

Hercules St Hamilton Apartments

Sustainability Assessment Report

Development Approval

Plus Architecture

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For further information refer to:

- https://www.worksafe.qld.gov.au/_data/assets/pdf_file/0008/58193/safe-design-structurescop-2013.pdf
- https://www.safeworkaustralia.gov.au/system/files/documents/1702/how_to_manage_whs_risks.pdf

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1.1 INTRODUCTION

This report is intended to confirm the expected energy efficiency performance level of the proposed development at Hercules St Hamilton. The development comprises two basement parking levels, an activated ground plane, 3 podium carpark levels with small commercial tenancies, communal pool and gym facilities on podium level 4, with residential apartments above on levels 5 to 23. Level 23 includes penthouse terrace facilities and communal bbq area.

The Project design has been revised to address pre-application meeting notes and advice provided by EDQ. The revised design has been assessed for energy efficiency and comments have been provided for further areas of investigation or improvement.

1.2 PROJECT DETAILS

Project Details	
Property	5 Hercules St Hamilton
NCC Classification:	Class 2 Residential
NatHERS Climate Zone	10 Brisbane AMO
Analysis software:	FirstRate5, Version 5.3.1a (3.21)
NatHERS Technical Documentation	NatHERS Assessor Handbook V1.1, 2019 Technical Note Version, June 2019 FirstRate5 User Manual Version 7, 2020
Project Documentation	Development Application Deck

1.3 CODE PROVISIONS

The proposed development was assessed using the following building Queensland Development Code (QDC) provisions:

- QDC MP4.1:
 - Performance Requirement P2 - The thermal performance of sole-occupancy units in class 2 buildings complies with performance requirement JP1 of the BCA 2009 (Volume 1).
 - Acceptable Solution A2 - (1) The thermal performance of each sole-occupancy unit in a class 2 building complies with JV1 of the BCA 2009 (Volume 1), except that:
 - for JV1(a)(i), each sole-occupancy unit:
 - achieves a software rating of at least 4 stars; and
 - if the building is located in NatHERS climate zone 7, 9, 10, 19 or 50—the unit does not exceed the separate heating and cooling load limits for the unit set out in schedule 5; and
 - for JV1(a)(ii), the average software rating of all sole-occupancy units in the building is at least 5 stars; and
 - the deemed to satisfy provisions of Section J of the BCA 2009 (Volume 1) have no effect for sole-occupancy units.

No QDC credits were used to achieve compliance for the assessment. Common areas have not been assessed at this stage.

1.4 ASSESSMENT METHOD

The development has been assessed using NatHERS compliant software on indicative levels. These were determined to align with NatHERS requirements for exposure (wind pressure etc). Each SOU on the following levels was assessed and the results were used as indicative for other levels as shown in the following table:

Level Assessed	Used as indicative for the following levels
Level 5	Level 5
Level 8	Levels 6 - 10
Level 12	Levels 11 – 14
Level 18	Levels 15 – 21
Level 22	Level 22
Level 23	Level 23

1.5 RATINGS ACHIEVED

Software ratings for each apartment are shown in the following table. Colour bands show the results grouped by indicative assessment. SOU positions have been determined beginning with “1” in the northeast corner and counting clockwise around the façade.

Level	Star Rating by SOU Position							Average for Level
	1	2	3	4	5	6	7	
L5	6.40	8.90	7.90	5.50	5.70	6.40	4.20	6.43
L6	7.40	8.90	7.80	5.50	6.30	7.10	4.60	6.80
L7	7.40	8.90	7.80	5.50	6.30	7.10	4.60	6.80
L8	7.40	8.90	7.80	5.50	6.30	7.10	4.60	6.80
L9	7.40	8.90	7.80	5.50	6.30	7.10	4.60	6.80
L10	7.40	8.90	7.80	5.50	6.30	7.10	4.60	6.80
L11	7.40	8.80	7.90	5.40	6.30	7.20	4.80	6.83
L12	7.40	8.80	7.90	5.40	6.30	7.20	4.80	6.83
L13	7.40	8.80	7.90	5.40	6.30	7.20	4.80	6.83
L14	7.40	8.80	7.90	5.40	6.30	7.20	4.80	6.83
L15	4.90	7.80	6.10	7.90				6.68
L16	4.90	7.80	6.10	7.90				6.68
L17	4.90	7.80	6.10	7.90				6.68
L18	4.90	7.80	6.10	7.90				6.68
L19	4.90	7.80	6.10	7.90				6.68
L20	4.90	7.80	6.10	7.90				6.68
L21	4.90	7.80	6.10	7.90				6.68
L22	4.70	4.80						4.75
Lowest Rating								4.20
Highest Rating								8.90
Whole Building Average								6.71

Note that the two penthouse apartments on L22 span L23 also. QDC MP4.1 requires the following performance:

- Each SOU achieves a software rating of at least 4 Stars, and
- The average software rating of all SOUs is at least 5 Stars

The minimum SOU rating is slightly higher the requirement of 4 Stars and is achieved by a single SOU. The maximum rating is achieved by 6 SOUs. The average rating is significantly higher than the minimum requirement of 5 Stars.

1.6 THERMAL PERFORMANCE SPECIFICATION

Many variations for thermal performance were assessed in the process of developing a solution that not only achieves compliance but a significantly greater average rating than minimum requirements. Thermal performance specifications required to achieve the assessed energy efficiency performance level are shown in Table 1:

Table 1 - Thermal performance specifications

Construction Element	Thermal Performance Specification
FLAT-FRAMED ROOF	<ul style="list-style-type: none"> ❖ Solar Absorptance medium, not more than 0.5 ❖ R1.4 foil-faced insulation, foil face down ❖ Air gap ❖ R1 bulk insulation to all ceilings below framed roof ❖ Plasterboard ceiling 10mm
CONCRETE SLAB ROOF	<ul style="list-style-type: none"> ❖ Solar absorptance not more than 0.6 ❖ R1.5 bulk insulation to all ceilings below slab roof ❖ Plasterboard ceiling 10mm
WALLS – EXTERNAL	<ul style="list-style-type: none"> ❖ Medium colour ❖ FC sheet minimum 9mm ❖ Air gap/furring channel ❖ Anti-glare building wrap on framing, facing outward to air gap ❖ R2 fibreglass batts in framing ❖ Plasterboard lining 10mm
WALLS – TO LIFT CORE	<ul style="list-style-type: none"> ❖ core-filled 190 block wall ❖ Air gap/furring channel ❖ NIL insulation ❖ Plasterboard lining 10mm
WALLS – PARTY WALL	<ul style="list-style-type: none"> ❖ Plasterboard 10mm lining each side ❖ R15 fibreglass insulation in framing ❖ Air gap to 2nd framing layer ❖ R1.5 fibreglass insulation in second framing layer
WALLS – INTERNAL TO WET AREAS	<ul style="list-style-type: none"> ❖ 10mm plasterboard lining each side ❖ R1.5 insulation in framing
WALLS – INTERNAL, ALL OTHER	<ul style="list-style-type: none"> ❖ Plasterboard 10mm lining each side ❖ NIL insulation required
GLAZING (ALL LOCATIONS)	<p><i>Awnings</i></p> <ul style="list-style-type: none"> ❖ Single glazed, low E clear/neutral, aluminium frame ❖ Default glazing: U-value 5.4; SHGC 0.49

Construction Element	Thermal Performance Specification
	<i>Sliding, Fixed</i> <ul style="list-style-type: none"> ❖ Single glazed, low E clear/neutral, aluminium frame ❖ Default glazing: U-value 5.4; SHGC 0.58
SHADING	<ul style="list-style-type: none"> ❖ As proposed
SUSPENDED EXTERNAL FLOOR (L5 SLAB SOFFIT/L4 CEILING, L23 SLAB SOFFIT/L24 BALCONY CEILING)	<ul style="list-style-type: none"> ❖ Suspended concrete slab, 200 minimum ❖ R2 insulation to u/s of slab
SUSPENDED INTERNAL FLOOR	<ul style="list-style-type: none"> ❖ Suspended concrete slab, 200 mm minimum ❖ NIL insulation to u/s of slab or ceiling of level below
CEILING FANS	<ul style="list-style-type: none"> ❖ 1200 mm fans in each bedroom, MPR and kitchen/living/dining area ❖ 2x 1200mm fans in larger kitchen/living/dining areas – SOU 57, 67, 77, 87, 97, 107, 117, 127, 137, 147, all kitchen/living/dining areas L15 and higher
FLOOR COVERINGS	<ul style="list-style-type: none"> ❖ tile floor coverings in wet areas ❖ timber flooring all other areas

1.7 FINDINGS

The apartment tower façade treatment and apartment layouts enable a generally high level of energy efficiency, due to the degree of articulation providing more opportunities for opening on two orientations. Shading fins generally assist to limit required cooling energy. However, due to the generally high proportion of glazing, care is required to achieve higher performance levels. Low E glass is required to achieve the assessed performance levels and insulation is generally required on exposed slabs.

The average star rating is 1.7 stars above the required minimum average of 5 Stars, without the requirement for excessive insulation. This is largely due to the employment of passive design techniques.

While the overall performance level is high, there is room for improvement in some areas as outlined following:

Glazing ratio

A greater degree of performance could be achieved by reducing the amount of glazing on the façade. This would particularly benefit SOUs on the southwest corner (typically the highest position number for each level) which generally rate low for this project. Introducing more opaque panels or floor to sill panels would help achieve this. Note that SOU 184 achieves a high rating on the SW corner due to having a different layout that employs a greater wall ratio facing the western sun.

Shading

Vertical fins would help improve performance on the western façade, particularly the southwest corner. Many different screening options would help, particularly operable screens that allow occupants to move the shading to suit sun angles and seasons.

Glazing Operability

It will be important to maintain high levels of glazing operability, since the openability of windows on high rise SOUs is restricted. In the assessment almost every window has been assumed to be operable in a restricted fashion if not opening onto a balcony.

Southwest Corner

The southwest corner apartments on levels 5 to 14 are the worst performers in the building. This is due to a high degree of glazing, lack of vertical fin shading, and apartment layout/orientation that faces a large area of glass toward the western afternoon sun. Reconfiguring glazing ratio, degree of shading and wall to glazing ratio will enable a significant performance gain for all these apartments. This will in turn lift the performance of the whole building and provide a much better occupant experience for those living on the southwest corner. A layout revision may help achieve any targeted performance gains.

Level 23 Eaves

The performance of the penthouse apartments would benefit from a generally greater degree of eave overhang to the east and west and some northerly exposure. It is recognized that river views are to the south and a services area is to the north, however if there is opportunity to reconfigure, apartment performance would benefit.

CONCLUSION

Energy efficiency assessment shows that although some apartments achieve a star rating only slightly above the minimum performance requirement of 4 Stars, the average star rating at 6.7 stars is significantly above the required minimum of 5 Stars.

Careful design modifications, particularly on the southwest corner of the tower will achieve significant performance gains for apartments located on that corner, which will in turn lift the performance of the entire development. It is expected that these performance gains could be realized in a reasonably straight-forward manner during the next design phase.



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