greenstar

Daylight and Views calculation guide

Guidance on calculation methods for daylight and views requirements

Version 1

7 March 2022

Green Building Council Australia

Building a sustainable future

Introduction

Version control

Version	Date	Description
1	07/03/2022	Initial release for Green Star Buildings. (Adapted from Green Star – Design & As Built)

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Daylight and Views

This calculation guide outlines a methodology to demonstrate compliance with the requirements of Daylight and Views in Green Star Buildings projects. Using the methodologies provided, project teams can identify areas within the project with high levels of daylight and access to views for the relevant credits. Project teams are encouraged to use this calculation guide instead of daylight modelling for the Green Star Building credit: Light Quality - Minimum Expectation: Daylight.

Relevant rating tools

The table below provides the relevant rating tools, credits, and requirements for which this calculation guide can be used.

Rating tool	Credit	Performance level	Requirement
Green Star Buildings	Light Quality	Minimum Expectation	Daylight & View
	Connection to Nature	Credit Achievement & Exceptional Performance	Views

Daylight

The daylight hand calculation methodology determines the areas within buildings with high levels of daylight.

The following are required for this calculation:

- The project is not overshadowed
- The building glazing has a visual light transmittance (VLT) of at least 40%

This calculation methodology is based on Good Practice Guide 245: Desktop guide to daylighting - for architects (DETR, 1998).

Refer to Appendix A for a worked example.

Overshadowing

Projects with external shading unaffected by a direct 25° line from the centre of the window are considered not overshadowed as illustrated in Figure 1 below. External shading can include buildings, cliffs, or any other solid structure, but does not include trees.

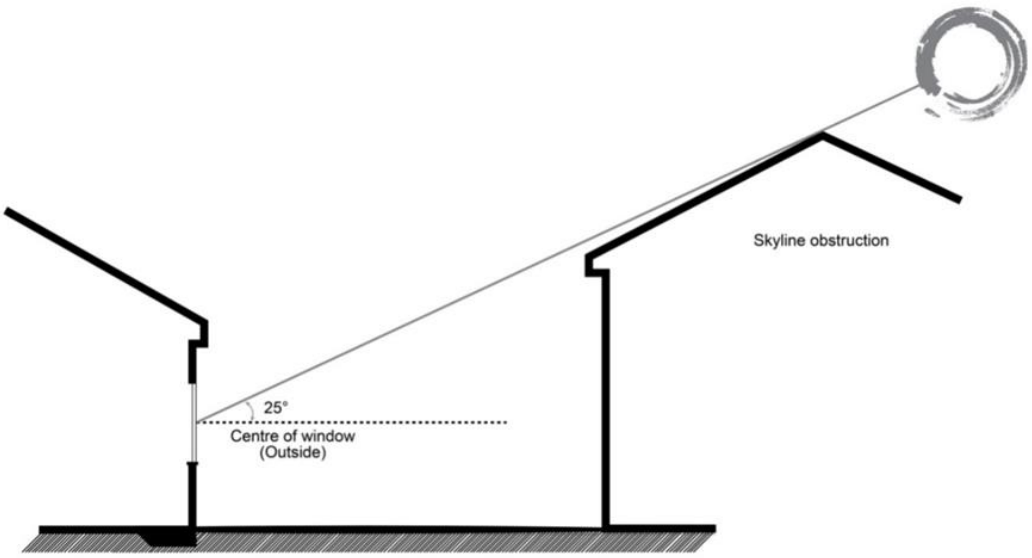


Figure 1: Angle of obstruction for external shading

Visual light transmittance (VLT)

The glazing must have a visible light transmittance of at least 40% with the assumption that there is no significant loss of light due to external obstructions, tinted glazing, or interior screening.

The following table provides typical VLT values for various types of glazing.

Glazing type	VLT range
Clear single glazing	~70 - 90%
Tinted single glazing (green)	~70%
Tinted single glazing (grey)	~20%
Clear double glazing	~70 - 80%

Glazing type	VLT range
Double glazing with a low emissivity coating	~40 - 70% (but can be as low as 10%)

Note:

- Project teams may use these values as a guide but must provide verification that the glazing used for the project has a VLT of 40% or greater.
- Dirt can provide a further 5% reduction in VLT with normal cleaning in an urban setting. Reductions in VLT due to dirt do not need to be included for the purposes of Green Star.

Zone of compliance

The zone of compliance is an area in the horizontal plane (as shown in Figure 2) is the area within the regularly occupied area where there is access to daylight and is calculated as follows:.

$Zone\ of\ compliance = d \times w$

Where:

- $d = depth = 2h$
- $w = width\ = width\ of\ the\ glazing$

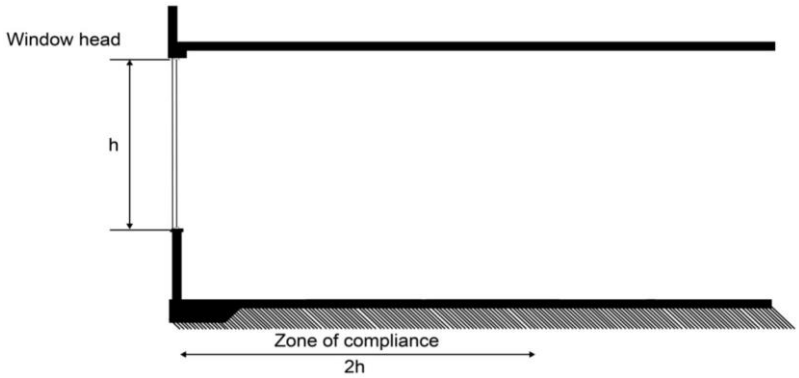


Figure 2: Dimensions for calculating the zone of compliance

Note

- When plotting the depth of the zone of compliance, the zone cannot be drawn past permanent solid or glazed partitions
- Any column or mullion < 0.5 m in width can be disregarded, and the glazing width considered to be continuous
- Desktop / tabletop level is set at 700 mm AFFL for all Green Star rating tools

Defining ‘h’

The value of ‘h’ is defined as the height of the window head, which can be calculated based on how occupants will use the space.

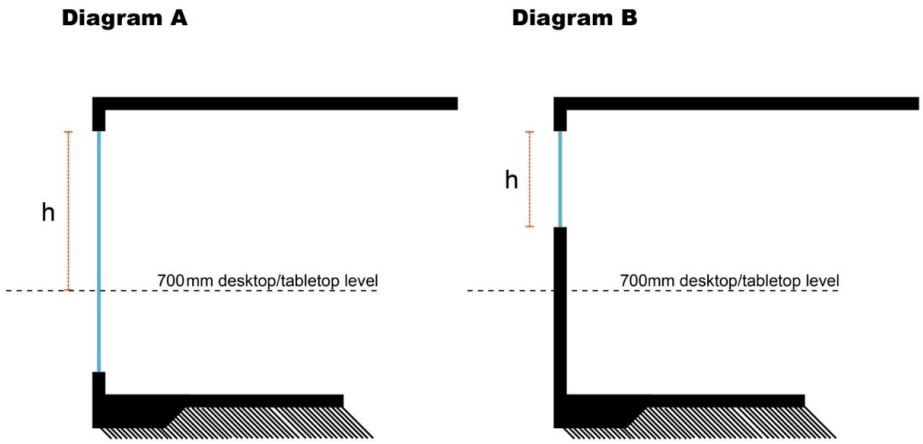


Figure 3: How to determine the dimension of 'h'

For spaces, where a desk is provided such as office settings, ‘h’ is calculated as:

- Height above the desktop / tabletop level of 700 mm (Figure 3 Diagram A)
- Height above the bottom sill of the glazing, where the bottom sill is above desktop / tabletop level of 700mm (Figure 3 Diagram B)

For spaces, where there is no desk provided such as living rooms or bedrooms in residential apartments, ‘h’ is calculated as:

- Height of the window as installed.

Compliant areas

Regularly occupied area

The percentage of compliant regularly occupied area can be calculated as follows:

$$Zone\ of\ compliance\ (m^2) = h \times 2 \times w$$

$$Regularly\ occupied\ area\ (m^2) = A_{regularly\ occupied}$$

$$Compliant\ area\ (\%) = \frac{Zone\ of\ compliance}{A_{regularly\ occupied}} \times 100$$

*Refer to the Submission Guidelines to identify the regularly occupied areas for your project.

Views

The views hand calculation methodology determines the areas within buildings with access to views.

Refer to Appendix B for a worked example.

Line of sight

The line of sight to the view is used to determine the area of compliance, or a complying workstation. A primary space or workstation that has direct line of sight within 8 meters of a qualifying view will meet the requirements. A qualifying view can be a window, atrium, or high-quality internal view, depending on the rating tool. When calculating the distance to the view, the thickness of external walls must be considered.

The line of sight is determined by drawing a line from the qualifying view to the eye of the building occupant. The occupant must be seated or standing at a work setting or mobile within a retail, industrial, or other space. A line at 45° can be used for corners of high-quality views.

Conditions

All types of views

For calculations with any type of views, the following conditions apply:

- Permanent partitions must be accounted for
  - If the view is obscured by a permanent partition, the area behind this partition must be excluded from the area of compliance
  - If the view is obscured by a temporary partition, which can be removed during occupied hours, then this area can be counted towards the area of compliance
  - Workstations and partitions which are less than 1.5m tall can be excluded
- Internal and external columns can be excluded
- Internal, fully glazed partitions can be excluded

External Views

For calculations with external views, the following conditions apply:

- The view must extend from the perimeter of the building and be unblocked by any permanent solid structure (i.e. there must not be another building within 8 m)
- The area behind any solid portion of the perimeter of the external wall must be excluded
- Glazing below 720 mm or above 2,400 mm cannot contribute to external views
  - There is no minimum dimension for glazing prescribed within this guide, however project teams are encouraged to consider the intent of the credit in the context of their building to establish whether the glazing provided within their project will have the capacity to provide views to occupants. For example, it is unlikely that a 400 mm high window at 2,000 mm above floor levels would have the capacity to provide high quality views to occupants.

See Figures 4 and 5 for illustrations.

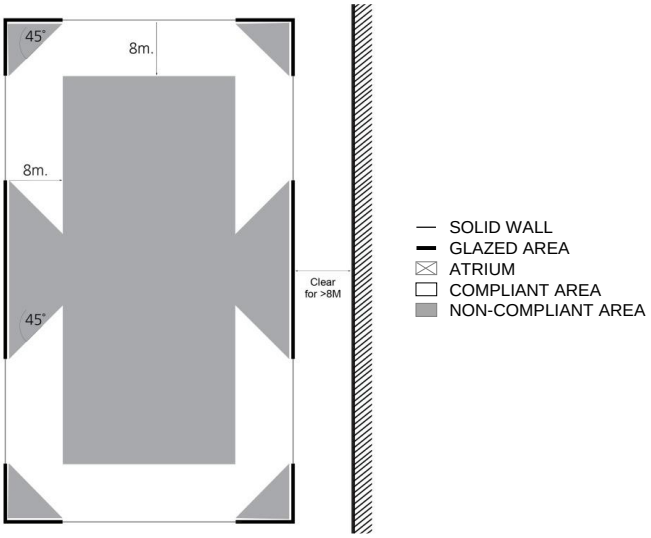


Figure 4: External views

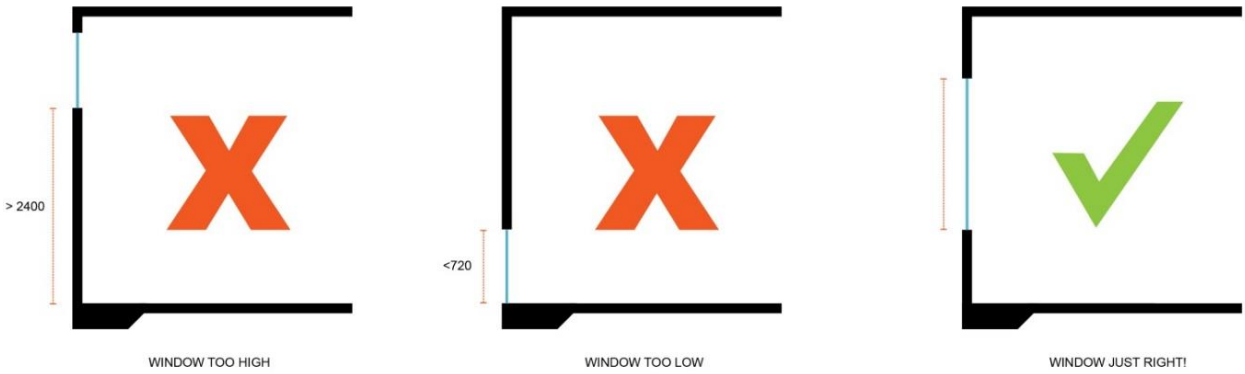


Figure 5: Vision glazing

Daylit atrium views

A combination of external and atrium views may be used to demonstrate compliance as a ‘view’.

For calculations with daylit atrium views, the following conditions apply:

- The atrium must be at least 8 m wide and 8 m deep (depth across the atrium, this is not referring to the height of the atrium) at any point where the line of sight is demonstrated
- If the space opens directly onto the atrium, calculations must be made from the vision glazing or from the internal perimeter of the atrium if no internal glazing is installed
- The area behind any solid portion of the atrium perimeter must be excluded from the calculations
- A minimum daylight factor of 3% must be achieved for 90% of the atrium area on the lowest level for which compliance is claimed
- A combination of external and atrium views may be used to demonstrate compliance

See Figure 6 for illustrations.

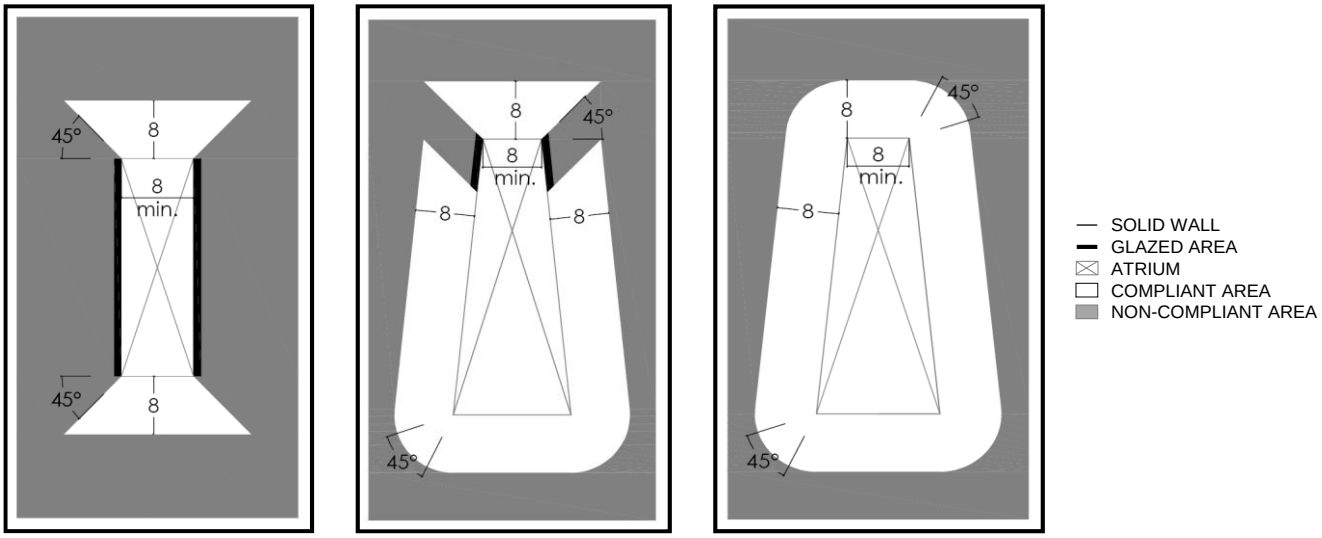


Figure 6: Daylight atrium views

High-quality internal views

A combination of multiple internal views may be used to demonstrate compliance as a ‘view’

See Figure 7 for illustrations.

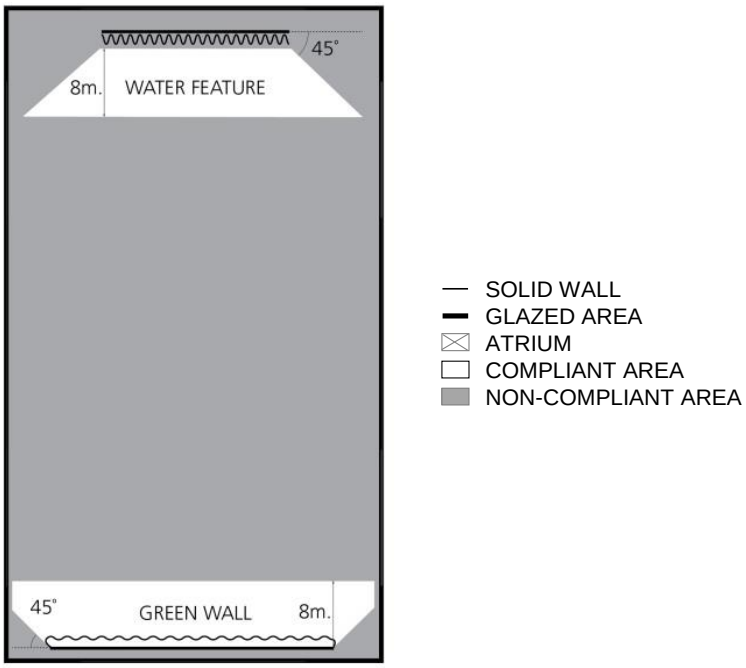


Figure 7: High quality internal views

Compliant areas

Regularly occupied area

The percentage of area within 8 m of views can be calculated as follows

$$\begin{aligned} Area\ with\ views = {} & A_{views}\ (m^2) \\ = {} & (width\ of\ compliant\ external\ view\ \times 8m + area\ within\ 45^o) \\ & + (width\ of\ compliant\ atrium\ view\ \times 8m + area\ within\ 45^o) \\ & + (width\ of\ compliant\ internal\ view\ \times 8m + area\ within\ 45^o) \end{aligned}$$

$$Regularly\ occupied\ area = A_{regularly\ occupied}\ (m^2)$$

$$Compliant\ area\ (\%) = \frac{A_{views}}{A_{regularly\ occupied}} \times 100$$

*Refer to the Submission Guidelines to identify the regularly occupied areas for your project.

Work settings

The percentage of work settings within 8 m of views can be calculated as follows:

$$\begin{aligned} Worksettings\ with\ views = {} & \mathrm{W_{views}} \\ = {} & (work\ settings\ within\ 8\ m\ of\ an\ external\ view) + (work\ settings\ within\ 8\ m\ of\ an\ atrium\ view) \end{aligned}$$

$$Total\ number\ of\ worksettings = W_{total}$$

$$Compliant\ work\ settings\ (\%) = \frac{W_{views}}{W_{Total}} \times 100$$

References

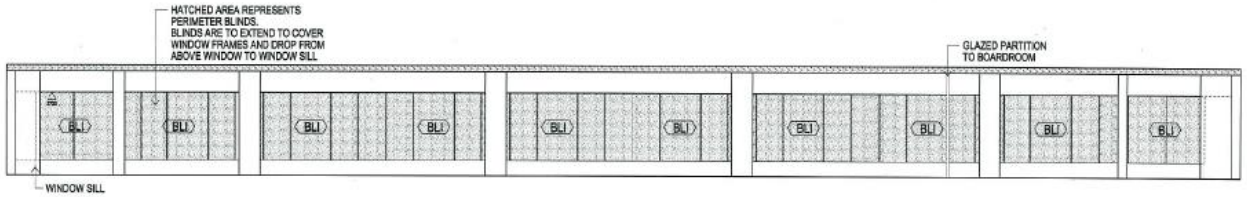
The Department of Environment, Transport and the Regions (DETR), 1998, Good Practice Guide 245 'Desktop guide to daylighting – for Architects', http://www.cibse.org/getmedia/19b5aa2a-309f-4e8d-8e72-07b5c4c4cf72/GPG245-Desktop-Guide-to-Daylighting-for-Architects.pdf

Appendix

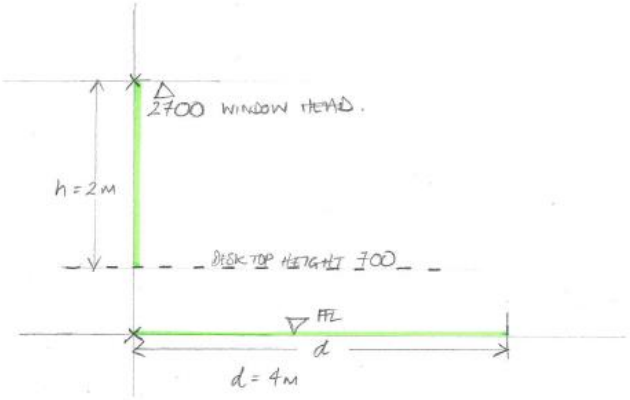
Appendix A: Daylight calculation example

The plans in this appendix are provided as an example and illustration of the daylight hand calculation methodology but is not an example of meeting the requirements.

IEQ-4: 1



01 PERIMETER BLIND ELEVATION - WEST FACADE
1:100



Calculating the Zone of Compliance.

Depth of the zone of Compliance = h x 2 = 4m. *1
'w' width of the Zone of compliance = width of glazing *2
Zone of Compliance = h x 2 x w

*1
The zone of Compliance may not be drawn past solid or glazed partitions.

*2
Any column or mullion < 0.5m in width can be disregarded and the glazing is treated as continuous.

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INTELLECTUAL PROPERTY

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CLIENT PROJECT No.

PROJECT
GREEN BUILDING COUNCIL OF AUSTRALIA

BVN PROJECT NUMBER
M0709010

TRUE NORTH PROJECT NORTH

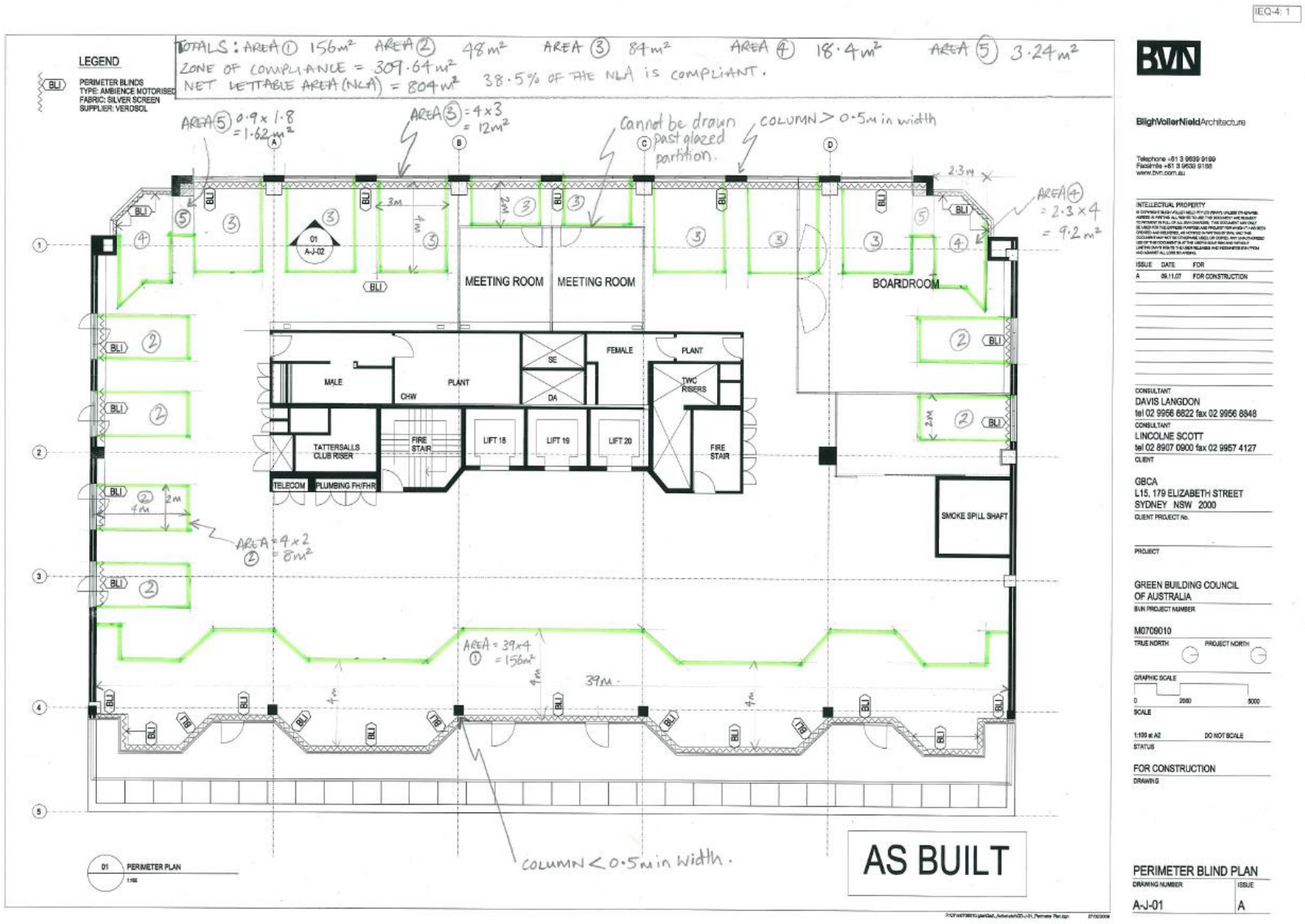
GRAPHIC SCALE
0 2000 5000

SCALE
1:100 at A2 DO NOT SCALE

STATUS
FOR CONSTRUCTION

DRAWING
PERIMETER BLIND ELEVATION PLAN

DRAWING NUMBER A-J-02
ISSUE A


IEQ-4: 1
TOTALS: AREA ① 156m² AREA ② 48m² AREA ③ 84m² AREA ④ 18.4m² AREA ⑤ 3.24m²
ZONE OF COMPLIANCE = 309.64m²
NET LETTABLE AREA (NLA) = 804m²
38.5% OF THE NLA IS COMPLIANT.
LEGEND
BLI
PERIMETER BLINDS
TYPE: AMBIENCE MOTORISED
FABRIC: SILVER SCREEN
SUPPLIER: VEROSOL
AREA ⑤ 0.9 x 1.8 = 1.62m²
AREA ③ = 4x3 = 12m²
Cannot be drawn past glazed partition.
COLUMN > 0.5m in width
AREA ④ = 2.3x4 = 9.2m²
MEETING ROOM
MEETING ROOM
BOARDROOM
MALE
PLANT
CHW
SE
DA
FEMALE
PLANT
TWC RISERS
TATTERSALLS CLUB RISER
FIRE STAIR
LIFT 18
LIFT 19
LIFT 20
FIRE STAIR
TELECOM
PLUMBING FH/FHR
SMOKE SPILL SHAFT
AREA = 4x2 ② = 8m²
AREA = 39x4 ① = 156m²
39m
COLUMN < 0.5m in width.
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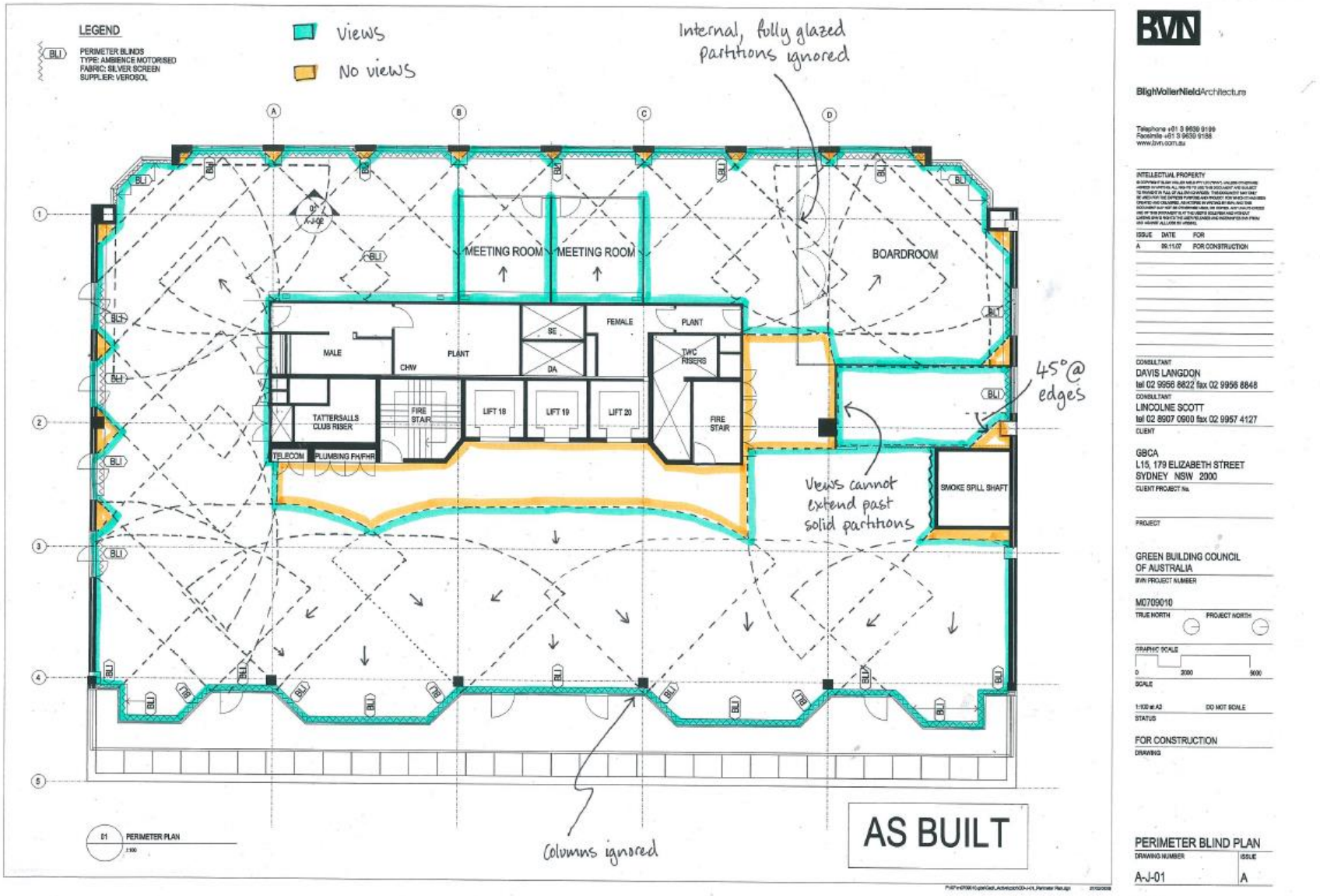
Appendix B: Views calculation example

The plans in this appendix are provided as an example and illustration of the daylight hand calculation methodology but is not an example of meeting the requirements.


IEQ-4: 1
LEGEND
BLI
PERIMETER BLINDS
TYPE: AMBIENCE MOTORISED
FABRIC: SILVER SCREEN
SUPPLIER: VEROSOL
Views
No views
Internal, fully glazed partitions ignored
MEETING ROOM
MEETING ROOM
BOARDROOM
MALE
CHW
PLANT
SE
DA
FEMALE
PLANT
TWC RISERS
TATTERSALLS CLUB RISER
FIRE STAIR
LIFT 18
LIFT 19
LIFT 20
FIRE STAIR
TELECOM
PLUMBING FA/FHR
SMOKE SPILL SHAFT
45°@ edges
Views cannot extend past solid partitions
Columns ignored
AS BUILT
01 PERIMETER PLAN
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INTELLECTUAL PROPERTY
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