS Energy rating	4 Star Achieved	4.4 Star Base Case Decimal Rating

This report demonstrates that the proposed Stage 2 hotel development at 135 Badgerys Creek Road, Bradfield, NSW 2556 is capable of achieving a 4 Star NABERS Energy for Hotels rating based on inputs summarised in this report.

Although slightly conservative measures have been applied to calculations within this report, there may be additional equipment specified that has not been incorporated into the assessment at this stage. It is recommended the design team review the inputs and equipment assessed in this report and advise of any likely additional equipment inclusions that could result in increased energy consumption.

The following sections contain information relating to the methodology and inputs used to estimate the Hotels NABERS Energy Rating.

2. Introduction

2.1 Purpose

This report concerns the NABERS Energy for Hotels Estimation regarding the proposed Stage 2 hotel development at 135 Badgerys Creek Road, Bradfield, NSW 2556, in accordance with NABERS 'The Rules Energy & Water for Hotels V5.2' & NABERS 'Handbook for Estimating NABERS Ratings' v3.2.

2.2 Rated Inputs

NABERS for Hotels rules requires a calculation to be completed regarding Number of Rooms, Number of Rooms with Full-Service Laundering, Number of Function Room Seats, and Surface Area of Heated Pools in order to determine a benchmark energy budget associated with a targeted rating. A summary for the assessment is provided below:

Table 2: Summary of Rating Inputs

Parameter	Value	Data Source
Hotel Star Rating	4	TBC by project team
Number of Guest Rooms in the hotel	200	Counted from Architectural Plan dated 22/09/25
Number of Rooms with Full-Service Laundering	30	Assumed, TBC by client.
Number of Function Room Seats	0	No Function Rooms present

2.3 Information Sources & Document References

- NABERS Energy and Water for Hotels v5.2;
- NABERS Handbook for Estimating NABERS Ratings v3.2; &
- Architectural drawings set (22/09/25).

2.4 Annual Energy Estimation Methodology

Energy consumption associated with the Hotels HVAC system has been calculated in energy simulation software, whilst annual energy consumption associated with all other energy end uses have been calculated manually. Where assumptions have been made or risks identified, they are outlined in the applicable section within this report.

3. NABERS Rating Input Summary

This Section outlines the general parameters required to facilitate evaluation of a NABERS for Hotels Energy Rating, and how these have been determined for this assessment.

Table 3: NABERS Rating Input Summary

Item	Description
Building Rating Type	The project is targeting a 4 Star NABERS Energy for Hotels Rating through a Commitment Agreement, which will be verified via an Independent Design Review. As such, this assessment is concerned only with the Hotel and its associated energy consumption.
Hotel AAA Star Rating	The total Hotel AAA Star Rating is assumed to be 4 Star. Prior to the next NABERS update, the hotel operator shall confirm AAA star rating of hotel, or complete the NABERS calculator from the following link: https://www.nabers.gov.au/sites/default/files/2022-11/Calculator%20-%20Hotel%20Quality%20Star%20Rating%20Verification.xlsx
Number of Rooms in the Hotel	The number of rooms has been counted at 200, as described in Section 2.2.
Number of Rooms with Full-Service Laundering	It has been assumed that full-service laundering will be provided to 30 hotel rooms (15% of total hotel rooms).
Number of Function Room Seats	There are no function rooms within the project boundary.
Surface Area of Heated Pools	There are no heated pools within the project boundary.

4. NABERS Energy for Hotels

4.1 Introduction to NABERS

NABERS is Australia's most adopted building performance rating, aiming to account for all GHG emissions within a building, allowing Hotels to be benchmarked against common parameters such as energy consumption, hotel AAA star rating, number of rooms in the hotel, number of rooms with full-service laundering, number of function room seats, surface area of heated pools, and location.

4.2 Minimum Energy Coverage

The minimum energy coverage is the energy consumed in supplying building central services to Hotels and common spaces during the rated period. This includes the following:

- Common area, guest room and back-of-house HVAC;
- Common area, guest room, exterior and back-of-house lighting;
- Common area, guest room, exterior and back-of-house power;
- Vertical transportation servicing the hotel;
- Car park lighting and ventilation, where provided for the exclusive use of hotel guests or hotel staff;
- On-site hotel kitchens and hotel restaurants servicing guests with charge-to-room facilities;
 - L1 Café/Bar Kitchen;
 - L1 Restaurant Kitchen; &
 - Room Service.
- Any on-site laundries;
- Any on-site heated indoor/outdoor pools for guest use;
- Small light and power for both front and back of house;
- Lighting, power and HVAC services to any on-site function rooms;
- Gyms for guest use or gyms with guest charge-to-room facilities, located within the hotel;
- Day spas with guest charge-to-room facilities, located within the hotel;

4.3 Energy Inclusions

Systems included in the rating are:

- Common area, guest room and back-of-house HVAC;
- Domestic hot water services;
- Common area, guest room, exterior and back-of-house lighting & power;
- Vertical transportation servicing the hotel;
- On-site hotel kitchens and hotel restaurants servicing guests with charge-to-room facilities;
- On-site laundries;
- Small light and power for both front and back of house;
- Lighting, power and HVAC services to any on-site function rooms;
- Security, communication and fire protection services; and
- Other systems as described in this report.

4.4 Energy Exclusions

Energy consumption for non-hotel applications that do not have charge-to-room facilities may be excluded. These may only be excluded on the basis of meter readings specific to the application concerned. In the absence of meter readings, no exclusions are permitted & no estimates are permitted.

4.5 Occupancy Assumption

For the purpose of this assessment, an average 80% annual room occupancy rate has been assumed to account for periods of unoccupancy. This occupancy rate has been applied to all calculations throughout the report.

Table 4: Room Occupancy

Item	No. of rooms
Total number of rooms	200
Average occupancy (80%)	160

Table 4.1: Hotel Guest Rooms, L1 Café/Bar, Restaurant and Co-Working Space occupancy

Area	Occupants	Diversity	Daily Occupants
200 Rooms	320 (1.6 people per room)	80% average - annual occupancy rate	256
Staff	25 (per day)	Assumed, to be confirmed by client	25
L1 Café/Bar	58 (peak)	50% average Occupancy (NCC Spec Jvc Table 2f) 2 hour sitting	174
L1 Restaurant	164 (peak)		339
Co-Working Space L2	60 (peak)	38% average Occupancy (NCC Spec Jvc Table 2f) 2 hour sitting	177
Co-Working Space L3	55 (peak)		177

5. Simulated Building Form

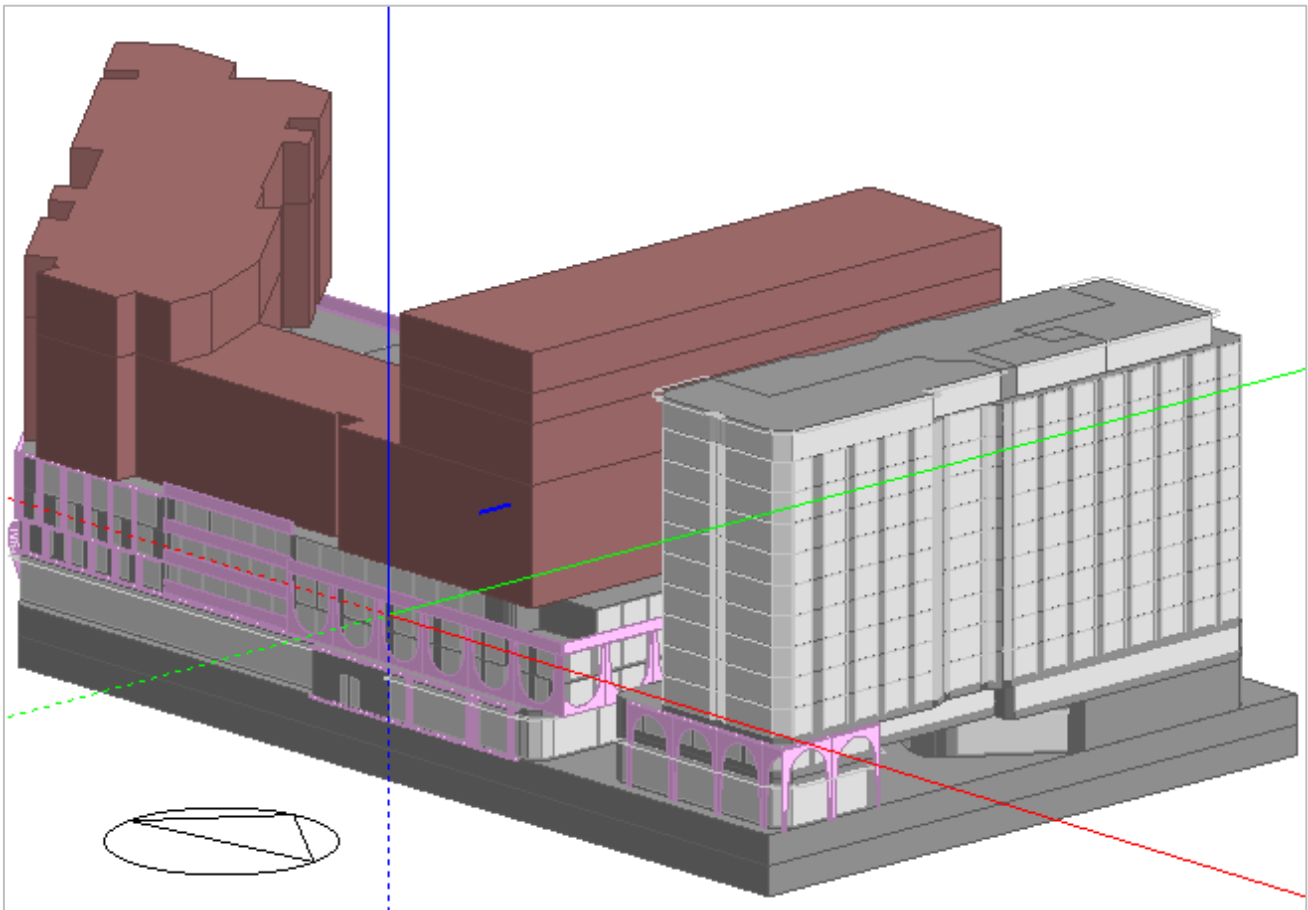
The Stage 2 Hotel development is located at 135 Badgerys Creek Road, Bradfield, NSW 2556. The project includes car parking across Basement 2 to the Lower Ground level, with retail tenancies and a supermarket located on Ground Floor. Level 1 accommodates a café/bar, restaurant, gym, medical suites, and commercial office spaces, while Level 2 features additional medical suites and co-working areas. Co-working spaces continue on Level 3, alongside a dedicated childcare centre. Hotel accommodation spans from the Ground Floor to Level 3, and residential units occupy Levels 4 through Level 10.

5.1 Hotel Building Envelope

The envelope of the hotel floors comprises high thermal performance wall systems with tinted double glazed window systems. Adjacent buildings deemed to have the potential to impact the thermal performance of the Hotel have been included in the building simulation model geometry.

'250801_P220001_J1V3_Report_1.0' contains full details relating to the Hotel thermal envelope.

Figure 1: Image of Geometric Model Used for Simulation



Simulated fabric R-values for the building construction are as per Table 5:

Table 5: Proposed Building Fabric Thermal Properties

Construction Element of Thermal Envelope	Simulated Total System R-value
External Wall	Façade R-values per J1V3 Report.
Internal Walls to Unconditioned Space within thermal envelope	
Roofs	
Floors to Unconditioned Space Below	
Ceilings to Unconditioned Space above	

5.2 Proposed Total System Glazing Specifications

Glazing systems for the development have been modelled based on minimum performance requirements to comply with Section J 2022. Please refer to Section J J1V3 report '250801_ P220001_J1V3_Report_1.0' for more details.

During design development, the NABERS report will be updated to reflect glazing performance values that arise following discussions/feedback received from the project façade consultant.

Table 6: Proposed Glazing Thermal Properties

Façade Type	Total System U-Value	Total System SHGC
Hotel/Co-working	≤U2.0	≤0.20

5.3 External Shading & Adjacent Buildings

Shading has been based on architectural documentation (*Architectural drawings set (22/09/25)))* for the purpose of the Base Case Simulation. Adjacent Buildings have been included in the simulation.

5.4 Infiltration

For the purpose of the simulation, infiltration values of 0.7 air changes per hour has been applied throughout all zones during hours when the zone has no mechanically supplied outside air and 0.35 air changes per hour has been applied at all other times.

5.4.1 Internal loads

Internal Lighting Loads

Internal lighting loads have been based on Illumination power density adjustment factors (J7D3b) applied on NCC 2022 maximum lighting values (J7D3a) as shown in Table 7 below:

Table 7: Internal Lighting Loads - Assumed

Zone Type	NCC Lighting Load (NCC 2022 Table J7D3a)	Adjustment Factor (NCC 2022 Table J7D3b)	Simulated Peak Lighting Loads (W/m ²)
Stairways	2	0.6	3.33 (NCC 2022 J7)
Car Park	2	0.7	2.86 (NCC 2022 J7)
Amenities, WC	3	0.6	5 (NCC 2022 J7)
Store, BOH, Linen, Tech Room	1.5	0.6	2.5 (NCC 2022 J7)
Co-Working	4.5	0.7	6.43 (NCC 2022 J7)
Sitting Area, Lounge, Admin	4.5	0.6	7.5 (NCC 2022 J7)
Bar/Café	14	0.6	23.33 (NCC 2022 J7)
Restaurant	14	0.7	20 (NCC 2022 J7)
Lobby, Lift Lobby	5	0.6	8.33 (NCC 2022 J7)
Corridor	5	0.7	7.14 (NCC 2022 J7)
Reception	9	0.7	12.86 (NCC 2022 J7)

Simulated Internal Equipment Loads

The simulated equipment loads are outlined in Table 8 below:

Table 8: Internal Equipment Loads

Zone Type	Simulated Peak Equipment Loads (W/m ²)
Admin, Co-working Spaces	11 W/m ² (NCC 2022)
L1 Café, Restaurant	5 W/m ² (NCC 2022)
Hotel Guest Rooms	160 W/room (NABERS Handbook v2.0)
Comms, Switch Room	100 W/m ² (Assumed)
All other spaces	Simulated with no Load

5.4.2 Operational Profiles

HVAC operational profiles used throughout the simulation are outlined in Table 9 below:

Table 9: Operation & HVAC Hours

Zone Type	HVAC Hours of Operation
Hotel Guest Rooms - Level 2 East Facing	0am to 0pm (Assumed 24-hour operation to account for occupants with extensive use of HVAC)
Hotel Guest Rooms – Remaining	7pm to 7am (Assumed 12-hour operation)
L1 Hotel Entry, Lift Lobbies, Corridors	0am to 0pm (Assumed 24-hour operation)
L1 Café, Restaurant	Per Class 6 (NCC Specification 35)
Admin, Co-working Spaces	Per Class 5 (NCC Specification 35)
Communications Room & Switch room	On 24/7

Lighting, occupancy and equipment operation profiles have been based on profiles within the NABERS Handbook v3.2.

6. Simulation Software & Input Parameters

6.1 Simulation Software

The energy estimation has been carried out using simulation software DesignBuilder v7.3.1.003, which simulates using the EnergyPlus v9.4 calculation engine. DesignBuilder estimates the energy consumption of a building on an hourly basis over a full year, considering the site location, the building structure and the type of building services installed.

DesignBuilder v7.3.1.003 & EnergyPlus v9.4 have both completed the BESTEST validation for calculation and comparison with similar analysis programs as required by ASHRAE Standard 140.

6.2 Simulation Calendar

Analysis over a 12-month period has been used in this assessment, based on a local weather data file containing environmental conditions for each of the 8,760 hours in a year. The Hotel is assumed to be open for 365 days per year.

6.3 Weather Data

The following weather data has been used in the assessment of the building energy consumption as an input to the building simulation model:

- SYDNEY IWEA. These weather files are known as Reference Meteorological Year (RMY) weather files. They are based on 26 years of historical weather data from the period 1990-2015. Weather data includes dry bulb temperature, absolute humidity, atmospheric pressure, wind (speed, direction), solar radiation (global, direct, diffuse), cloud cover, solar altitude, and solar azimuth.

6.4 Other Modelled Inputs

- Building envelope; including building form, orientation, insulation, glazing, shading, window and spandrel sizes and infiltration;
- Internal loads; including lighting, equipment and occupancy;
- HVAC system; including system design, equipment, operational profiles, zones, central systems, Chillers, FCU's and condenser systems;
- HVAC controls; including outside air flow, airflow control and temperature control bands.

The following sections contain details on the proposed HVAC systems.

7. HVAC System Description

7.1 Mechanical

7.1.1 System Description

Air Conditioning Systems

VRF System

Cooling and heating has been simulated using an air cooled multi split VRF system, with roof mounted condensers (typically 2 condensers per floor). The proposed VRF system shall be designed to serve the hotel building providing comfort conditions to various spaces throughout the hotel. Relevant areas as follows:

- Level 1 to Level 3 Guest Rooms;
- Level 1 Admin;
- Level 1 – 3 Corridors and Lift Lobbies;
- Communications Room; &
- Level 1 Reception, Bar/Café, Lounge & Restaurant.

Mechanical Ventilation Systems

The area nominated below generally require ventilation under the BCA and will be designed to comply with the requirements of AS1668.2 regarding to exhaust and outside air quantities.

General Supply System

- Communications Room;
- Miscellaneous areas as required by code;
- L1 Café and Restaurant Kitchens;
- Electrical Switch Room; &
- Level 1 -3 Guest Room and corridor outside air supply.

General Exhaust Systems

- Basement Garbage Room;
- Level 1 Guest Washroom;
- Car Park;
- Level 1 to Level 3 Guest Room Bathrooms; &
- Staff Toilets.

The NABERS assessment will be updated based on proposed design following receipt of a mechanical equipment schedule.

7.1.2 Simulated Setpoints

The simulated temperature set points are in accordance with Table 10. Energy Simulation software does not achieve a setpoint with floating deadband that would be seen in reality (22.5+/-1.5 for example), and operates to achieve a single set point when in cooling or heating modes. Therefore, temperature setpoints are modelled at a reduced deadband in order to more accurately reflect air conditioning energy consumption.

Table 10: Simulated Temperature Set Points

Area	Simulated Set Points °C
Air-Conditioned Hotel Spaces	Cooling: 23.5°C Heating: 21.5°C

8. Simulated HVAC Inputs

The below Section outlines the simulated system inputs in instances where the building performance simulation software is unable to explicitly model a specific component of the mechanical system per its intended configuration/operation, a workaround has been adopted as described below.

8.1 Indoor Units

Fan Coil Indoor Units have been modelled in each guest room and other miscellaneous conditioned spaces. Small individual air-cooled split systems have additionally been modelled serving the Basement Switch Room, Staff Room, L1 Communication Room and Level 15 Communication Room.

Zoned General Input and Controlling Parameters have been summarized in the Table below.

Table 11: Simulated HVAC System Inputs

Item	Model Input	Comment
Space Heating Set Point & control	21.5°C	Fixed set-point that the simulated indoor unit meets when heating demand is present.
Space Cooling Set Point & control	23.5°C	Fixed set-point that the simulated indoor unit meets when cooling demand is present.
Cooling Coil Capacity	Varies per FCU	Autosized based on internal loads on weather file design days.
Heating Coil Capacity	Varies per FCU	Autosized based on internal loads on weather file design days.
Fan Operating Pressure	150 Pa	Assumed in absence of design documentation.
Fan Motor Power	Varies	Auto calculated within software based on flow rate, pressure, and efficiency inputs.
Supply Air Flow	Varies	Autosized based on internal loads on weather file design days.
Outdoor Air	10/S/PP	Assumed in absence of design documentation.
Fan Operation	On/Off	Interacted with AC Unit.
CO ₂ set point	NA	
Economy Cycle	NA	
Fan Efficiency	60%	Fan Total Efficiency has been assumed as 60%.
VRF Outdoor Unit	Varies	Autosized based on connected indoor unit capacities.

8.2 Operating schedules

Operating schedules used to simulate annual building HVAC consumption are outlined in Section 5.4.2.

8.3 Annual HVAC Energy Consumption Estimate

The annual energy consumption of HVAC components associated with the Hotel:

Table 12: Estimated Annual HVAC System Consumption

HVAC Component	Annual Consumption (kWh)
Cooling	85,632
Heating	10,250
Fans	4,412
Total HVAC Energy	100,294

9. Manual Calculations for Building Energy Estimation

9.1 Miscellaneous ventilation

In the absence of design documentation, miscellaneous fan consumption has been estimated based on assumptions derived from previous projects of similar type and scale. The assessment can be updated to reflect the proposed mechanical equipment schedule when available in design development.

Table 13 outlines the calculation methodology used to estimate annual energy consumption:

Table 13: Estimated Annual Miscellaneous Fan Energy Consumption

Fan	Power (kW)	Annual Consumption (kWh)	Estimated Operation
Outdoor Air Fan (OAF)	3.7	32,468	Continuous Operation
Tenant Exhaust Fan (TEF)	8.1	70,562	Continuous Operation
General Exhaust Fan (GEF)	0.7	5,947	Continuous Operation
Kitchen Supply Fan (KSF)	3.5	30,660	Continuous Operation
Exhaust Air Fan (EAF)	5.5	3,985	CO Monitoring - Assumed 2 hours per day
Supply Air Fan (SAF)	0.4	5	Open in Fire Mode - Assume 12 hours for testing each year
Total Consumption		143,628	

9.2 Car park ventilation

In the absence of design documentation, miscellaneous fan consumption associated to basement car park has been estimated based on assumptions. The assessment can be updated to reflect the proposed mechanical equipment schedule when available in design development.

Table below outlines the calculation methodology used to estimate annual energy consumption:

Table 14: Estimated Annual Miscellaneous Fan Energy Consumption

Serving Area	Power (W)	Annual Consumption (kWh)	Estimated Operation
Car Park	6	17,520	10 hours a day @ 30%, 5 hours a day @100%, 365 days per year
Total Consumption		17,520	

Outdoor air fans associated with the HVAC systems have been included in results contained in Section 8.3, Table 12.

9.3 Hydraulic Services

In the absence of detailed design documentation, assumptions have been made regarding pump flow rate, quantities, pump power and annual operating hours derived from previous projects of similar type and scale. The assessment can be updated to reflect the proposed hydraulic equipment schedule when available in design development. Table below outlines the calculation methodology used to estimate annual energy consumption.

Table 15: Estimated Annual Hydraulics Services Energy Consumption

Description	Quantity	Pump Power (kW)	Total (kW)	Hours per Year	Annual Energy Consumption (kWh)
Cold Water Transfer Pump	1 (Duty)	4	4	2,500	10,000
Sewage Pumps	1 (Duty)	3.7	3.7	1,500	5,550
Non-potable cold water transfer pump/Rainwater Reuse Pump	1 (Duty)	2.2	2.2	2,500	5,500
Hot Water Circulating Pump	1 (Duty)	1.0	1	8,760	8,760
Submersible Drainage Pump	1 (Duty)	7.5	7.5	1,500	11,250
Submersible Drainage Pump	1 (Duty)	2.2	2.2	1,500	3,300
Submersible Grinder Pump	1 (Duty)	2.2	2.2	1,500	3,300
Total Annual Consumption					47,660

9.4 Domestic Hot Water

Domestic hot water (DHW) consumption for Staff EOT, & Guest Rooms have been estimated based on assumptions in absence of design documentation.

DHW supplied to Guest Rooms, & Staff EOT Toilets has been based on electric heat pump units with a COP of 3.5 and storage vessels with 10% system losses (Assumed). Proposed hot water heating system design data will be included in a revised assessment in design development.

In absence of design documentation, the total hotel staff number is assumed to be 25 at peak hours. Design team to confirm and provide estimated staff count for inclusion in next update.

- Staff showers: It is assumed that 20% of staff (5 people) will use the shower once per day, with each use lasting 5 minutes.
- Staff Toilet Taps: It is assumed that 20% of staff (5 people) will use the hot water taps twice per day, with each use lasting 20 seconds.
- Staff Kitchen Tap: It is assumed that 100% of staff (25 people) will use the hot water taps twice per day, with each use lasting 20 seconds.

Estimated Annual Water Consumption for hotel have been based on following assumptions:

- Hotel Room showers: It is assumed that 50% occupants will use the shower once per day and 50% will use twice a day, with each shower lasting 8 minutes.
- Hotel Room Taps: It is assumed that all occupants will use the hot water taps twice per day, with each use lasting 20 seconds.

Estimated annual energy consumption associated with (DHW) is outlined in the following tables:

Table 16: Estimated Annual Staff Toilet's Tap Hot Water Consumption

Uses per day per person	Uses per Day	Duration (Minutes)	Litres Per Minute	Litres per Day	Litres p.a	kL p.a
2	10	0.33	4.5	15	5,475	5.48

Table 17: Estimated Annual Staff Kitchen Tap Hot Water Consumption

Uses per day per person	Uses per Day	Duration (Minutes)	Litres Per Minute	Litres per Day	Litres p.a	kL p.a
2	50	0.33	4.5	75	27,375	27.38

Table 18: Estimated Annual Staff Shower Hot Water Consumption

Uses per day per person	Uses per Day	Duration (Minutes)	Litres Per Minute	Litres per Day	Litres p.a	kL p.a
1	5	5	7.5	188	68,438	68.44

Table 19: Estimated Annual Basement Staff Toilets and Kitchen Hot Water Energy Consumption

Total kL	Entering Temp (°C)	Leaving Temp (°C)	Efficiency	Losses	Annual Energy Consumption (kWh)
101.3	15	42	350%	10%	1,010

Table 20: Estimated Annual Water Consumption – Hotel Guest Rooms Shower

Hotel guests having shower	Uses per day per person	Uses per Day	Duration (Minutes)	Litres Per Minute	kL p.a
256	1.5	384	8	7.5	8,409.6

Table 21: Estimated Annual Water Consumption – Hotel Room Taps

Hotel Guests using taps	Uses per day per person	Uses per Day	Duration (Minutes)	Litres Per Minute	kL p.a
256	2	512	0.33	4.5	280.32

All occupants (50% average Occupancy (NCC Spec JVC Table 2f) - 2hr Seating) of L1 Café/Bar and L1 Restaurant are assumed to use taps once a day, with each use lasting for 20 seconds.

Table 22: Estimated Annual Water Consumption – L1 Café/Bar Taps

Occupants using taps	Uses per day per person	Uses per Day	Duration (Minutes)	Litres Per Minute	kL p.a
174	1	174	0.33	4.5	95.27

Table 23: Estimated Annual Water Consumption – L1 Restaurant Taps

Occupants using taps	Uses per day per person	Uses per Day	Duration (Minutes)	Litres Per Minute	kL p.a
339	1	339	0.33	4.5	185.60

50% L1 Café/Bar and Restaurant occupants are assumed to use L1 Guest Washroom taps once a day, with each use lasting for 10 seconds.

Table 24: Estimated Annual Water Consumption – L1 Guest Washroom Taps

Occupants using taps	Uses per day per person	Uses per Day	Duration (Minutes)	Litres Per Minute	kL p.a
257	1	257	0.16	4.5	70.2

All occupants of L2 and L3 Co-working space are assumed to use taps once a day, with each use lasting for 20 seconds.

Table 25: Estimated Annual Water Consumption – L2 Co-working space taps

Occupants using taps	Uses per day per person	Uses per Day	Duration (Minutes)	Litres Per Minute	kL p.a
177	1	20	0.33	4.5	96.9

Table 26: Estimated Annual Water Consumption – L3 Co-working space taps

Occupants using taps	Uses per day per person	Uses per Day	Duration (Minutes)	Litres Per Minute	kL p.a
177	1	20	0.33	4.5	96.9

Table 27: Estimated Annual DHW Energy Consumption – Heat Pump System

Total kL	Entering Temp (°C)	Supply Temp (°C)	Efficiency	Losses	Annual Consumption (kWh)
9,866	15	42	350%	10%	98,420

9.5 Vertical Transportation

Energy associated with vertical transportation systems (lifts) have been estimated based on assumptions derived from previous projects of similar size and scale in line with default loads within NABERS Handbook 3.2. Lift energy consumption has been estimated by assuming that there is no regenerative break installed for the lifts and 7.3kW nominated lift power (0.3kW when the lift is in standby mode). Lift selections will be incorporated in to an updated report in design development.

Table 28: Estimated Annual Vertical Transport Energy Consumption (Lift 1)

Proposed Building Existing Lift 1							
Lift Duty	Operation	Travelling Distance (m)	Rated Speed (m/s)	Nominated Power (kW)	Regenerative Breaks	Standby Power (kW)	Annual Consumption (kWh)
Medium	7days/week	14.5	2.5	7.3	No	0.30	3,919.4

Table 29: Estimated Annual Vertical Transport Energy Consumption (Lift 2)

Proposed Building Existing Lift 2							
Lift Duty	Operation	Travelling Distance (m)	Rated Speed (m/s)	Nominated Power (kW)	Regenerative Breaks	Standby Power (kW)	Annual Consumption (kWh)
Medium	7days/week	14.5	2.5	7.3	No	0.30	3,919.4

Table 30: Estimated Total Annual Vertical Transport Energy Consumption

All Lifts	Annual Consumption (kWh)
Total	7,839

9.6 Common Area, Guest Room, and BOH Lighting

Estimated electricity consumption from lighting associated with Guest Rooms, Common & BOH areas has been calculated based on section 5.4.1 Table 7. Design team to confirm and provide lighting documentation including lighting layouts for all spaces and fixture data sheets specifying wattage for inclusion in next update.

Table 31: Estimated Annual Common Area, Guest Room, and BOH Lighting

Space	Annual Energy Consumption (kWh)
Guest Rooms, Common & BOH areas	238,937

9.7 External Lighting

In absence of design documentation, the external lighting load associated with the hotel has been assumed to be 2kW. Annual energy consumption has been based on the average between the summer and winter equinox in Sydney, that averages at approximately 11.5 hours (Night hours) per day across a year. Table 29 shows estimated annual consumption from external lighting. Design team to confirm and provide design documentation for inclusion in next update.

Table 32: Estimated Annual External Lighting Energy Consumption

Lighting Power (W)	Annual Consumption (kWh)	Comment
2,000	8,395	11.5 hours/day, 365 days/year
Totals	8,395	

9.8 Standby Generators

In absence of design documentation, no back-up generator has been considered in this assessment. Design team to confirm if a generator will be provided for hotel back up power prior to the next report update.

9.9 Security and Comms

Annual energy consumption has been assumed based on a 10kW load for security and comms equipment. Design team to confirm likely comms and security equipment loads for inclusion in next report.

Table 33: Estimated Annual Security & Comms Energy Consumption

Equipment Item	Equipment Power (kW)	Total Loads to account for UPS (kW)	Annual Consumption (kWh)	Comment
Security & Comms	10	11	31,317	10 hours @ 50% utilisation + 14 hours @ 20% utilisation
Totals			31,317	

9.10 Fire Protection Systems

In absence of design documentation, the following data associated with fire protection systems has been based on assumptions derived from previous projects of similar type and scale. The below tables show estimated annual energy consumption associated with fire protection systems. Fire protection system loads will be included once available in detailed design.

Table 34: Estimated Annual Fire Control Panel Energy Consumption

Equipment Item	Equipment Power (kW)	Annual Consumption (kWh)	Comment
Fire Protection Control Panels	4	10,512	24 hours @ 30% Diversity

Table 35: Estimated Annual Electric Pump Energy Consumption

Equipment Item	Equipment Power (kW)	Annual Consumption (kWh)	Comment
Electric Pump 1	15	1,800	120 hrs per annum

Table 36: Estimated Annual Diesel Pump Energy Consumption

Equipment Item	Litres Diesel per hours	Litres Diesel per Annum	Comment
Diesel Pump 1	25	1,000	40 hrs per annum
Diesel Pump 2	25	1,000	40 hrs per annum

Table 37: Estimated Annual Jacket Heater Energy Consumption

Equipment Item	Equipment Power (kW)	Annual Consumption (kWh)	Comment
Jacket Heater	0.5	2,190	24 hours @ 50% Diversity

Table 38: Estimated Annual Jacking Pump Energy Consumption

Equipment Item	Equipment Power (kW)	Annual Consumption (kWh)	Comment
Jacking Pump	1.5	180	120 hrs per annum

When design documentation associated with the diesel fire pump and fire control panels are provided, the above calculations can be updated.

9.11 Hotel Equipment

Estimated electricity consumption from hotel guest room and co-working space equipment has been calculated based on assumptions in absence of design documentation. All rooms have been assumed to have refrigerator, TV and additional plug-in loads. Following receipt of a guest room equipment schedule the calculation can be updated based on proposed equipment selections.

Table 39: Room/Co-working Equipment Energy Consumption

Equipment Item	Power Consumption
TV	82 W
Refrigerator (On 24/7)	195 kWh/year
Phone/IT Charging	50 W
Co-Working	11 W/m ²

Equipment Energy Consumption from Loading Dock Rotating Platform has been estimated based on assumptions derived from previous projects of similar type and scale. Design team to confirm and provide FFE schedule with data sheets for specified equipment, for inclusion in next update.

Table 40: Loading Dock Turntable Platform Energy Consumption

Equipment Item	Power Input (Assumed)	Annual Energy Consumption before Apportionment (kWh)	Level of Apportionment (%)	Annual Energy Consumption after Apportionment (kWh)	Comment
Loading Dock Turntable Platform	10.4kW	946.7	24.4	230.7	Operating 3 times per day & 5 mins duration for each usage

Table 41 shows estimated annual energy consumption:

Table 41: Estimated Annual Hotel Equipment Energy Consumption

Equipment	Annual Consumption (kWh)
Energy Consumption for Hotel Guest Room TV	35,975
Phone/IT Charging	8760
Hotel Guest Room Fridge Energy Calculation	39,000
Other associated equipment (L1 Admin, L2-L3 Co-Working Area)	37,890
Hotel Loading Dock Equipment Energy	231
Total	121,855

9.12 Estimated Annual Kitchen Energy Consumption

The annual energy consumption associated with kitchens has been based on assumptions derived from previous projects in absence of design documentation. For the purpose of assessment, 50% of hotel room occupants order 1 breakfast, 1 lunch and 1 dinner from main kitchen daily. The diversity factor applied, as referenced in Table 42, accounts for the use of lighter meals and the assumption that not all meals served will be three-course. Project team to confirm and provide estimated number of meals for main kitchen, L1 Café/Bar and L1 Restaurant for inclusion in next update.

Table 42: Estimated Annual Kitchen Energy Consumption – Main Kitchen

Room Service	Meals per day	Energy per meal (kWh)	Diversity	Annual Consumption (kWh)
Breakfast	128	2.4	50%	56,064
Lunch	128	2.4	50%	56,064
Dinner	128	2.4	75%	84,096
Total				196,224

Additionally, it is assumed that 174 individuals (based on 30% average occupancy and 2-hour sitting period) use the L1 Café/Bar and 339 individuals use L1 All Day Night Restaurant per day. A diversity factor of 30% has been applied to Café/Bar to reflect the likelihood that a portion of meals served will be lighter in nature. A diversity factor of 75% has been applied to L1 Restaurant to reflect the likelihood that not all meals are 3 course. Additionally, Café/Bar restaurant occupants have been assumed to have at least 0.5 and 1.5 meals respectively in a day.

Table 43: Estimated Water Consumption Associated with Kitchens

Area	People	Meals Per Day Per Occupant	Total Meals Per Day	Energy per Meal (kWh)	Diversity	Annual Consumption (kWh)
L1 Café/Bar	174	0.5	87	2.4	30%	22,863.6
L1 Restaurant	339	1.5	508.5	2.4	75%	334,084.5
Total						356,948

9.13 Onsite Generation

In absence of PV System drawing/specification, no PV has been considered in this assessment.

9.14 Standby Generators

In absence of generator data sheets, no standby generator has been considered in this assessment.

9.15 On-Site Laundry Services

Laundrying services are estimated for 15% of the total rooms, based on an estimated daily load of 3.5 kg per room, including towels, bed linens, pillowcases, and bathmats. On-site laundrying services are based on the use of five 9.5 kg commercial washing machines, each consuming 44.3 litres of water per full load. It is assumed that each machine operates at a frequency of 15 cycles per week to cater for the total load from 15% rooms.

As the exact equipment specifications are currently unavailable, assumptions have been applied as outlined in the tables below. Design team to confirm and provide data sheets for clothes dryer and clothes washer for inclusion in next update.

Table 44: Estimated Weekly Laundry Cycles

Laundry Estimation	Quantity	Unit
Total Rooms	200	Rooms
15% Rooms to have laundry service (Assumed)	30	Rooms
Avg Load per room per day	3.5	kg
Total Load per day	105	kg
Washing Machine Capacity	9.5	kg
No Of Machines (Assumed)	5.00	-
Load per week	735	kg
Cycles per week (per machine)	15	Total

Table 45: Estimated Annual Clothes Dryer Energy Consumption

Dryer	Value
kWh per load (per kg)	0.20
Kg per load	9
Number of Machines	5
Cycles per week	15
kWh per year	7,241

Table 46: Estimated Annual Clothes Washer Energy Consumption

Washer	Value
kWh per load (per kg)	0.14
Kg per load	9.5
Number of Machines	5
Cycles per week	15
kWh per year	5,351

Table 47: Estimated Annual Total Laundry Energy Consumption

Laundry	Energy Consumption kWh per year
Dryer	7,241
Washer	5,351
Total	12,592

10. NABERS Rating Summary

Table 50 shows the Base Case annual energy consumption totals. The result shown in table below indicates a 4 Star NABERS rating (25,639 MJ/per room/per year – 4.4 NABERS Star).

Table 48: Base Case Results Summary

End Use	Annual Electricity (kWh)	Annual Gas (MJ)	Annual Diesel (L)
Heating	10,250	-	-
Cooling	85,632	-	-
HVAC Fans	4,412	-	-
Interior Lighting	238,938	-	-
External Lighting	8,395	-	-
Laundry	12,592	-	-
Kitchen Equipment	553,172	-	-
Hotel Equipment	121,855	-	-
Miscellaneous Ventilation	143,628	-	-
Car Park Ventilation	17,520	-	-
DHW	99,431	-	-
Hydraulic Pumps	47,660	-	-
Comms & Security	31,317	-	-
Fire Protection	14,682	-	2,000
Standby Generators	-	-	-
Vertical Transport	13,465	-	-
PV Generation	-	-	-
TOTALS	1,402,950	-	2,000



Your estimated Energy rating is
4 star.

The total energy use of each room is 25639.1 MJ/room p.a.

4.4 stars

Rating progress metric 

988820 kg CO₂-e p.a.

Total greenhouse gas emissions, scope 1, 2 and 3 

4944 kg CO₂-e/room p.a.

Actual greenhouse gas emissions per room, scope 1, 2 and 3

Decimal Star Rating: 4.4 Star

11. Summary & Next Steps

This report demonstrates that the proposed hotel development at 135 Badgerys Creek Road, Bradfield is capable of achieving a 4 Star NABERS Energy for Hotels rating based on inputs summarised in this report.

As mentioned throughout, a number of assumptions have been made in absence of detailed design documentation. The project team should review the inputs used in this report and provide comment if the systems included are generally in line with the design intent, or if any additional equipment should be included in the next report revision.

Prior to the next update the information requested in above sections will be required to allow the development to be accurately assessed against the targeted 4 Star NABERS Energy for Hotels Rating.