



# WATTBLOCK



## Equitable Common Area Rooftop Allocation for Solar

**Lot 1/6 Noel Avenue, Adamstown NSW 2289**

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## Summary

Wattblock has conducted an analysis of the solar potential of the roof space on 6 Noel Avenue, Adamstown. An equitable split of the roof space has been estimated between the 9 individual lots of the complex.

In this study, an allocation for lot 1 only was requested. Figure 1 highlights the roof space that this lot has a fair entitlement to, as well as the remaining area which can be then split between the remaining 8 residential lots.



**Figure 1:** Outline of roof areas to split between Lot 1 (green) and the remaining 8 Lots (grey) at 6 Noel Avenue, Adamstown

The area of this space for lot 1 is  $48m^2$ . However, this amount is only valid for this particular section as different sections of the roof have different value in solar generation due to varying orientations and shading (see section 1 for a detailed calculation on the roof space value).

## 1. Detailed Calculations

In a shared complex of apartments or townhouses, it is important that the Owners Corporation can fairly split the roof space between all residential lots for the use of solar. For an equitable allowance of roof area for solar generation, the following factors are important to consider:

1. Individual lot entitlements
2. Roof area available for solar generation
3. Roof shading
4. Roof orientation and tilt

### 1.1. Individual Lot Entitlements

Each private lot is granted an entitlement figure. The larger the lot entitlement, the more roof space that resident is 'entitled' to use for solar. Table 1 presents the lot entitlements for the 9 residential apartments in your strata complex.

**Table 1:** Breakdown of lot entitlements at 6 Noel Avenue, Adamstown

Lot	Entitlement	% of Total
1	130	13.0%
2	103	10.3%
3	103	10.3%
4	103	10.3%
5	128	12.8%
6	103	10.3%
7	103	10.3%
8	103	10.3%
9	124	12.4%
<b>Total:</b>	<b>1000</b>	<b>100%</b>

The percentage of entitlement grants a particular lot an equivalent percentage of available weighted area for use of solar.

### 1.2. Available Roof Space for Solar

Not all of the entire roof space can be used for solar generation. This is due to various factors such as excessive shading, available room for solar panels, obstacles, or accessibility. Also, this strata scheme has already used some of this roof space to install a solar system for common area electricity use. This area will also need to be removed from the total available.

Figure 2 below highlights the area on the roof that is suitable for the installation of solar panels. The total usable area is  $404m^2$ .



**Figure 2:** Available roof space to be used for solar at 6 Noel Street, Adamstown

### 1.3. Shading

Surrounding structures to the complex include many trees. These have a large effect on the amount of shading to certain parts of the roof space during the day and other times of the year. Wattblock have estimated the impacts of shading on different areas of the roof throughout the entire year.

The areas of different shading on the roof space are labelled in figure 3. Table 2 presents the yearly output of a solar panel on different roof areas as a percentage of the total unshaded output. I.e. a value of 80% indicates that 20% of the total possible yield has been obstructed due to shading.



**Figure 3:** Areas with different shading conditions on the roof of 6 Noel Avenue, Adamstown

**Table 2:** Breakdown of lot entitlements at 6 Noel Avenue, Adamstown

Area Label (from fig. 2)	Area (m <sup>2</sup> )	Shading Factor (%)
1	26	95
2	21	95
3	21	88
4	9	95
5	8	90
6	18	99
7	18	92
8	13	89
9	18	88
10	17	86
11	10	99
12	10	94
13	10	92

Area Label (from fig. 2)	Area (m <sup>2</sup> )	Shading Factor (%)
14	20	90
15	10	84
16	26	97
17	24	95
18	17	89
19	17	87
20	16	97
21	15	95
22	15	94
23	15	92
24	15	88
25	4	80
26	7	75
27	4	55

#### 1.4. Roof Orientation and Panel Tilt

The orientation and tilt of the panels on the roof are the last major factor to consider for solar generation. Generally, the most north-facing that a surface is, the more solar output it will generate. East and west facing panels will generate more in the evenings and mornings respectively. It is assumed that the tilt of the panels on the colorbond roof of the complex is 20 degrees to the horizontal.

West orientations can be considered more valuable than those towards the east, as they will generate more solar power during peak hour electricity tariff rates and, if consumed immediately, will reduce electricity bills more effectively. However for this analysis, Wattblock has assumed that only the total annual generation of each orientation is important, as this is more appropriate to consider, if battery storage will be included in the future. Figure 4 and table 3 shows the different zones of panel orientation and tilt on the roof space. Also provided in table 3 are the relative levels of generation for an unshaded solar panel in these regions. These levels of generation are normalised to the zone of most generation, which is zone A.

**Table 3:** Orientation and tilt zones for 6 Noel Avenue, Adamstown

Zone	Orientation (degrees, clockwise from North)	Panel tilt (degrees to the horizontal)	Relative solar generation (normalised to zone A)
A	340	20	1.00
B	297	20	0.923
C	86	20	0.916



**Figure 4:** Orientation and tilt zones on the roof of 6 Noel Avenue, Adamstown



### 1.5. Total Analysis

The combination of all of these factors give a total weighted value of each section of area on the roof, presented in table 4. These area sections are defined as those presented in figure 2.

**Table 4:** Weighted areas for each section of roof space (defined according to the labels in figure 2)

Area Label (from fig. 2)	Area (m <sup>2</sup> )	Weighted Area (m <sup>2</sup> )
1	26	24.70
2	21	18.42
3	21	17.06
4	9	7.89
5	8	6.65
6	18	16.45
7	18	15.29
8	13	10.68
9	18	14.62
10	17	13.50
11	10	9.14
12	10	8.68
13	10	8.49

Area Label (from fig. 2)	Area (m <sup>2</sup> )	Weighted Area (m <sup>2</sup> )
14	20	16.62
15	10	7.76
16	26	23.12
17	24	20.90
18	17	13.87
19	17	13.56
20	16	14.23
21	15	13.06
22	15	12.93
23	15	12.65
24	15	12.10
25	4	2.93
26	7	4.81
27	4	2.02

The total weighted area of the roof is then 342m<sup>2</sup>. Table 5 shows the amount of this weighted area that each lot is entitled to.

**Table 2:** Lot entitlements to weighted area

Lot	% Entitlements	Weighted area (m <sup>2</sup> )
1	13.0%	44.5
2	10.3%	35.2
3	10.3%	35.2
4	10.3%	35.2
5	12.8%	43.8
6	10.3%	35.2
7	10.3%	35.2
8	10.3%	35.2
9	12.4%	42.4
<b>Total:</b>	<b>100%</b>	<b>342</b>