If a building becomes architecture, then it is art. Clearly, if a building is not functionally and technically in order, then it isn't architecture either – it's just a building.
Arne Jacobsen

Mechanical Engineering
Lighting Design
Sustainable Design
Electrical Engineering

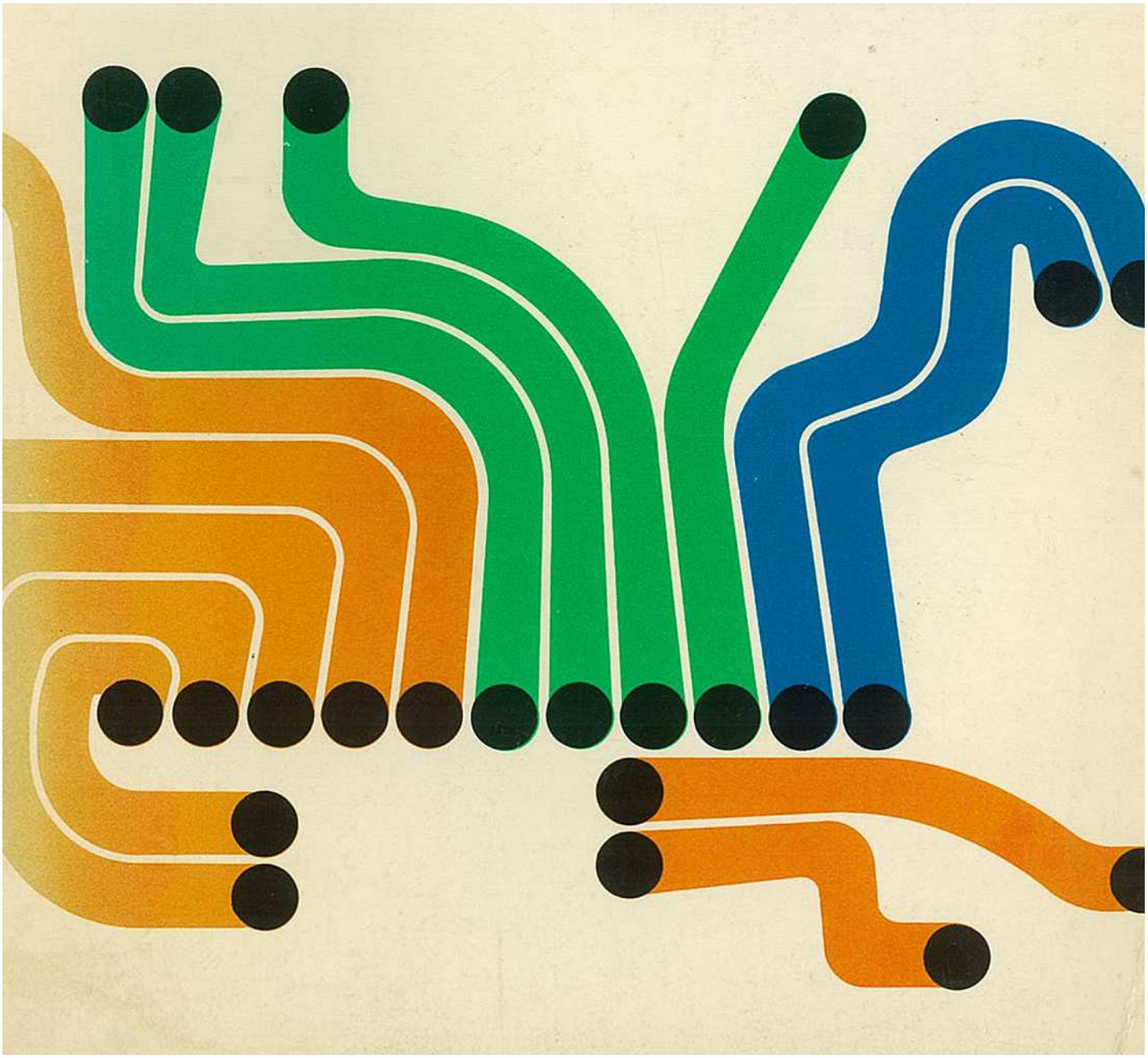
Copenhagen
London
Sydney
Hong Kong
New York

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

SUSTAINABLE DESIGN

STEENSEN VARMING

OPT Tenancy 5
Section-J Report



Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

Document Revision and Status

Date	Rev	Issue	Notes	Checked	Approved
20.07.2016	01	Draft	[for comment]	BAJ	BAJ
03.08.2016	02		Updated	BAJ	BAJ
05.10.2016	03	Final	Revised architectural design	BAJ	BAJ
07.10.2016	04	Final	updated	BAJ	BAJ
09.11.2016	05	Final	Revised architectural documentation	DV	BAJ

Sydney November 9th , 2016
Ref. No. 167160

Diksha Vijapur
Sustainability Consultant

diksha.vijapur@steensenvarming.com
+61 2 99672200

Table of contents

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

1.0 Executive Summary

The purpose of this report is to review and assess the proposed refurbishment of Tenancy-5 at the Overseas Passenger Terminal (OPT).

The proponent seeks to use Tenancy 5 as an indoor and outdoor restaurant and bar (incorporating a micro-brewery) as detailed below:

- Fitout, alterations and additions of Levels 1 & 2 for use as a restaurant and bar;
- Internal alterations within Tenancy 5 including amendments to the layout and internal stairs.

The assessment has been carried out against the compliance requirements for Energy Efficiency, under Section J of the National Construction Code (NCC) 2016.

This report nominates the deemed-to-satisfy (DTS) requirements of parts J1, J2 and J3 of the NCC 2013.

- J1 Building Fabric
- J2 Glazing
- J3 Building Sealing

It is assumed that the relevant members of the design team will ensure compliance with the other components of section-J (i.e. J4 to J8). Hence, this report does not include details of these particular sub-sections.

The information provided in this report is meant to provide guidance to Collins and Turner Architects in developing the design and construction details for the building envelope.

NOTE 1:
This report is not for the purpose of certification and/or checking of building fabric design documentation. Our role is limited to the production of this report outlining the minimum properties of the building envelope must be to aid in documentation of the same. Others would then need to ensure that their designs are carried out in accordance with these requirements, making reference to our report as the basis for the minimum performance requirements.

NOTE 2:
The requirements stated in this report need to be reflected in the various design documents as performance parameters and specifications for the builder/ contractor to demonstrate compliance.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

2.0 Classification

2.1 Building

The proposed refurbishment of tenancy-5 is considered to have the following classification:

LEVEL	USE	NCC CLASSIFICATION
Level-1	Restaurant	Class 6
Level-2	Restaurant	Class 6
	Micro-brewery	Excluded from Section-J*

* The BCA Consultant (BCA Logic) have advised that the brewery pod can be excluded from the scope of Section-J, based on the functional use of that space.

2.2 Climate Zone

The proposed site is located in Climate Zone 5, as per the climate zone classification of NCC 2016.

2.3 Basis of assessment

The following documents have formed the basis for the Section-J DTS assessment.

- Architectural drawings issued by Collins and Turner Architects (Issue Date: 05.10.2016).
  - 257-ADA-000_ Rev A
  - 257-ADA-001_ Rev A
  - 257-ADA-002_ Rev A
  - 257-ADA-010_ Rev E
  - 257-ADA-011 _ Rev E
  - 257-ADA-012_ Rev G
  - 257-ADA-013_ Rev G
  - 257-ADA-020_ Rev C
  - 257-ADA-021_ Rev C
  - 257-ADA-022_ Rev C
  - 257-ADA-030_ Rev C
  - 257-ADA-031_ Rev C
  - 257-ADA-040 to 043
  - 257-ADA-080 to 097
  - 257-ADA-110 to 112

- The following drawing has been provided by Collins and Turner architects on 04.08.2016, to determine the extent of basement below the project's floor:

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

- 3611-M02 _ Sydney Cove Passenger Terminal – Basement Level – North zone

NOTE: The input for the glazing calculator is based on the Architectural Drawings noted above. Steensen Varming have based the total facade and glazing areas on information provided by Collins and Turner architects, and Collins and Turner will need to review and confirm they are correct. Steensen Varming take no responsibility for the accuracy of the drawing dimensions.

The performance properties U-value and SHGC (solar heat gain coefficient) do not necessarily relate to a specific glass product, and we understand Collins and Turner Architects will review and source the glazing selections to meet (or exceed) the requirements.

The performance values stated in this report are for the whole window construction including framing, window seal and glazing. The values are not glazing centre point performance, but for the complete window system.

The window supplier will need to demonstrate that the performance as modelled is achieved with the installed window system.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

3.0 Summary of DTS requirements

The following section summarises the DTS requirements for the proposed Tenancy-5 refurbishment, in accordance with Part J1 of NCC 2016.

Part	Topic	Minimum performance requirement
Part J1.1	Application of Part J1	Building elements forming the envelope of a Class 2 to 9 building, should be evaluated against Part J1. The proposed refurbishment is classified as Class 6, therefore Part-J1 is applicable.
Part J1.2	Thermal Construction – General	Thermal insulation must form a continuous thermal barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier of the building. Insulation must abut or overlap adjoining insulation.
Part J1.3	Roof and ceiling construction	■ If Roof upper solar absorptance value is not more than 0.40 then DTS is **R3.2** ■ If roof absorptance value is between 0.4 and 0.6 then DTS is **R3.7** ■ If roof absorptance is greater than 0.6 then DTS is **R4.2** (Collins and Turner architects should determine the roof upper solar absorptance value and specify the associated Roof R-value from above options)
NOTE: Where, for operational or safety reasons associated with exhaust fans, flues or recessed downlights, the area of required ceiling insulation is reduced, the loss of insulation must be compensated for by increasing the R-Value of the insulation in the		

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

remainder of the ceiling. Compensation should be in accordance with Table J1.3 b.

Part	Construction element	Minimum performance requirement
Part J1.4	Roof lights	Not applicable, as the proposed design does not contain any rooflights or skylights.
Part J1.5	Walls (External)	External walls of the thermal envelope must achieve a minimum of R2.80. R-value concessions can be applied under the following scenarios: ■ A concession of **R0.50**, for a wall with a surface density of not less than 220 kg/m2 ■ A concession of **R0.50**, for walls facing the south orientation ■ A concession of **R0.50** for walls shaded with a projection shade angle of 30 to 60°, as per diagram-A. ■ A concession of **R1.00** for walls shaded with a projection shade angle of more than 60°, as per diagram-A As a best practise measure, we recommend Collins and Turner architects to not apply any concessions for the proposed refurbishment.

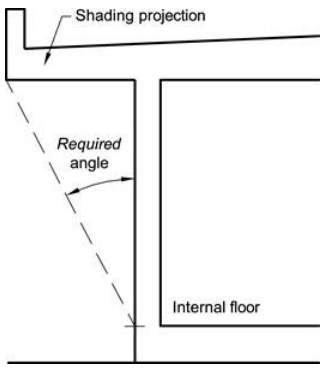


Diagram-A Shading angle

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

STEENSEN VARMING

Part	Construction element	Minimum performance requirement
Part J1.5	Walls (Internal) (i.e. any wall, other than an external wall, that is part of the thermal envelope)	Internal walls forming the thermal envelope boundary: ■ Must achieve a minimum or **R1.0**, where the adjacent enclosed non-conditioned space has a ventilation of not more than 1.5 air changes per hour of outside air during occupied hours. ■ Must achieve a minimum of R 1.80, if adjacent space is unenclosed or if the adjacent space has a ventilation of more than 1.5 air changes per hour of outside air Refer to Section-4 Thermal mark-ups for location and extent of thermal insulation.
Part J1.6	Floors	A floor that is part of the thermal envelope of a building, including floors above or below a carpark or a plantroom, must achieve the following R-values: ■ Slab on ground (without an in-slab heating or cooling system) – **Nil** ■ Slab on ground (withan in-slab heating or cooling system) – **R 1.25** ■ Suspended floor without an in-slab heating or cooling system, and located above an enclosed space – **R 1.0** ■ Suspended floor with an in-slab heating or cooling system, and located above an enclosed space – **R1.25** ■ Suspended floor located above an un-enclosed space – **R2.0** The slab on ground option is applicable to the project. However, if in-slab heating will be introduced, then the

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

		floor should achieve R1.25, as noted above.
Part	**Construction element**	**Minimum performance requirement**
Part J2.0	Glazing	To identify the minimum thermal performance requirements, the glazing in each storey of a building must be assessed separately. Assessment is undertaken on a floor-by-floor basis, and includes: ■ glazing in the external fabric facing each orientation; and ■ glazing in the internal fabric. Glazing requirements for the proposed project are noted in Section-5.
Part J3.0	Building Sealing	Requirements of Part J3 are noted below.
Part J3.1	3.1 Application of part J3	Part J3 is applicable to the proposed refurbishment
Part J3.2	J3.2 Chimneys and flues	The chimney or flue of an open solid-fuel burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue. This requirement shall be captured in the mechanical services strategy.
Part J3.3	J3.3 Rooflights	This section is not applicable to the proposed project, as there are no rooflights.
Part J3.4	J3.4 Windows and doors	(a) A seal to restrict air infiltration must be fitted to each edge of a door, openable *window* forming part of the envelope of a conditioned space or habitable space. This is applicable to all

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

		doors and windows proposed for the external facade. Collins and Turner architects to document the seals in the architectural drawings. **(b)** The requirements of (a) do not apply to— (i) a window complying with AS 2047; or (ii) a fire door or smoke door; or (iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security. **(c)** A seal required by (a)— (i) for the bottom edge of an external swing door, must be a draft protection device; and (ii) for the other edges of an external door or the edges of an openable window or other such opening, may be a foam or rubber compression strip, fibrous seal or the like. **(d)** An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, revolving door or the like, other than— (i) where the conditioned space has a floor area of not more than 50 m2; or (ii) where a café, restaurant, open front shop or the like has— (A) a 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and (B) at all other entrances to the café, restaurant, open

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

		front shop or the like, self-closing doors.
Part J3.5	J3.5 Exhaust Fans	A miscellaneous exhaust fan, such as a bathroom or domestic kitchen exhaust fan, must be fitted with a sealing device such as a self-closing damper or the like when serving— (a) a conditioned space; or (b) a habitable room in climate zones 4, 5, 6, 7 or 8.
Part J3.6	Construction of roofs, walls and floors	(a) Roofs, ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage in accordance with (b)when forming part of— (i) the envelope; or (ii) the external fabric of a habitable room or a public area in climate zones 4, 5, 6, 7 or 8. (b) Construction required by (a) must be— (i) enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or (ii) sealed by caulking, skirting, architraves, cornices or the like. (c) The requirements of (a) do not apply to openings, grilles or the like required for smoke hazard management.
Part J3.7	Evaporative coolers	An evaporative cooler must be fitted with a self-closing damper or the like when serving— (a) a heated space; or (b) a habitable room or a public area of a building in climate zones 4, 5, 6, 7 or 8.

If a building becomes architecture, then it is art. Clearly, if a building is not functionally and technically in order, then it isn't architecture either – it's just a building.
Arne Jacobsen

Mechanical Engineering
Lighting Design
Sustainable Design
Electrical Engineering

Copenhagen
London
Sydney
Hong Kong
New York

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

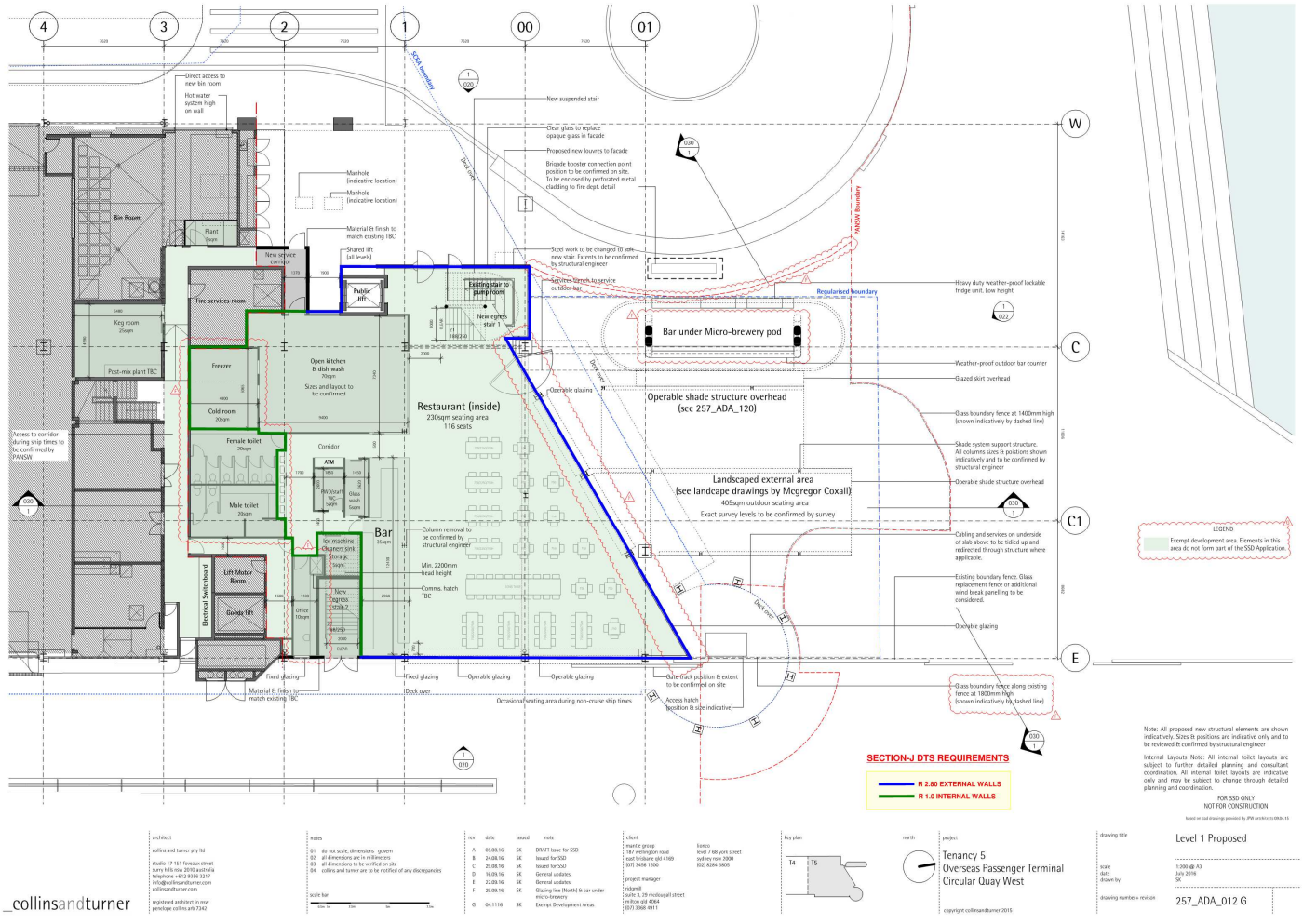
STEENSEN VARMING

4.0 Thermal mark-ups

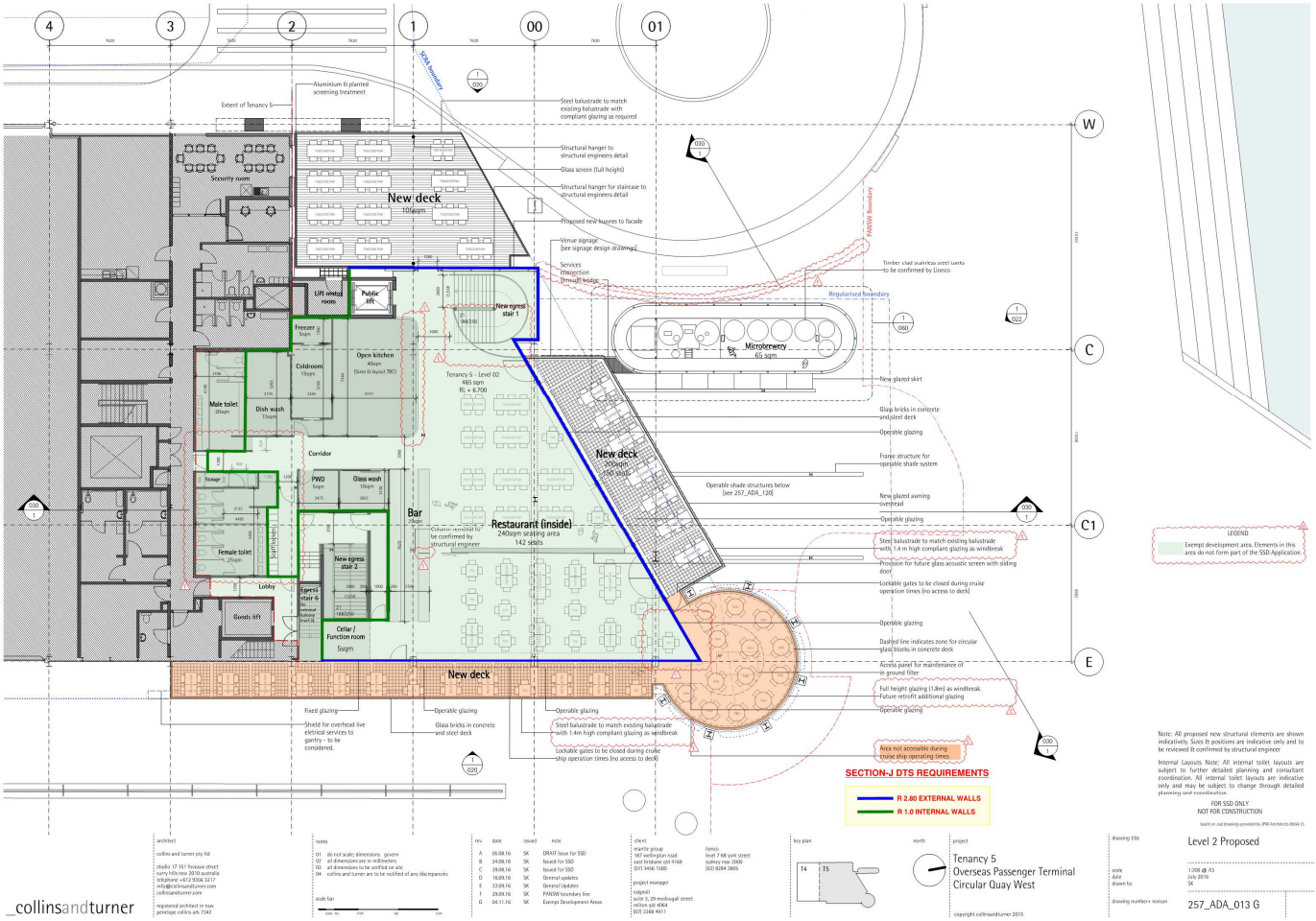
The following mark-up illustrates the location and extent of wall insulation, required to achieve the DTS performance values of R2.8 and R1.0, for external and internal walls respectively.

(It should be noted that the R-values indicate the total performance of the wall assembly, and it does not imply insulation alone).

4.1 Level-1



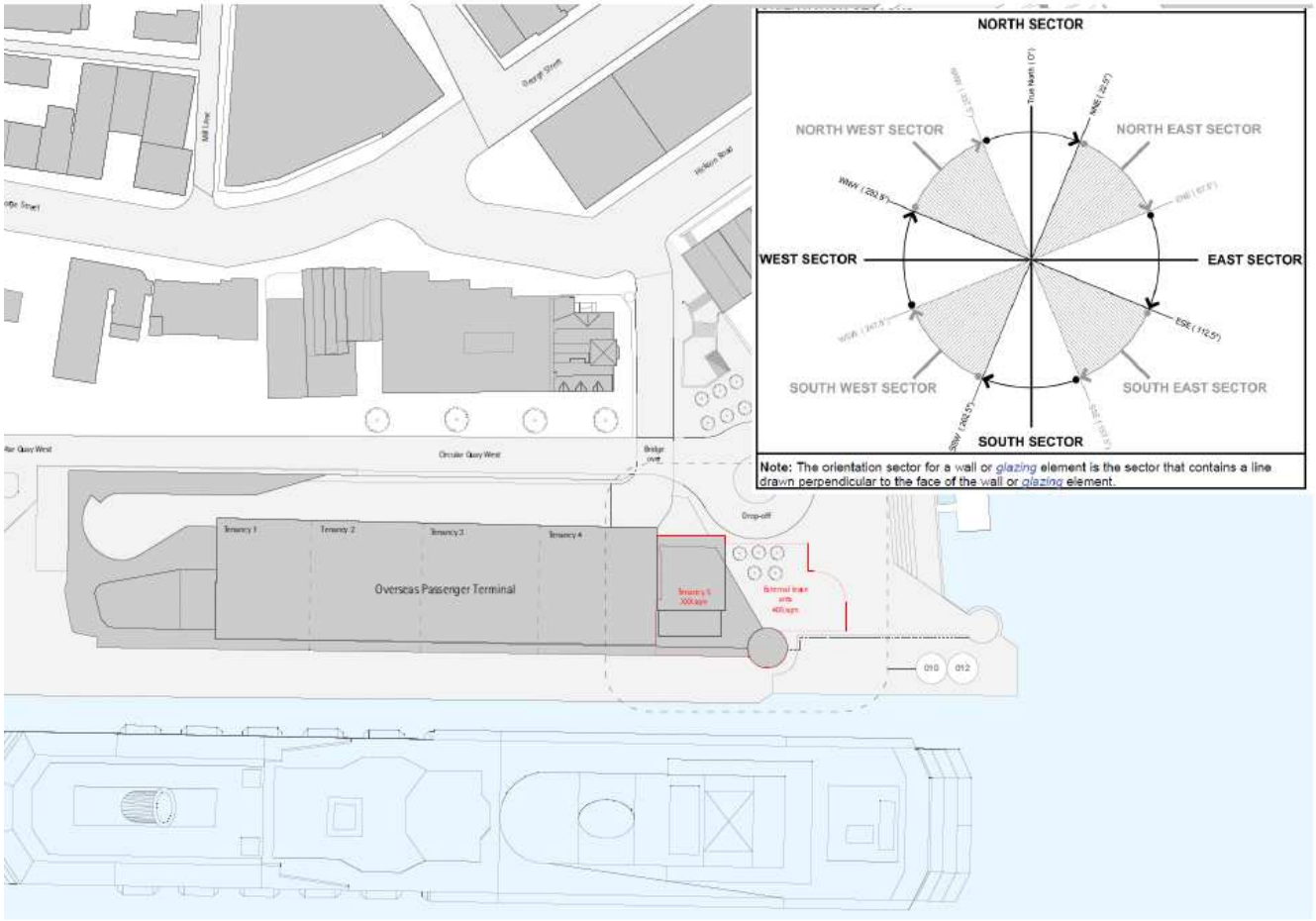
4.2 Level-2


New deck
105sqm
New deck
200sqm
150 seats
New deck
Restaurant (inside)
240sqm seating area
142 seats
Bar
Microbrewery
65 sqm
Tenancy 5 - Level 02
465 sqm
RL + 6.700
Cellar / Function room
55sqm
SECTION-J DTS REQUIREMENTS
R 2.80 EXTERNAL WALLS
R 1.0 INTERNAL WALLS
LEGEND
Exempt development area. Elements in this area do not form part of the SSD Application
FOR SSD ONLY
NOT FOR CONSTRUCTION
Level 2 Proposed
Tenancy 5
Overseas Passenger Terminal
Circular Quay West
257_ADA_013 G
_collinsandturner

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

5.0 Glazing Claculators

The glazing assessment has been undertaken on the basis of the following facade orientations.



NOTE: The glazing assessment has been undertaken using two asssessment options:

- Option-1 – Glazing is considered to be exterior glazing of a typical conditioned zone of a restaurant
- Option-2 – Glazing is considered to be shop-front / retail display glazing.

The second option allows the glazing performance to be reduced, in comparison to option-1.

Option-1 evaluates the space like a typical continuously occupied space (such as an office environment). Whereas, Option-2 is more appropriate because, in a restaurant the exterior glazing is used to showcase the interior activity, and the occupants are

not constrained to sit along the perimeter zone. They are free to move to a more comfortable zone if required.

5.1 Option-1

5.1.1 Level-1

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014) — HELP

Building name/description: OPT Tenancy 5 | Application: other | Climate zone: 5

Storey: 1

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	11.7m²	80m²	127m²					3.2m²	
Option B									n/a
Glazing area (A)	*8.71m²*	*59.6m²*	*61.3m²*					*2.32m²*	

Number of rows preferred in table below: 20 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Glazing-A	E		3.09	2.41		7.0	0.36	2.320	3.900	0.59	0.81	0.94	0.88	7.45	12% of 100%
2		E		3.09	2.41		7.0	0.36	2.320	3.900	0.59	0.81	0.94	0.88	7.45	12% of 100%
3		E		3.09	2.41		7.0	0.36	2.320	3.900	0.59	0.81	0.94	0.88	7.45	12% of 100%
4		E		3.09	2.41		7.0	0.36	2.320	3.900	0.59	0.81	0.94	0.88	7.45	12% of 100%
5		E		3.09	2.41		7.0	0.36	2.320	3.900	0.59	0.81	0.94	0.88	7.45	12% of 100%
6		E		3.09	2.41		7.0	0.36	2.320	3.900	0.59	0.81	0.94	0.88	7.45	12% of 100%
7	Glazing-B	E		3.09	2.47		7.0	0.36	2.320	3.900	0.59	0.81	0.94	0.88	7.64	12% of 100%
8	Glazing-C	E		3.09		8.92	7.0	0.36	2.320	3.900	0.59	0.81	0.94	0.88	8.92	15% of 100%
9	Glazing-D	N		3.09	2.82		7.0	0.80	8.600	3.900	2.21	0.81	0.00	0.27	8.71	100% of 75%
10	Glazing-E	NE		3.09	2.59		7.0	0.37	5.000	3.900	1.28	0.81	0.77	0.57	7.99	13% of 98%
11		NE		3.09	2.59		7.0	0.37	5.000	3.900	1.28	0.81	0.77	0.57	7.99	13% of 98%
12		NE		3.09	2.59		7.0	0.37	5.000	3.900	1.28	0.81	0.77	0.57	7.99	13% of 98%
13		NE		3.09	2.59		7.0	0.37	5.000	3.900	1.28	0.81	0.77	0.57	7.99	13% of 98%
14	Glazing-F	NE		3.09	2.24		7.0	0.37	5.000	3.900	1.28	0.81	0.77	0.57	6.91	12% of 98%
15		NE		3.09	2.24		7.0	0.37	5.000	3.900	1.28	0.81	0.77	0.57	6.91	12% of 98%
16		NE		3.09	2.24		7.0	0.37	5.000	3.900	1.28	0.81	0.77	0.57	6.91	12% of 98%
17		NE		3.09	2.24		7.0	0.37	5.000	3.900	1.28	0.81	0.77	0.57	6.91	12% of 98%
18	Glazing-G	NW		3.09	0.75		7.0	0.71	9.200	3.900	2.36	0.81	0.35	0.35	2.32	100% of 99%
19																
20																

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters. While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

if inputs are valid

DISCLAIMER:

Note that the glazing performance properties U and SHGC (solar heat gain coefficient) stated in the above table, do not necessarily relate to a specific glass product. We recommend Collins and Turner Architects to review and source the glazing selections to meet (or exceed) the above mentioned minimum requirements.

The performance values stated in this report are for the whole window construction including framing, window seal and glazing. The values are not glazing centre point performance, but for the complete window system. The window supplier will need to demonstrate that the performance as modelled is achieved with the installed window system.

5.1.2 Level-2

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014) HELP

Building name/description: OPT Tenancy 5 | Application: other | Climate zone: 5

Storey: Level 2

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A		94m²	137m²						
Option B									n/a
Glazing area (A)		*68.4m²*	*69.4m²*						

Number of rows preferred in table below: 15 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Glazing Type-2A	E		3.09		7.64	7.0	0.30				0.00	1.00	1.00	7.64	11% of 100%
2		E		3.09		7.64	7.0	0.30				0.00	1.00	1.00	7.64	11% of 100%
3	Glazing Type 2B	E		3.09		7.45	7.0	0.30				0.00	1.00	1.00	7.45	11% of 100%
4		E		3.09		7.45	7.0	0.30				0.00	1.00	1.00	7.45	11% of 100%
5		E		3.09		7.45	7.0	0.30				0.00	1.00	1.00	7.45	11% of 100%
6		E		3.09		7.45	7.0	0.30				0.00	1.00	1.00	7.45	11% of 100%
7		E		3.09		7.45	7.0	0.30				0.00	1.00	1.00	7.45	11% of 100%
8		E		3.09		7.45	7.0	0.30				0.00	1.00	1.00	7.45	11% of 100%
9	Glazing Type 2C	E		3.09		9.45	7.0	0.30				0.00	1.00	1.00	9.45	14% of 100%
10	Glazing Type 2D	NE		1.92		44.20	6.0	0.55	4.750	3.000	1.58	1.08	0.59	0.47	44.20	84% of 99%
11	Glazing Type 2E	NE		1.05		24.17	6.0	0.55	4.750	1.050	4.52	0.00	0.00	0.20	24.17	16% of 99%
12																
13																
14																
15																

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters. While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

if inputs are valid

DISCLAIMER:

Note that the glazing performance properties U and SHGC (solar heat gain coefficient) stated in the above table, do not necessarily relate to a specific glass product. We recommend Collins and Turner Architects to review and source the glazing selections to meet (or exceed) the above mentioned minimum requirements.

The performance values stated in this report are for the whole window construction including framing, window seal and glazing. The values are not glazing centre point performance, but for the complete window system. The window supplier will need to demonstrate that the performance as modelled is achieved with the installed window system.

5.2 Option-2

5.2.1 Level-1

Report from Level-1 Proposed shop display.xlsx *printed 20/07/2016*

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **OPT Tenancy 5**

Application: **shop display**

Climate zone: **5**

Storey: **1**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	11.7m²	80m²	127m²					3.2m²	
Option B									n/a
Glazing area (A)	*8.71m²*	*59.6m²*	*61.3m²*					*2.32m²*	

Number of rows preferred in table below: **20** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Glazing-A	E		3.09	2.41		7.0	0.53	2.320	3.900	0.59	0.81	0.94	0.88	7.45	12% of 100%
2		E		3.09	2.41		7.0	0.53	2.320	3.900	0.59	0.81	0.94	0.88	7.45	12% of 100%
3		E		3.09	2.41		7.0	0.53	2.320	3.900	0.59	0.81	0.94	0.88	7.45	12% of 100%
4		E		3.09	2.41		7.0	0.53	2.320	3.900	0.59	0.81	0.94	0.88	7.45	12% of 100%
5		E		3.09	2.41		7.0	0.53	2.320	3.900	0.59	0.81	0.94	0.88	7.45	12% of 100%
6		E		3.09	2.41		7.0	0.53	2.320	3.900	0.59	0.81	0.94	0.88	7.45	12% of 100%
7	Glazing-B	E		3.09	2.47		7.0	0.53	2.320	3.900	0.59	0.81	0.94	0.88	7.64	12% of 100%
8	Glazing-C	E		3.09		8.92	7.0	0.53	2.320	3.900	0.59	0.81	0.94	0.88	8.92	15% of 100%
9	Glazing-D	N		3.09	2.82		7.0	0.80	8.600	3.900	2.21	0.81	0.00	0.27	8.71	100% of 51%
10	Glazing-E	NE		3.09	2.59		7.0	0.51	5.000	3.900	1.28	0.81	0.77	0.57	7.99	13% of 100%
11		NE		3.09	2.59		7.0	0.51	5.000	3.900	1.28	0.81	0.77	0.57	7.99	13% of 100%
12		NE		3.09	2.59		7.0	0.51	5.000	3.900	1.28	0.81	0.77	0.57	7.99	13% of 100%
13		NE		3.09	2.59		7.0	0.51	5.000	3.900	1.28	0.81	0.77	0.57	7.99	13% of 100%
14	Glazing-F	NE		3.09	2.24		7.0	0.51	5.000	3.900	1.28	0.81	0.77	0.57	6.91	12% of 100%
15		NE		3.09	2.24		7.0	0.51	5.000	3.900	1.28	0.81	0.77	0.57	6.91	12% of 100%
16		NE		3.09	2.24		7.0	0.51	5.000	3.900	1.28	0.81	0.77	0.57	6.91	12% of 100%
17		NE		3.09	2.24		7.0	0.51	5.000	3.900	1.28	0.81	0.77	0.57	6.91	12% of 100%
18	Glazing-G	NW		3.09	0.75		7.0	0.71	9.200	3.900	2.36	0.81	0.35	0.35	2.32	100% of 68%
19																
20																

page 1 of 2

DISCLAIMER:

Note that the glazing performance properties U and SHGC (solar heat gain coefficient) stated in the above table, do not necessarily relate to a specific glass product. We recommend Collins and Turner Architects to review and source the glazing selections to meet (or exceed) the above mentioned minimum requirements.

The performance values stated in this report are for the whole window construction including framing, window seal and glazing. The values are not glazing centre point performance, but for the complete window system. The window supplier will need to demonstrate that the performance as modelled is achieved with the installed window system.

5.2.2 Level-2

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014) HELP

Building name/description: OPT Tenancy 5 | Application: shop display | Climate zone: 5

Storey: Level 2

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A		94m²	137m²						
Option B									n/a
Glazing area (A)		*68.4m²*	*69.4m²*						

Number of rows preferred in table below: 15 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading	Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Glazing Type-2A	E		3.09		7.64	7.0	0.44				0.00	1.00	1.00	7.64	11% of 99%
2		E		3.09		7.64	7.0	0.44				0.00	1.00	1.00	7.64	11% of 99%
3	Glazing Type 2B	E		3.09		7.45	7.0	0.44				0.00	1.00	1.00	7.45	11% of 99%
4		E		3.09		7.45	7.0	0.44				0.00	1.00	1.00	7.45	11% of 99%
5		E		3.09		7.45	7.0	0.44				0.00	1.00	1.00	7.45	11% of 99%
6		E		3.09		7.45	7.0	0.44				0.00	1.00	1.00	7.45	11% of 99%
7		E		3.09		7.45	7.0	0.44				0.00	1.00	1.00	7.45	11% of 99%
8		E		3.09		7.45	7.0	0.44				0.00	1.00	1.00	7.45	11% of 99%
9	Glazing Type 2C	E		3.09		9.45	7.0	0.44				0.00	1.00	1.00	9.45	14% of 99%
10	Glazing Type 2D	NE		1.92		44.20	6.0	0.75	4.750	3.000	1.58	1.08	0.59	0.47	44.20	82% of 98%
11	Glazing Type 2E	NE		1.05		24.17	6.0	0.75	4.750	1.050	4.52	0.00	0.00	0.20	24.17	18% of 98%
12																
13																
14																
15																

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters. While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

if inputs are valid

DISCLAIMER:

Note that the glazing performance properties U and SHGC (solar heat gain coefficient) stated in the above table, do not necessarily relate to a specific glass product. We recommend Collins and Turner Architects to review and source the glazing selections to meet (or exceed) the above mentioned minimum requirements.

The performance values stated in this report are for the whole window construction including framing, window seal and glazing. The values are not glazing centre point performance, but for the complete window system. The window supplier will need to demonstrate that the performance as modelled is achieved with the installed window system.

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

5.3 Shading

The Section-J glazing assessment has been updated as per the revised architectural design, with the inclusion of a shading device on Level-2 (i.e. an awning on the northern façade).

From discussion with Collins and Turner architects, it has been noted that the awning will be comprised of a glazed structure, and 10.38mm laminated glazing may need to be used for structural reasons.

Thermal performance of the glazed awning has not yet been specified by the architects. Based on the Section-J assessment, Steensen Varming's advice is being sought to understand the type of glass that could be used to achieve the best outcome.

Section-J

For the current project, the Section-J assessment has been undertaken as per the deemed-to-satisfy (DTS) methodology.

As per the DTS provisions, external shading devices should be capable of restricting 80% of summer solar radiation. For the proposed Lev-2 awning, this could be achieved through a combination of the following:
1. Glazing performance (measured as Solar heat gain coefficient - SHGC) &
2. Depth of the awning structure.

For the current assessment, it has been considered that the awning structure will be designed to restrict 80% of summer sun as stated above. To achieve this, the awning is considered to have an SHGC of greater than 0.75, and the remaining shading to be provided by the shading offered by the depth of the steel-structure.

If the architects wish to deviate from the above performance requirements, the following options are available:

- OPTION-A – (Retain previous assessment)
  Retain the glazing performance values for the Northern facade, as per previous Section-J assessment. (i.e. Considering that the proposed awning offers no shading benefit, due to clear glass)

- OPTION-B – (Consider JV3 assessment method)
  It should be noted that the DTS assessment method is a very prescriptive approach and does not allow much flexibility in terms of using other glass types (with lower SHGC). However, if the design team intend to use an alternative glass type, then JV3 assessment methodology could be considered.

  Consider an awning that would provide less than 80% shading, and evaluate its benefit via an alternative assessment using the JV3 methodology. The JV3 method compares the energy consumption of the proposed building to the energy consumption of a reference building (reference building is set-up as per the DTS provisions).

Level 8, 9 Castlereagh Street
Sydney, NSW, 2000, Australia
ABN 50 001 189 037
t : +61 / 02 9967 2200
e : info@steensenvarming.com

This approach would require thermal modelling to be undertaken. The modelling should validate that the shortfall from DTS on the northern facade, is being made-up elsewhere in the facade. (via performance improvements to be made on other external glazing members, along the remaining facade).
This approach might not be suitable because any improvements beyond the DTS will result in a dark coloured glazing, potentially going against the architectural design intent for the project.

Updated glazing calculation

With the inclusion of the proposed glazed awning on Lev-2 northern facade, the performance requirements for the northern glazing have been revised to a lower-performance (compared to previous version of the Section-J assessment).

Based on the updated calculations, the performance of the Lev-2 northern glazing has been revised to the following values:

- Option-1 (Considering the Lev-2 restaurant space to be a Conditioned space) – U-value ≤ 6.0 SHGC ≤ 0.55
- Option-2 (Considering the Lev-2 restaurant space to be shop front type) – U-value ≤ 6.0 SHGC ≤ 0.75

Previously, the SHGC requirements were 0.21 and 0.28 for options 1 and 2 respectively. These previous values would have resulted in an amber coloured glazing for the north facade on Level-2.

With the revised assessment, the Lev-2 northern glazing can have clear glazing (provided the awning is capable of restrictign 80% of summer sun as noted above).