

TMK CONSULTING ENGINEERS

1907135_HC-A
OCTOBER 2019



HEATING AND COOLING LOAD ASSESSMENT

PROPOSED MIXED USE DEVELOPMENT
76 – 78 COMMERCIAL ROAD, PORT ADELAIDE SA 5015

PREPARED FOR: VITO GROUP PTY LTD

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1 EXECUTIVE SUMMARY

The purpose of this report is to provide a preliminary analysis of the energy efficiency of the apartments in the proposed mixed use building at 76 – 78 Commercial Road, Port Adelaide.

Section J0.2 of the Building Code of Australia 2016 states that “*the sole-occupancy units of a Class 2 building or a Class 4 part of a building must—*

- a) *for reducing the heating or cooling loads—*
 - i. *collectively achieve an average energy rating of not less than 6 stars; and*
 - ii. *individually achieve an energy rating of not less than 5 stars, using house energy rating software;*

Therefore, each apartment must achieve a minimum 5 star rating, with the average star rating for the entire building being no less than 6 stars.

The Star ratings have been calculated utilising FirstRate v5.2.10, a house energy rating software accredited under the Nationwide House Energy Rating Scheme (NatHERS).

A summary of the results are outlined below:

- i. R2.0 insulation is required to all external walls.
- ii. R5.0 insulation is required to all exposed roof spaces.
- iii. Glazing requirements for all apartments: $U=6.7$, $SHCG=0.57$



2 INTRODUCTION

The objective of this report is to:

- a. Determine the outcome of House Energy Simulation for the proposed class 2 apartments against the star rating scheme.
- b. The program that has been used for this simulation was FirstRate Ver 5.2.10 which is approved software by CSIRO.

The aim of this report is to:

- a. Prove the energy consumption for each of the proposed apartments will achieve a minimum of 5.0 star rating, and an overall average of 6.0 stars by using the building materials as listed in the FirstRate feature report.



3 RESULTS

3.1 INTRODUCTION

These energy requirements have been calculated using a standard set of occupant behaviours and so do not necessarily represent the usage pattern or lifestyle of the intended occupants. They should be used solely for the purposes of rating the building. They should not be used to infer actual energy consumption or running costs.

3.2 REQUIREMENTS

In order to achieve a minimum average of 6 stars house energy rating, the following are required:

Insulation					
Level	Apartment	Walls: External	Walls: Bounding Apartments / Carpark / Lobby	Exposed Ceiling/Roof	Floor
Ground Floor	Apartment A1	R2.0	n/a	n/a	n/a
First Floor	Apartments A2 – A5	R2.0	n/a	R4.0	R2.0

Glazing				
Level	Apartment / Location	U Value	SHGC	Requirement
Ground Floor	Apartment A1	6.7	0.57	All windows and sliding doors must achieve an overall system (framing, etc) U-Value Shading Coeff as specified
First Floor	Apartments A2 – A5	6.7	0.57	



4 STAR RATING

4.1 INTRODUCTION

Typical apartments were assessed in each floor, including apartments above basement, between floors and top apartments. In addition, apartments facing all facades were assessed to determinate glazing and insulation requirements.

4.2 OUTCOME

With the glazing and insulation proposed, the star ratings demonstrate that not all apartments achieve a minimum of 5 stars and however, collectively they achieve a star rating of not less than 6 stars

Apartment	Star Rating
A1	5.6
A2	6.7
A3	6.9
A4	6.2
A5	6.2
Average	6.3

Builder to ensure compliance with the following requirements:

- J0.2 (b) general thermal construction, comply with J1.2
- J0.2 (c) thermal breaks, comply with J1.3(d) and J1.5(c)
- J0.2 (d) for compensating for a loss of ceiling insulation, comply with J1.3(c)
- J0.2 (e) floor edge insulation, comply with J1.6(c) and J1.6(d)
- J0.2 (f) building sealing comply with Part J3



5 APPENDIX

Star Rating Features report

FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	16 Adelaide (Kent Town)
Site Exposure	suburban
Client Name	VITO GROUP PTY LTD
Rated Address	76-78 Commercial Road PORT ADELAIDE
Accredited Rater	Mario De Lorenzo
Date	
Reference	1907135 - A1

Energy Usage

Type	Energy MJ/m²
Total	107.2
Heating	78.3
Cooling	28.9

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	47.5
Unconditioned Room Area	8.1
Garage Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Bedroom 1	11.0	bedroom	Y
Bedroom 2	8.8	bedroom	Y
Kitchen/Meals/Living	27.8	kitchen	Y
Bathroom / Laundry	8.1	unconditioned	N

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Cast Concrete	2.0	0	23.9
Brick Veneer	2.0	0	53.6
Internal Plasterboard Stud Wall	0.0	0	36.7
Brick Veneer	0.0	0	9.9

Floors

Type	Bulk Insulation (R)	Ventilation	Area (m²)
CSOG: Slab on Ground	0.0	encl	55.6

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Slab:Slab - Suspended Slab	0.0	0.0	55.6

Windows

Type	U-Value	SHGC	Area (m²)
ALM-001-01 A Aluminium A SG Clear	6.70	0.57	14.04

Window Directions

Direction	Area (m²)
WSW	14.0

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	0	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 2	9.0	78.5	0.5	4.5
Bedroom 1	65.7	722.6	38.3	421.0
Kitchen/Meals/Living	129.7	3599.9	43.3	1201.8

FirstRate® Provisional Diagnostic Information

Project Information

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Site Exposure	suburban
Client Name	VITO GROUP PTY LTD
Rated Address	76-78 Commercial Road PORT ADELAIDE
Accredited Rater	Mario De Lorenzo
Date	
Reference	1907135 - A2

Energy Usage

Type	Energy MJ/m²
Total	76.6
Heating	32.6
Cooling	44.0

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	48.4
Unconditioned Room Area	3.8
Garage Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Bedroom 1	10.5	bedroom	Y
Kitchen/Meals/Living	37.9	kitchen	Y
Bathroom	3.8	unconditioned	N

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Cast Concrete	2.0	0	33.1
Brick Veneer	0.0	0	11.3
Internal Plasterboard Stud Wall	0.0	0	28.3
Brick Veneer	2.0	0	11.5
Internal Plasterboard Stud Wall	2.0	0	33.5

Floors

Type	Bulk Insulation (R)	Ventilation	Area (m²)
150mm concrete slab	0.0	encl	50.7
150mm concrete slab	2.0	encl	1.5

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Cont:Attic-Continuous	5.0	0.0	52.2

Windows

Type	U-Value	SHGC	Area (m²)
ALM-001-01 A Aluminium A SG Clear	6.70	0.57	7.80

Window Directions

Direction	Area (m²)
ENE	7.8

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	0	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 1	13.2	138.0	2.7	28.6
Kitchen/Meals/Living	42.1	1598.9	61.0	2313.9

FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
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Site Exposure	suburban
Client Name	VITO GROUP PTY LTD
Rated Address	76-78 Commercial Road PORT ADELAIDE
Accredited Rater	Mario De Lorenzo
Date	
Reference	1907135 - A3

Energy Usage

Type	Energy MJ/m²
Total	71.1
Heating	27.6
Cooling	43.4

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	50.5
Unconditioned Room Area	3.8
Garage Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Bedroom 1	10.6	bedroom	Y
Kitchen/Meals/Living	39.8	kitchen	Y
Bathroom	3.8	unconditioned	N

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Brick Veneer	0.0	0	14.0
Cast Concrete	2.0	0	35.7
Internal Plasterboard Stud Wall	2.0	0	33.5
Brick Veneer	2.0	0	11.5
Internal Plasterboard Stud Wall	0.0	0	26.1

Floors

Type	Bulk Insulation (R)	Ventilation	Area (m²)
150mm concrete slab	0.0	encl	52.8
150mm concrete slab	2.0	encl	1.5

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Cont:Attic-Continuous	5.0	0.0	54.3

Windows

Type	U-Value	SHGC	Area (m²)
ALM-001-01 A Aluminium A SG Clear	6.70	0.57	7.80

Window Directions

Direction	Area (m²)
ENE	7.8

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	0	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 1	11.8	125.8	3.9	41.1
Kitchen/Meals/Living	35.4	1410.9	59.5	2371.5

FirstRate® Provisional Diagnostic Information

Project Information

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Client Name	VITO GROUP PTY LTD
Rated Address	76-78 Commercial Road PORT ADELAIDE
Accredited Rater	Mario De Lorenzo
Date	
Reference	1907135 - A4

Energy Usage

Type	Energy MJ/m²
Total	91.6
Heating	41.8
Cooling	49.8

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	48.4
Unconditioned Room Area	3.8
Garage Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Bedroom 1	10.5	bedroom	Y
Kitchen/Meals/Living	37.9	kitchen	Y
Bathroom	3.8	unconditioned	N

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Brick Veneer	0.0	0	11.3
Cast Concrete	2.0	0	33.1
Internal Plasterboard Stud Wall	2.0	0	33.5
Brick Veneer	2.0	0	11.5
Internal Plasterboard Stud Wall	0.0	0	28.3

Floors

Type	Bulk Insulation (R)	Ventilation	Area (m²)
150mm concrete slab	0.0	encl	52.2

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Cont:Attic-Continuous	5.0	0.0	52.2

Windows

Type	U-Value	SHGC	Area (m²)
ALM-001-01 A Aluminium A SG Clear	6.70	0.57	7.80

Window Directions

Direction	Area (m²)
WSW	7.8

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	0	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 1	13.5	141.1	2.1	21.8
Kitchen/Meals/Living	54.9	2082.4	69.2	2626.7

FirstRate® Provisional Diagnostic Information

Project Information

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Site Exposure	suburban
Client Name	VITO GROUP PTY LTD
Rated Address	76-78 Commercial Road PORT ADELAIDE
Accredited Rater	Mario De Lorenzo
Date	
Reference	1907135 - A5

Energy Usage

Type	Energy MJ/m²
Total	91.7
Heating	44.4
Cooling	47.3

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	50.5
Unconditioned Room Area	3.8
Garage Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Bedroom 1	10.6	bedroom	Y
Kitchen/Meals/Living	39.8	kitchen	Y
Bathroom	3.8	unconditioned	N

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Cast Concrete	2.0	0	35.7
Brick Veneer	0.0	0	14.0
Internal Plasterboard Stud Wall	0.0	0	26.1
Brick Veneer	2.0	0	11.5
Internal Plasterboard Stud Wall	2.0	0	33.5

Floors

Type	Bulk Insulation (R)	Ventilation	Area (m²)
150mm concrete slab	2.0	encl	23.3
150mm concrete slab	0.0	encl	31.0

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Cont:Attic-Continuous	5.0	0.0	54.3

Windows

Type	U-Value	SHGC	Area (m²)
ALM-001-01 A Aluminium A SG Clear	6.70	0.57	7.80

Window Directions

Direction	Area (m²)
WSW	7.8

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	0	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 1	23.8	253.0	3.0	31.9
Kitchen/Meals/Living	56.7	2259.4	66.4	2646.2