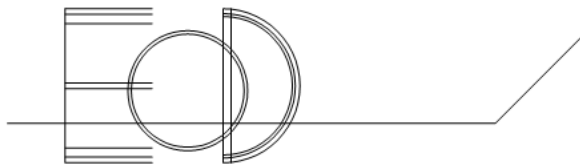


Energy and Outdoor Design



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ABN: 91505034369

ENERGY EFFICIENCY REPORT

Client:	NIC Design
Owner:	Huida Unley Park No.1
Address:	392-394 Unley Road, Unley Park SA
Date:	31 May, 2019
Job number:	EOD-2638A Dwelling 3
Assessor:	Stephen Cramond MRICS NatHERS Cert IV
Total heating and cooling load:	94.2 MJ/m2
Star rating:	6.1 Stars (in accordance with star band chart)

Compliance with this part demonstrates compliance with Performance Requirement P2.6.1

BCA Part 3.12.0.1 – Heating and Cooling loads

To reduce heating and cooling loads, a building must achieve an energy rating using house energy rating software of not less than:-

- 6 Stars for all climate zones other than 1 & 2.

Accredited House Energy rating software has been used to demonstrate heating and cooling load reduction to satisfy the requirements of BCA Clause 3.12.0 (a)(i)(A) for this project. Attached to this report in appendix A is a copy of the following supporting supplementary documents:-

- Star band verification based on the final heating and cooling loads achieved
- Heating and cooling load summary
- Star band chart

Project Insulation specification:	Project glazing specification:
<ul style="list-style-type: none"> • R2.5 insulation to all external walls • R2.0 insulation to all internal walls • R2.0 insulation to all upper level floors • R5.0 bulk ceiling insulation to roof areas • Antiglare sarking under all new roof cladding only • Note if metal framing is used, a thermal break between the metal framing and any metal cladding / fibre cement cladding or timber cladding of minimum R0.2 is required 	<ul style="list-style-type: none"> • All glazing is specified as double glazed <p>Stegbar double glazed data used to demonstrate compliance as no specific manufacturer specified. U values & SHGC values are noted within the heating and cooling load section of this report</p> <p>Note: The software window library does not have data for fixed windows. Sliding glass data has been used as a closest window type</p>

BCA Part 3.12 – Building Fabric

Requirements	<u>Required</u>		
	Yes	No	N/A
Building fabric thermal insulation must :-			
Meet AS/NZS 4859.1 requirements	√		
Form a continuous barrier including overlapping and maintains thickness / airspace as required (ceilings, walls etc)	√		
Must not affect safe operation of building services	√		
Is a thermal break required (only for steel cladding on steel framing with either no internal lining or fixed direct to metal frame). R0.2 blanket required between metal cladding and metal frame	√	Only if metal framing is used	

BCA Part 3.12.3.1 – Chimneys and Flues

Requirements	<u>Required</u>		
	Yes	No	N/A
A chimney or flue associated with a solid fuel burning appliance must have a damper / flap to seal the flue			√

BCA Part 3.12.3.2 – Roof Lights

Requirements	<u>Required</u>		
	Yes	No	N/A
A roof light must be capable of being sealed by weatherproof seal / a shutter / imperforate ceiling diffuser if serving a habitable room (climate zones 4,5,6,7 & 8) or conditioned space			√

BCA Part 3.12.3.3 – External Windows and Doors

Requirements	<u>Required</u>		
	Yes	No	N/A
External doors and windows must be capable of being sealed from air leakage by a seal (draft seals required to external window and door edges) where serving a habitable room (climate zones 4,5,6,7 & 8) or conditioned space	√		

BCA Part 3.12.3.4 – Exhaust Fans

Requirements	<u>Required</u>		
	Yes	No	N/A
An exhaust fan (if provided) must be capable of being sealed with a self sealing device ie self closing damper if serving a habitable room (climate zones 4,5,6,7 & 8) or conditioned space	√		

To achieve 6 star compliance, all exhaust fans documented require dampers to enable sealing

BCA Part 3.12.3.5 – Construction of Roofs Walls and Floors

Requirements	<u>Required</u>		
	Yes	No	N/A
Building external fabric items such as roofs, external walls and external floors and any openings ie window frames, door frames etc must be constructed to minimize air leakage if serving a habitable room (climate zones 4,5,6,7 & 8) or conditioned space	√		

BCA Part 3.12.3.6 – Evaporative Coolers

Requirements	<u>Required</u>		
	Yes	No	N/A
Evaporative coolers must be fitted with a self closing damper or the like if serving a habitable room (climate zones 4,5,6,7 & 8) or heated space			√

Compliance with part 3.12.5 requirements below demonstrates compliance with Performance Requirement P2.6.2

BCA Part 3.12.5.1 – Insulation of Services

Requirements	<u>Required if provided</u>		
	Yes	No	N/A
Thermal insulation for central heating water piping and heating and cooling ductwork must be protected against effects of weather and sunlight, temperatures within service duct / pipe and comply with AS4859.1	√		

BCA Part 3.12.5.3 – Heating and Cooling Ductwork

Requirements	<u>Required if provided</u>		
	Yes	No	N/A
Heating and cooling ductwork and fittings (apart from those within a conditioned space / insulated by the building envelope) must achieve required R value and be sealed against air loss :			
• Climate zones 4,5 & 6 - R1.0 for heating or cooling only systems + evaporative systems	√		
• Climate zone 4 & 6 - R1.5 for combined systems / Climate zone 5 – R1.0 combined systems	√		

BCA Part 3.12.5.5 – Artificial Lighting

Requirements	<u>Required</u>		
	Yes	No	N/A
Lamp power density or illumination power density of artificial lighting must not exceed:- 5 W/m² for class 1 buildings 4 W/m² for verandahs or balconies attached to class 1 buildings 3 W/m² for class 10 buildings *modification factors may apply	√		
Halogen lamps separately switched from fluorescent lamps	√		
Artificial lighting to the perimeter of a building must be controlled by a daylight sensor or have average light source efficacy of not less than 40 lumens/W	√		

BCA Part 3.12.5.6 – Water heater in a Hot Water Supply System

A water heater in a heated water supply system must be designed and installed in accordance with Part B2 of NCC Volume 3 – Plumbing Code of Australia

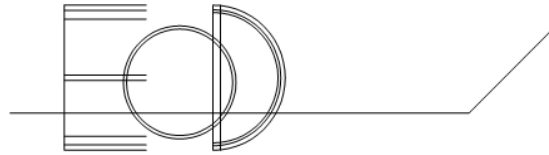
BCA Part 3.12.5.7 – Heating and pumping of a swimming pool or spa pool

Requirements	Required		N/A
	Yes	No	
Swimming pool heating must be by Solar heating not boosted with electric resistance heating, heater using reclaimed energy, gas, heat pump or a combination of these			√
Spa pool heating where sharing water reticulation with swimming pool to be either solar, gas, heat pump or			√
Combination. Where heating or part is by gas or heat pump, a cover to the pool / spa is required			
Timed switch is required for all pools / spas greater than 680L			√

Disclaimer

- 1) This energy efficiency compliance report is based entirely on the documentation stamped approved and attached to this report and as verified with the building designer. Any assumptions used outside of the plans have been verified with the design consultants. Where building services (ie air-conditioning, central heating etc) are not nominated, they have been noted not applicable under this assessment. Any alterations to the design or installation of new building services such as air-conditioning may alter the energy efficiency compliance of the dwelling.
- 2) While all due care has been taken in the preparation of this report, Energy and Outdoor Design ABN 91505034369 does not assume liability for any damage or loss due to misrepresentation of this report and confirms that this report provides general compliance advice to the requirements. All comments and recommendations relate to energy efficiency requirements only. All products used to achieve required R ratings are to be to the manufacturers recommendations and verified by the builder as suitable.
- 3) This is not a structural report. All assumptions and recommendations made within this report are for energy efficiency purposes only and should be verified by a suitably qualified structural expert as required.
- 4) This is a heating and cooling load summary report to verify compliance with BCA Part 3.12.0.1. It is not a thermal performance certificate.

Energy and Outdoor Design



South Australian Development Regulations 2008 as amended Regulation 88 Certificate

To: Private Certifier or Council Building Surveyor
Address: 392-394 Unley Road, Unley Park SA
Project Owner: Huida Unley Park No.1
Project: 11 x 2 storey dwellings

I Stephen Cramond of Energy and Outdoor Design hereby certify as an independent technical expert as defined in Regulation 85 of the Development Regulations 2008, that the building has been thermally assessed in accordance with NCC 2016 Volume 2 Section 3.12 and meets the performance requirements of NCC 2016 Volume 2, Part P2.6.1 subject to the conditions set out below

Sections of work covered by this certificate

- Energy efficiency report numbered EOD-2638A

Related Documents

- Architectural drawings numbered: 19002 sheets A2-001, A2-002, A2-021, A2-024, A2-027, A2-030, A2-121, A2-123, A2-125, A2-127, A2-321, A2-321, A2-323, A2-325, A2-327, A3-011, A3-012, A3-013, A5-001, A5-011, A5-012, A5-021 & A6-001 by NIC Design

Documents relied upon

- NCC 2016 Volume 2, Section 3.12 and Part P2.6.1

Conditions

- Nil

In issuing this certificate I duly declare the following to be accurate and true:-

1. I am not the building owner or an employee of the building owner
2. I have not been involved in any aspect of the relevant development (other than through the provision of preliminary advice of a routine or general nature)
3. I do not have any direct or indirect pecuniary interest in any aspect of the relevant development or any body associated with any aspect of the relevant development
4. I have qualifications that qualify me to act as a technical expert under these regulations

This certificate issued on the 30th day of May in the year of 2019

Name: Stephen Cramond MRICS

Qualifications: B.Bldg, NatHERS Certificate IV

Address: 21 Sheoak Drive, Athelstone SA 5076

Phone: 0434 395 762

Email: energyandoutdoor@adam.com.au

Signed:

Appendix A

Supporting documentation

Print

Diagnostics

Project Information

Mode	New Home
Climate	16 Adelaide (Kent Town)
Site Exposure	suburban
Client Name	NIC Design
Rated Address	392-394 Unley Road UNLEY PARK SA
Accredited Rater	Stephen Cramond MRICS
Date	31 May, 2019
Reference	EOD-2638A Residence 3 (Type B)

Energy Usage

Type	Energy MJ/m ²
Total	94.2
Heating	41.9
Cooling	52.3

FirstRate5
house energy rating software



6.1

Calculate

FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	16 Adelaide (Kent Town)
Site Exposure	suburban
Client Name	NIC Design
Rated Address	392-394 Unley Road UNLEY PARK SA
Accredited Rater	Stephen Cramond MRICS
Date	31 May, 2019
Reference	EOD-2638A Residence 3 (Type B)

Energy Usage

Type	Energy MJ/m²
Total	94.2
Heating	41.9
Cooling	52.3

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	101.7
Unconditioned Room Area	8.9
Garage Area	18.2

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Kitchen living	46.2	kitchen	Y
Powder room	2.0	dayTime	Y
Garage	18.2	garage	N
Stair lobby	9.9	dayTime	Y
Bedroom 1	11.1	bedroom	Y
Bedroom 2	11.1	bedroom	Y
Bath	8.9	unconditioned	N
Ensuite	6.3	nightTime	Y
Master bedroom / WIR	22.9	bedroom	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Wall type 08 - CSR012	4.0	0	94.4
Wall type 03 - CD03	2.5	0	36.9
Wall type 06 - CD06	2.5	0	22.4
Wall type 04 - CD04	2.5	0	35.3
Wall type 02 - CD02	2.5	0	15.9
Wall type 07 - Internal wall	2.0	0	94.8
Wall type 01 - CD01	2.5	0	30.0
Wall type 05 - CD05	2.5	0	5.8

Floors

Type	Bulk Insulation (R)	Ventilation	Area (m²)
CSOG: Slab on Ground	0.0	encl	66.0
Timber	2.0	encl	55.3
Timber	2.0	elevated	14.7

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Ceil: Ceiling	0.0	0.0	56.5
Cont:Attic-Continuous	5.0	0.0	79.4

Windows

Type	U-Value	SHGC	Area (m²)
STG-004-05 A Aluminium Sliding Door DG 5/6/5	4.45	0.59	8.91
STG-001-01 A Aluminium Awning Window DG 3/6/3	4.35	0.58	21.88
STG-006-01 A Aluminium Sliding Window DG 3-6-3	4.46	0.59	2.85

Window Directions

Direction	Area (m²)
N	21.0
E	2.8
S	9.8

Air leakage

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Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	2	0
Downlight	41	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Stair lobby	167.5	1661.8	98.7	979.4
Ensuite	25.2	159.1	45.3	286.0
Kitchen living	22.6	1042.2	59.7	2757.8
Master bedroom / WIR	15.8	361.7	43.4	991.4
Powder room	98.1	196.7	0.9	1.8
Bedroom 2	44.3	490.4	31.4	347.8
Bedroom 1	76.7	851.6	52.5	583.3

Provisional Diagnostic Information 31-05-2019 14:35:20 Ver:5.2.10b (3.13) Engine Ver:3.13 Accredited Rater:Stephen Cramond MRICS
Assessor's Accreditation Number:

Star bands

The program calculates the energy needed to be added to, or extracted from, each zone to maintain the comfort settings appropriate to the climate zone over the occupancy period of the zone. It is not modified by the efficiency of the appliance and so does not represent the actual energy consumed. Heating and cooling energy uses are then added together and divided by the net conditioned floor area of the dwelling (the total internal floor area, in square metres, of all rooms deemed to be conditioned for the purpose of the rating). Depending on the size of the dwelling and the proportion of external fabric that is shared with other units, an area correction is applied to the energy use. This area-adjusted energy use must be equal to or less than the figures shown in Table 18 to obtain the various star rating levels. Note that the actual star rating is displayed as a decimal star.

Table 18 Area-adjusted energy use and associated star ratings

Climate region	Location	Star rating																			
		0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
1	Darwin	853	773	706	648	598	555	516	480	446	413	381	349	317	285	253	222	192	164	140	119
2	Port Hedland	643	569	507	455	411	373	340	310	284	260	237	215	194	172	151	131	111	93	76	62
3	Longreach	654	550	465	396	340	294	257	226	200	178	159	141	124	107	90	74	58	43	29	18
4	Carnarvon	209	181	157	137	120	105	93	82	73	66	59	53	47	41	36	31	27	22	18	14
5	Townsville	337	309	283	259	238	218	200	183	168	153	140	127	114	103	92	81	71	61	52	44
6	Alice Springs	681	562	464	385	321	269	228	196	170	148	130	113	99	84	70	56	43	29	17	7
7	Rockhampton	344	295	255	222	194	171	152	136	122	110	99	90	80	71	63	54	46	38	31	24
8	Moree	597	481	388	315	258	214	180	155	135	119	106	94	83	71	60	47	35	24	14	7
9	Amberley	407	334	275	226	187	157	132	113	97	85	75	67	59	52	45	38	31	24	18	12
10	Brisbane	245	203	167	139	116	97	83	71	62	55	48	43	38	34	30	25	21	17	13	10
11	Coffs Harbour	286	232	188	153	125	103	86	73	63	55	49	44	39	34	29	24	19	15	11	7
12	Geraldton	349	285	233	191	158	132	112	96	83	73	64	57	50	43	36	29	22	16	10	5
13	Perth	483	387	311	251	204	167	139	118	102	89	79	70	61	52	44	34	25	17	9	4
14	Armidale	801	661	545	451	375	314	266	227	195	169	147	128	110	93	76	60	43	27	13	1
15	Williamtown	429	349	284	232	191	159	133	114	98	86	76	67	58	50	42	34	26	19	12	6
16	Adelaide	584	480	394	325	270	227	192	165	143	125	109	96	83	70	58	46	33	22	11	3
17	Sydney East	286	230	184	148	120	98	81	68	58	50	44	39	35	30	26	22	17	13	9	6
18	Nowra	517	423	346	284	235	195	164	140	121	105	92	81	70	60	50	40	30	20	12	5

Climate region	Location	Star rating																			
		0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
19	Charleville	525	434	359	284	235	195	164	140	121	105	92	81	70	60	50	40	30	20	12	5
20	Wagga Wagga	804	663	548	455	380	321	273	235	204	178	156	137	118	100	82	64	47	30	15	3
21	Melbourne	676	559	462	384	321	271	230	198	171	149	131	114	98	83	68	54	39	25	13	2
22	East Sale	791	653	541	449	376	317	269	231	201	175	153	133	115	98	80	63	46	30	15	2
23	Launceston	895	740	615	513	431	366	314	272	237	208	183	160	138	117	95	74	53	33	15	1
24	Canberra	957	792	657	547	458	387	330	284	247	216	189	165	142	120	99	77	56	35	17	2
25	Cabramurra	1666	1404	1188	1012	870	753	658	580	513	454	401	352	303	255	208	160	114	71	33	1
26	Hobart	876	723	598	498	417	354	303	262	229	202	177	155	134	113	92	71	51	31	14	0
27	Mildura	660	541	444	367	305	256	218	187	163	143	126	110	96	81	67	53	38	25	13	3
28	Richmond	555	450	365	298	245	203	171	146	127	112	99	87	77	66	55	44	34	23	14	7
29	Weipa	830	743	671	611	560	517	479	445	414	384	355	326	296	266	237	207	179	153	130	111
30	Wyndham	1229	1071	943	839	754	685	626	576	530	488	447	406	364	321	278	234	192	154	121	95
31	Willis Island	427	391	359	330	305	282	261	242	224	207	191	176	160	146	132	118	105	93	81	71
32	Cairns	330	302	276	253	232	214	197	181	167	153	140	128	117	105	94	84	74	64	56	48
33	Broome	732	652	585	531	486	448	416	387	360	335	310	285	260	234	208	182	157	134	115	99
34	Learmonth	511	439	379	330	290	256	228	204	184	166	149	134	119	104	89	74	60	47	35	25
35	Mackay	275	248	224	202	183	165	150	136	123	112	102	92	83	75	68	60	53	47	40	34
36	Gladstone	220	191	167	146	129	114	101	90	81	73	66	59	53	48	42	37	32	28	23	19
37	Halls Creek	755	649	563	492	434	387	348	315	286	259	235	211	187	162	138	114	90	69	50	34

Climate region	Location	Star rating																			
		0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
38	Tennant Creek	631	545	473	414	366	325	291	262	236	213	191	170	150	129	109	89	70	52	36	22
39	Mt Isa	656	560	481	417	363	320	284	253	227	205	184	164	145	126	108	90	72	55	40	28
40	Newman	631	527	442	373	318	273	237	207	183	162	144	127	111	95	80	64	49	35	22	11
41	Giles	517	429	357	298	252	215	185	161	142	126	111	98	86	73	61	49	36	25	15	7
42	Meekatharra	437	358	293	241	200	167	141	120	104	91	79	70	60	52	43	34	25	17	10	4
43	Oodnadatta	596	495	412	344	289	244	208	179	155	135	118	103	90	77	64	51	39	27	16	7
44	Kalgoorlie	490	396	320	259	211	173	144	122	105	91	80	70	61	52	43	34	25	17	9	3
45	Woomera	552	446	362	295	243	203	172	148	130	115	102	90	79	67	55	43	31	20	10	3
46	Cobar	580	469	379	308	253	210	176	151	131	115	101	89	78	67	55	44	32	21	11	4
47	Bickley	595	485	397	325	269	224	189	161	140	122	107	94	82	70	58	46	34	22	12	4
48	Dubbo	627	513	421	347	288	241	205	176	153	134	118	103	90	76	63	49	36	23	12	3
49	Katanning	664	537	436	354	290	241	202	172	149	130	114	100	87	74	61	48	34	22	11	2
50	Oakley	485	391	315	256	210	174	147	126	110	98	87	78	69	60	50	41	31	22	14	8
51	Forrest	498	401	324	262	213	175	146	124	107	93	82	72	63	53	44	35	25	16	8	2
52	Swanbourne	284	231	187	152	124	102	84	71	60	51	45	39	34	29	25	20	15	11	7	3
53	Ceduna	499	406	331	271	223	186	157	134	116	101	89	78	68	58	47	37	27	17	9	2
54	Mandurah	412	332	269	218	179	148	125	107	93	82	73	65	57	49	41	33	25	17	10	5
55	Esperance	430	351	286	233	191	158	132	111	95	82	71	62	54	46	38	30	22	14	7	1
56	Mascot	352	284	230	186	151	125	104	88	75	66	58	51	45	39	32	26	20	14	9	5
57	Manjimup	687	565	465	384	318	266	224	191	164	143	124	108	93	79	65	51	38	24	12	2

Appendix 1

Climate region	Location	Star rating																			
		0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
58	Albany	558	457	374	307	253	210	176	149	127	110	95	83	71	60	50	39	29	19	9	1
59	Mt Lofty	1173	987	833	706	603	518	448	391	342	301	264	230	198	166	136	105	76	48	22	1
60	Tullamarine	797	663	552	462	388	328	280	241	209	182	158	138	118	100	82	64	47	30	15	2
61	Mt Gambier	849	702	582	484	405	341	290	250	216	189	165	144	124	105	86	67	48	31	15	1
62	Moorabbin	742	615	511	426	357	301	256	220	190	165	144	125	108	91	75	58	43	27	13	1
63	Warrnambool	867	716	593	493	413	349	298	258	224	197	173	151	130	110	90	70	51	32	15	2
64	Cape Otway	708	593	497	418	353	301	257	222	193	168	146	127	109	92	76	59	43	28	14	2
65	Orange	1156	964	807	679	575	492	424	369	324	285	250	219	189	159	130	101	72	46	22	2
66	Ballarat	1045	874	734	618	525	448	386	335	293	257	225	197	169	143	117	91	66	42	20	2
67	Low Head	668	554	460	384	322	273	233	201	175	153	133	116	100	85	69	54	39	24	11	0
68	Launceston Airport	1048	867	719	600	505	428	367	318	278	245	215	188	162	137	112	86	61	38	17	0
69	Thredbo	1471	1238	1045	888	759	655	569	499	439	387	341	298	257	216	176	136	98	61	28	1