

Solar Access for Lots

Guidelines for Residential Subdivision in NSW



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Introduction

The Solar Access for Lots [SAL] Guide is a step-by-step tool, designed to assist subdividers detail solar access 'zones' on subdivision plans. This process determines designs that maximise solar access into living areas and living spaces of dwellings built on residential Greenfield subdivisions.

Rather than control lot size directly, the tool seeks to provide guidance on the placement of a dwelling on a lot to ensure solar access. The tool encourages dwelling shapes to be selected for certain lot orientations to allow good solar access to that dwelling, without compromising lot yields or an increase in lot size. It is based on common dwelling footprints and heights, yet has the flexibility to accommodate other variations.

The tool is primarily designed for use by subdividers with any subdivision intended for detached dwellings in NSW where the lots are at least 400m². However, it may be adapted for use with Integrated Development and may be applied to small lots and zero-lot line lots with care.

Councils in NSW can apply the tool as a voluntary or mandatory control mechanism for new subdivisions; it contains boundary setback figures appropriate for the range of latitudes covered by NSW.

The SAL Guide has been developed in consultation with key stakeholders in the NSW subdivision industry. It replaces the SAL tool promoted by the Sustainable Energy Development Authority as part of the Energy Smart Homes Program.



Figure 1. Good placement of the home and private open space allows each home to have good solar access for:

1. outdoor living
2. solar water heating and
3. outdoor clothes drying, while maintaining lot yields.

What is Solar Access?

The solar access of a lot refers to its potential to receive adequate sunlight in order for certain areas of a dwelling to catch the sun's energy. If a lot has good solar access, there will be adequate sunlight for a solar hot water system to work effectively, living areas with north-facing windows will receive sufficient sunlight to provide thermal comfort for occupants to reduce reliance on artificial heating and clothes lines can be located in sunny outdoor spaces to reduce reliance on clothes dryers. Occupants of houses in new estates tend to discover these benefits by accident if their home happens to have good solar access. This tool can help subdividers and developers dramatically increase the proportion of homes in an estate with these benefits. If this tool is used at the subdivision stage, developers can deliver good solar access for their customers with little or no additional cost to either developers or homebuyers.

About the SAL Guide

The SAL Guide takes a different approach to other Solar Access tools in that it seeks to control the placement of the dwelling on a lot to ensure solar access rather than simply control the lot size directly. This is done by defining, at the subdivision stage, the dimensions of an area of each lot in the subdivision that cannot be built upon. This then controls the placement of dwellings on those lots at the development application stage. These dimensions are influenced by the lot orientation and decisions regarding the height of a dwelling on the adjacent lot to the north. This tool does not provide a rating; it ensures that all lots achieve defined minimum requirements for solar access.

This approach allows lot sizes to be 'fine tuned' to place moderate controls on the dwelling options on a given lot, to protect the solar access, whilst at the same time maintaining typical lot yields across a subdivision. The control over lot dimensions remains in the hands of the subdivider as they are most aware of the dwelling types that would be placed on the lots. The tool encourages subdividers to make decisions on the footprint and height of dwellings to be placed on the lots at the

Defining Solar Access

For the purpose of this tool, solar access is defined as being protected solar gain for a specific period to the base of walls built parallel to the northern boundary (NE, N, NW). Only those walls in which windows are likely to be placed by designer are protected for solar access by the tool. The tool recognises that flexibility to place windows in north facing walls is constrained by cost, privacy, internal planning and streetscape issues. For example, maintaining solar access to the northern side boundary of the front section of the lot may not result in windows being located in that part of the dwelling. This zone is usually occupied by garages, master bedrooms and formal lounge areas that are unlikely to locate windows to the side boundary. The tool allows these spaces to be placed closer to the boundary and thereby reduce lot dimensions.

subdivision application stage in order to deliver both reasonable yields for themselves and reasonable solar access for the lot purchaser. The sample Area Plan (Fig. 7) and examples of lot/dwelling combinations provided at the end of this document illustrate how certain simple decisions can maximise overall yields. Subdivision designers that have used draft versions of this tool have found that it is compatible with the range of dwellings either anticipated or planned for their subdivisions.

Why have Controls at the Subdivision Stage?

Conventional council controls at the development application [DA] stage may be successful in achieving good solar access, however, the lots are assessed for overshadowing on an individual basis. This can result in either a dwelling being located such that it creates overshadowing for future adjacent dwellings, or good placement may be affected by future poor

placement. This tool will allow for a more 'orderly' placement of dwellings on lots across a subdivision where each dwelling's solar access is protected, before any house is built in the subdivision and ensures each dwelling receives a reasonable opportunity for solar access.

Street Layouts

Street layouts are not affected or controlled by this tool. Designers should initially layout out the subdivision according to site slope, drainage, optimising yields, etc – i.e. the normal process of subdivision design. It is recommended not to put in

side boundaries until the width of lots is established by using these guidelines. Subdivisions with rear laneways can also be readily accommodated by the tool.

While orienting streets in a North-South/East-West pattern is not essential, it is recommended to improve the efficiency of solar hot water systems on the roofs as these systems are more sensitive to less than ideal orientation than the thermal performance of dwellings.

Designing Solar Access Zones on Lots

This section provides an introduction to the concept of Solar Access Zones and guidelines on how to indicate and size them on a subdivision drawing.

Concept of Solar Access Zones

This tool specifies that each lot in a subdivision has both a Flexible Solar Access Zone (FSAZ) and a Minimum Solar Access Zone (MSAZ).

- The FSAZ is the reserved part of the lot that may not be built on, thereby allowing solar access to glazing and private open space.
- The MSAZ is the minimum area of the FSAZ that may not be built upon. The MSAZ can be moved to any place within the FSAZ at development application stage to accommodate a range of house footprints. Once the MSAZ and the dwelling are located at development application stage, the FSAZ is no longer applicable and can be built upon.

A control on the height of the lot to the north of the FSAZ and MSAZ can be applied by the subdivider to reduce their depth and consequently reduce overall lot sizes.

The dimensions of the Solar Access Zones depend on the decisions made by the subdivider and vary according to the height control applied. The Solar Access Zones are to be shown on a subdivision plan submitted to Council at subdivision application stage.

The dimensions in Table 1 (see page 9) relate to the Minimum Solar Access Zones. The dimensions allow full solar access to the walls built parallel to the northern boundary between 10.30am and 1.30pm on the 22nd of June (midwinter) and hence at least 3 hours of solar access. The Minimum Solar Access Zone is located on the site such that it is very likely that living room windows will be located in this wall.

How to Use the Solar Access for Lots Guide

This section provides advice on how to use the SAL Guide while maintaining conventional lot yields and continuing to provide housing choice for consumers. The following diagrams and explanatory information illustrate the concept of indicating and sizing these Solar Access Zones. This is followed by guidance and examples that will help designers lay out their subdivision in accordance with these guidelines.

Step 1. Lot Labelling

Figure 2a and 2b shows the range of possible lot orientations, and labels each. The street is to the centre of the diagram, i.e. a lot with the street to the North and the rear boundary to South is a 6.00 lot. If a subdivision has rear laneways, the same guidelines apply, i.e. the major street to which the house will be facing is considered the 'street'. Refer to the Advisory Notes for further information.

The shape and dimensions of the Solar Access Zones [SAZs] differs according to the lot orientation. Table 1 following the diagrams provides dimensions for the solar access zones. It is recommended that the subdivision designer establish the SAZs for a group of lots in a row that have the same label and adjust the side boundaries according to their business model. See the advisory notes for further details.

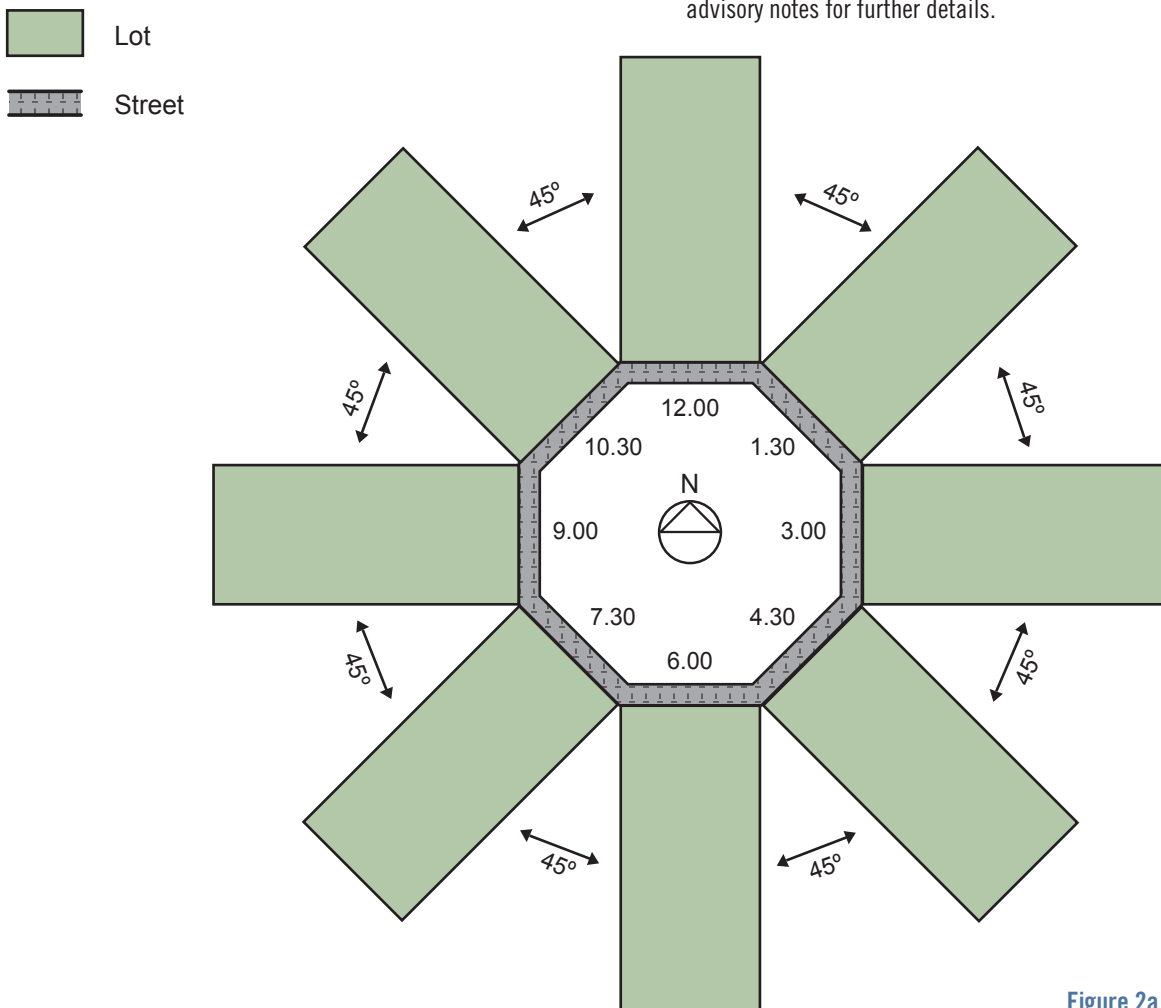


Figure 2a. Lot Labelling

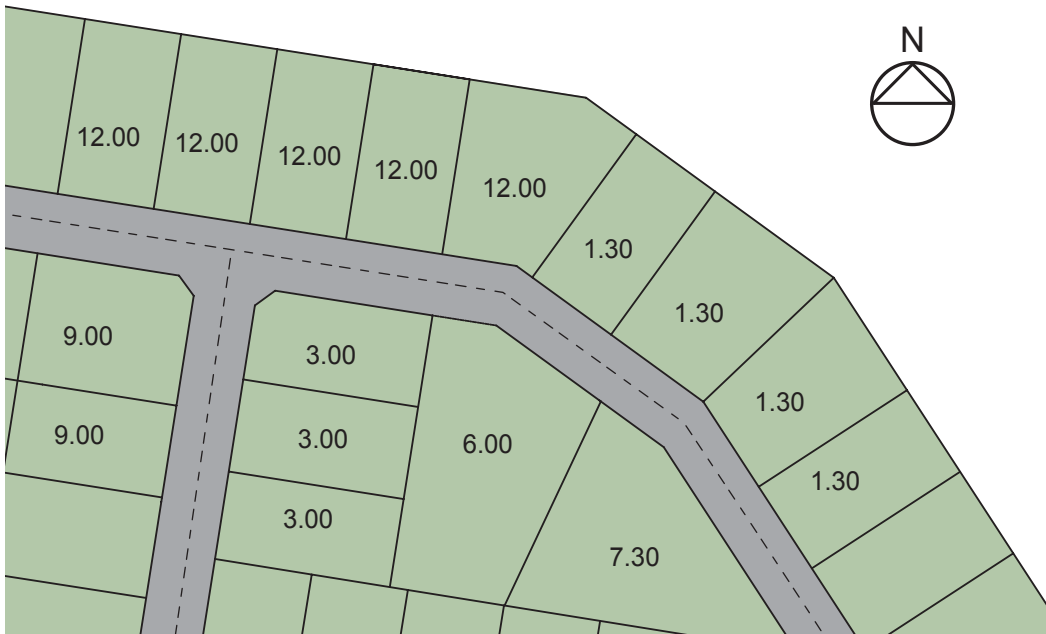


Figure 2b. Example of lot labelling on a subdivision

Step 2. Flexible Solar Access Zones

In Figure 3, below, a Flexible Solar Access Zone (FSAZ) is indicated as a dotted hatched area on each lot. The dimensions of the zone are given in Table 1 and vary depending on whether the heights of dwellings are controlled – refer to Balancing Flexibility of Dwelling Types with Lots Sizes, Advisory Notes

Page 11. This flexible zone generally indicates where a courtyard or private open space should be located on the lot.

The height of the part of the dwelling located on the lot to the ‘north’ of the FSAZ may be either single or double storey depending on the controls applied by the subdivider. For 1.30, and 10.30 lots, ‘north’ may be either north-west or north-east. For 4.30 lots, north-east and north-west for 7.30 lots.

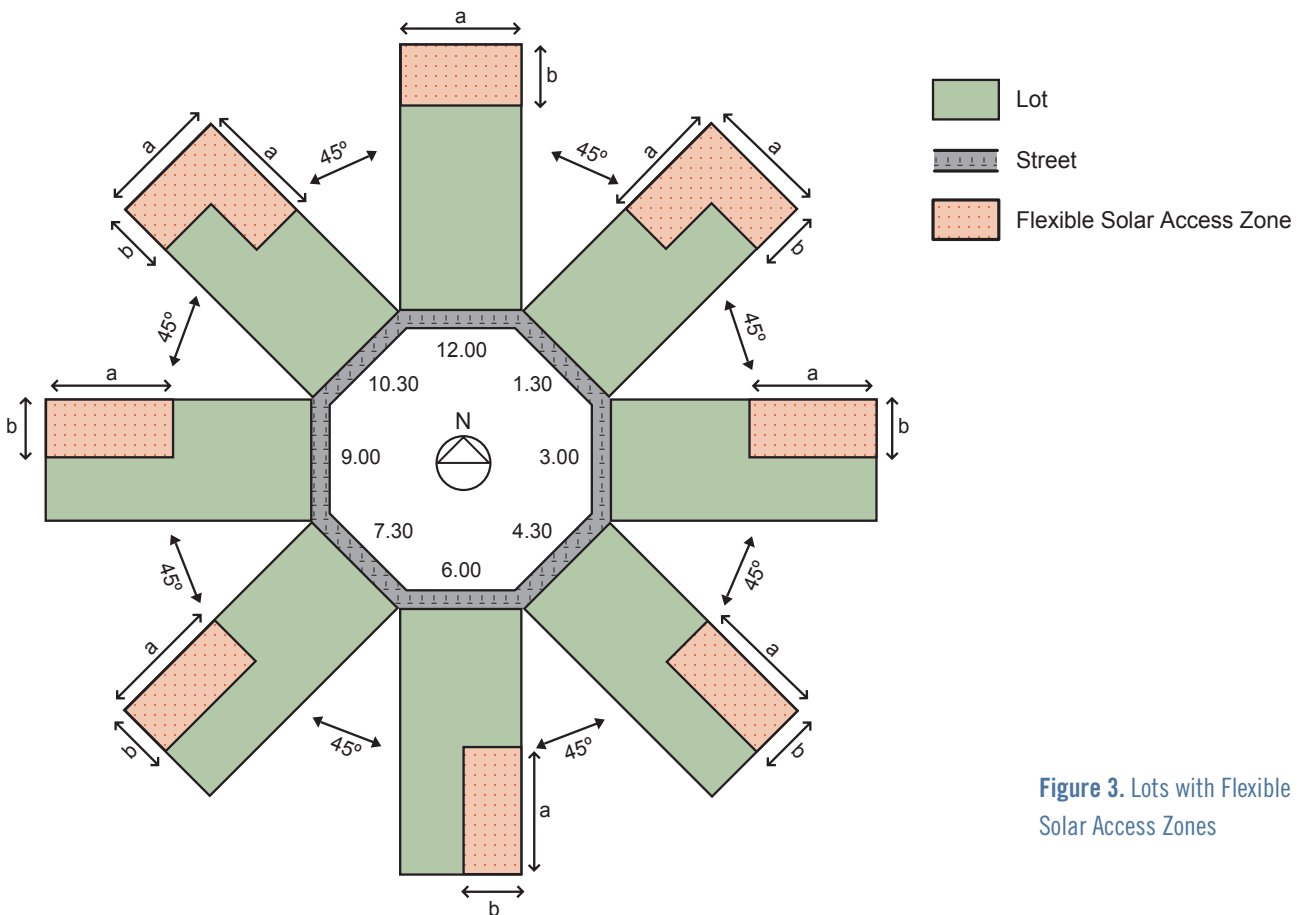


Figure 3. Lots with Flexible Solar Access Zones

Step 3: Minimum Solar Access Zones

The next step is to define the part of the lot where a dwelling will not be permitted at the development application stage – the Minimum Solar Access Zone (MSAZ) – in order to allow the opportunity for solar access to living room windows. The MSAZ is shown as a crossed box in Figure 4. Each lot must have a maximum height indicated to the north of the MSAZ on the adjacent lot, as this height control protects the solar access to a wall placed to the south of the MSAZ (refer to Figure 4 and Figure 6 on page 12).

Note: The crossed box Minimum Solar Access Zone can ‘slide’ to any position in the Flexible Solar Access Zone to accommodate a variety of dwelling configurations at the DA stage.

Once the location of the MSAZ is located at development application stage, the remaining FSAZ may be built upon, with the exception of lots 10.30 and 1.30 where the dwelling cannot encroach to the immediate north of the MSAZ as shown in Figure 4. The overall lot dimensions must then be sufficient to accommodate the MSAZ, the proposed dwelling and the normal setbacks.

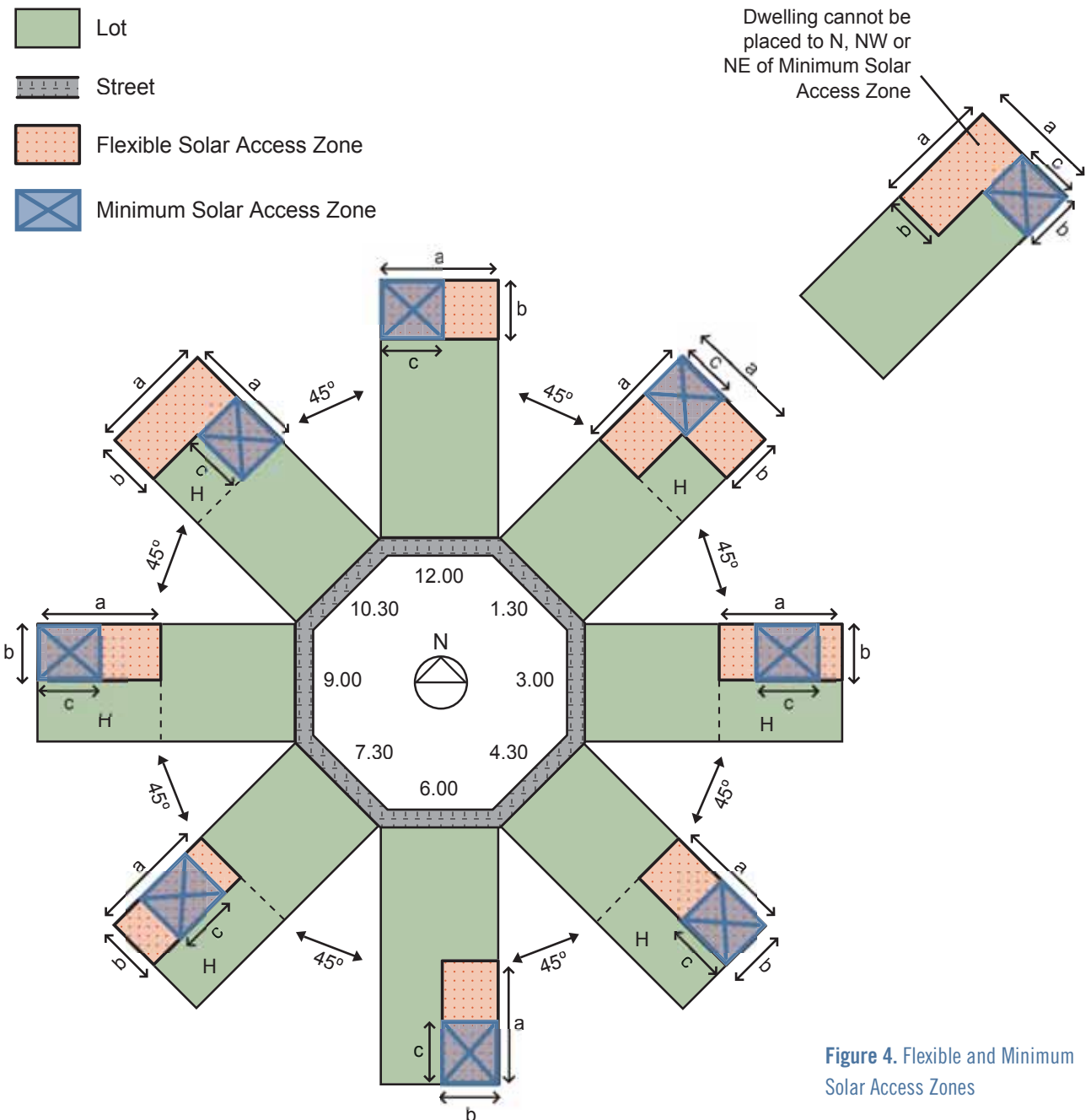


Figure 4. Flexible and Minimum Solar Access Zones

Step 4: Dimensions for Solar Access Zones

The table below, Table 1, provides values for a, b and c in Figures 3 and 4. They are based on the minimum solar access levels in Defining Solar Access (see page 4). The dimensions are measured from the lot boundary as indicated in Figures 3 and 4. The values for the closest location to the subject site should be used.

Dimension 'a' is intended to ensure the MSAZ is located in the 'rear yard' and not in the 'front yard'. This dimension may be extended at development application stage, provided Council is satisfied that the MSAZ is located in the rear yard. Dimension 'a' is 20m except where it is the length of the rear boundary, i.e. 12.00 lots.

Dimension 'b' assumes a minimum building setback of 1.5m for a building on the other side of the boundary with maximum eave encroachment of 600mm (i.e. 900mm boundary setback for edge of eave) and a nominal eave height of 2.7m for a single storey dwelling and 5m for a double storey dwelling. For zero lot line buildings, dimension 'b' should be increased by 900mm.

Dimension 'c' is set as a minimum width of the MSAZ to ensure reasonable solar access given the potential for overshadowing from adjacent perpendicular walls. The MSAZ may be split into two areas, each with a minimum 'c' dimension of 5m and totalling at least 10m. See Example 5 in the Examples of Houses on Lots section (page 18).

Table 1. Dimensions of Solar Access Zones





Storey Height to North	Sydney			Bega			Tweed		
	Dim. a	Dim. b	Dim. c	Dim. a	Dim. b	Dim. c	Dim. a	Dim. b	Dim. c
0-5% slope to south									
Single Storey to North	20m	3.3m	8m	20m	3.6	8m	20m	2.8	8m
Double Storey to North	20m	6.9m	8m	20m	7.4	8m	20m	5.9	8m
5-10% Slope to south									
Single Storey to North	20m	4.0m	8m	20m	4.3	8m	20m	3.4	8m
Double Storey to North	20m	8.1m	8m	20m	8.7	8m	20m	7	8m
10-15% Slope to south									
Single Storey to North	20m	4.3m	8m	20m	4.6	8m	20m	3.7	8m
Double Storey to North	20m	8.8m	8m	20m	9.5	8m	20m	7.6	8m
15-20% Slope to south									
Single Storey to North	20m	4.7m	8m	20m	5.0	8m	20m	4.1	8m
Double Storey to North	20m	9.6m	8m	20m	12.3	8m	20m	8.3	8m
0-5% Slope to north									
Single Storey to North	20m	3.3m	8m	20m	3.6	8m	20m	2.8	8m
Double Storey to North	20m	6.9m	8m	20m	7.4	8m	20m	5.9	8m
5-10% Slope to north									
Single Storey to North	20m	2.7m	8m	20m	2.8	8m	20m	2.1	8m
Double Storey to North	20m	5.5m	8m	20m	6.0	8m	20m	4.7	8m
10-15% Slope to north									
Single Storey to North	20m	2.2m	8m	20m	2.4	8m	20m	1.8	8m
Double Storey to North	20m	4.8m	8m	20m	5.2	8m	20m	4.1	8m
15-20% Slope to north									
Single Storey to North	20m	1.8m	8m	20m	2.0	8m	20m	1.5	8m
Double Storey to North	20m	4.0m	8m	20m	4.4	8m	20m	3.5	8m

Step 5: Submitting a Subdivision Plan

The subdivision plan [or Area Plan] indicating the Minimum Solar Access Zones with the above dimensions and maximum heights for sections of lots would then be submitted to Council at subdivision application stage.

Step 6: The Outcome at Development Application Stage

Figure 5 illustrates how dwellings of various shapes can fit on the lot without crossing over the Minimum Solar Access Zone or having a height that exceeds the double or single storey height limit that protects the MSAZ of the adjacent southern lot. This is the basic check that would be performed by Council staff at the subsequent development application submission to ensure the dwelling and the MSAZ can comfortably fit on the lot.

-  Lot
-  Street
-  Minimum Solar Access Zone
-  Dwellings on each lot

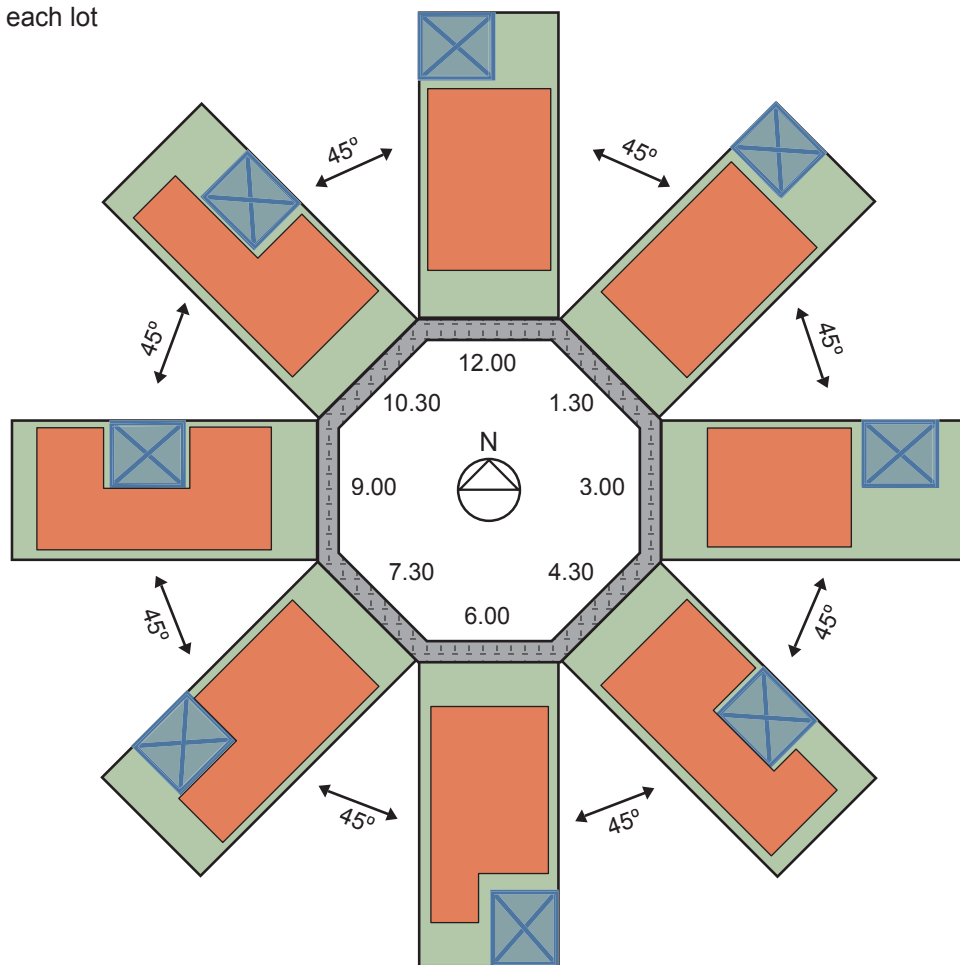


Figure 5. Minimum Solar Access Zones and House Footprints.

Advisory Notes for Subdividers (Creating Complying Subdivisions)

Balancing Flexibility of Dwelling Types with Lot Sizes

This tool specifically avoids setting minimum overall lot dimensions to allow subdividers to achieve similar yields to conventional Greenfield subdivisions, while creating subdivisions that provide reasonable levels of solar access for dwellings placed on the lots. This section provides guidance on achieving this balance for each lot orientation listed in Figures 3 and 4. The information focuses on how typical homes built on new subdivisions can accommodate the Minimum Solar Access Zone (MSAZ) on each lot orientation. Subdivision designers should consider this information in ensuring that the appropriate range of intended house types can be accommodated on their lots.

12.00 Lots – These lots are most suitable for double storey houses with the rear living spaces to north. The footprint of double storey houses tends to occupy a lower proportion of the lot area and therefore can accommodate the MSAZ on the lot. Single storey dwellings occupy a greater proportion of the lot area and those with the private open space in a courtyard configuration may require deeper lots to accommodate the MSAZ at the north of the lot (refer Example 7 on page 20).

1.30 and 10.30 Lots – These lots can be designed as either **12.00** lots or **3.00/9.00** lots given their access to either north east or north west solar gain.

6.00 Lots – These lots are generally difficult to achieve reasonable levels of solar access for living areas with the current range of homes designed for new subdivisions. Living areas are to the south and the house overshadows the rear private open space. Achieving reasonable levels of solar access on these lots would require a re-design of most common house types built on new subdivisions. This scale of change to the housing industry is considered to be excessive at this time, therefore the controls on these lots are such that the private open space is to the east rather than subject to undesirable low western solar gain.

House designers wishing to provide improved solar access to informal living areas and private open space may consider a central courtyard across half the lot with the volumes of the

building arranged to have only a single storey to the north of the courtyard. This layout has been used to some success in the Newington Village development at Homebush, Sydney.

3.00/9.00 and 4.30/7.30 Lots – These lots will require the most attention by subdivision designers as the long side walls of the houses can cast extensive overshadowing of private open space and north facing glazing.

The size of the Solar Access Zones on these lots is dependent on the height of a dwelling on the adjacent northern lot. It is therefore useful to consider a whole row of this lot type.

If the decision is taken to place restrictions on the height of dwellings and group single and double storey dwellings together, the lot dimensions become much smaller and lot sizes are very similar or identical to current industry practice. If the subdivider does not wish to make this choice, certain lots will inevitably be larger as single storey dwellings must be protected from overshadowing from double storey dwellings. The tool allows subdividers to trade a small amount of flexibility of dwelling choice on a lot for smaller lot dimensions. Alternatively subdividers that prefer greater flexibility of potential house designs can opt for larger lots to accommodate double storey dwellings to the north of single storey dwellings.

One method that provides for a range of housing options is to provide areas of the subdivision that cater for each of the following house shapes. Figure 6 below illustrates how to provide for each of these dwelling types.

Type 1: A row of double storey dwellings. Provides greatest flexibility. Lot dimensions should be wider to accommodate the depth of the MSAZ and the future house.

Type 2: A row of double storey dwellings with a single storey rear wing. Provides less flexibility, yet minimises lot dimensions. The MSAZ and the FSAZ are the same dimensions to require L-shaped footprints and prevent a single storey courtyard house being built on these lots – refer Type 3 below.

Type 3: A row of single storey dwellings. This allows courtyard shapes to be protected from overshadowing from double storey dwellings. Figure 6 shows a typical double storey and courtyard house where the courtyard is overshadowed.

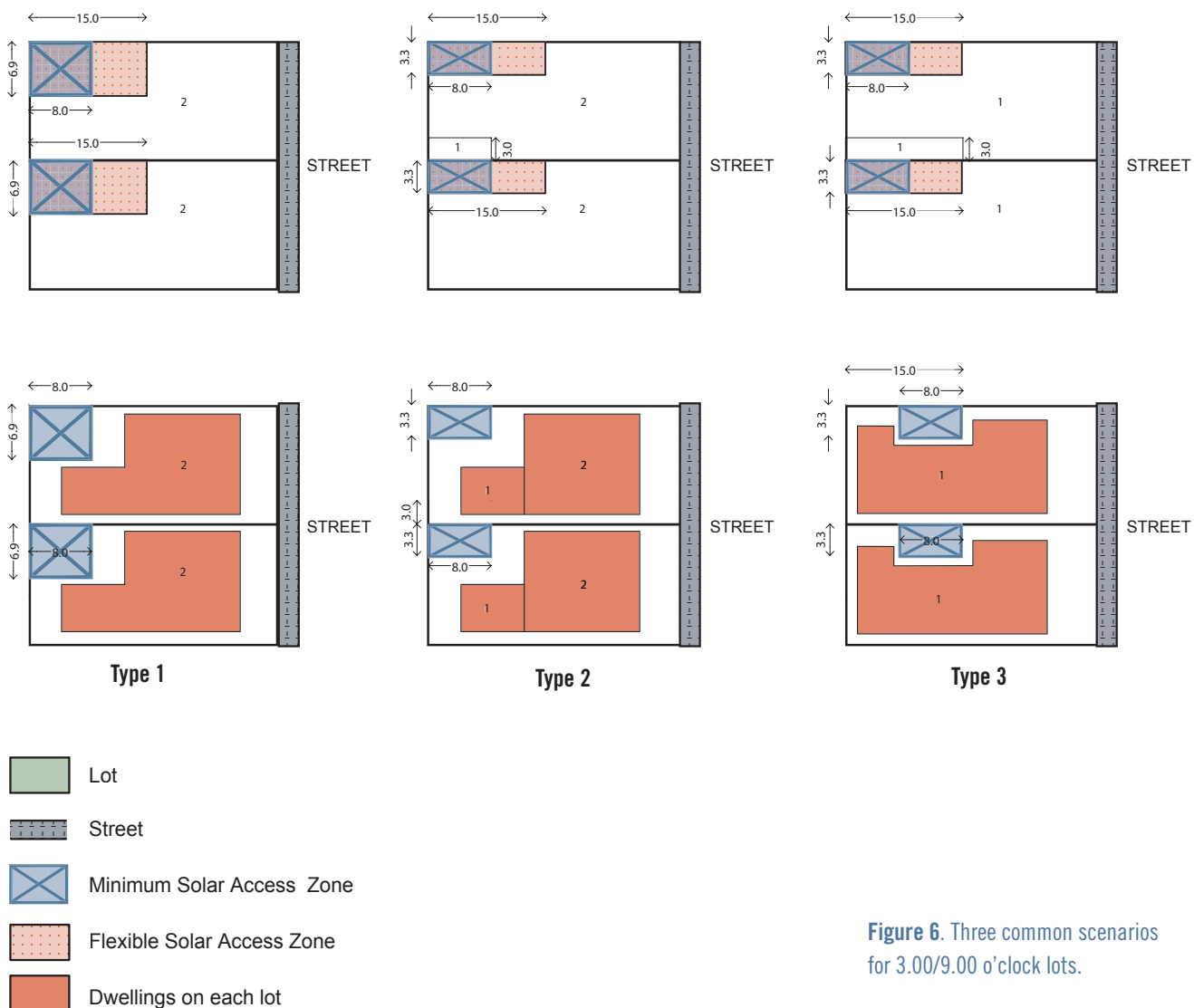


Figure 6. Three common scenarios for 3.00/9.00 o'clock lots.

Developments with Rear Lane Access

In these cases, it is common for garages to be placed to the rear of the lot. No adjustment to the Solar Access Zones are necessary for this circumstance as the garages should be located on the southern side of the lot to permit the MSAZ to be located to the northern side of the lot. If a room is to be located to the north of the garage, the courtyard model as indicated in Figure 6 would apply to the lot.

Information to Provide to the Purchaser

The Subdivision Plan should form part of Council's controls for that subdivision via a Site Specific Development Control Plan [DCP] or Area Plan or a reference in the overall DCP to the Subdivision Plan. The DCP would then be referred to in a 149 Certificate for each lot in the subdivision.

As is the case for all other controls, it is the responsibility of the purchaser to check all controls that apply for a given lot. Subdividers can assist lot purchasers by informing them of the controls relating to their site. Home builders can assist buyers by recommending certain house products for certain lot types that would be complying. This would be a simple graphic process of indicating a house on a range of lot sizes that also indicate the MSAZ and the height of the lot to the north.

Advisory Notes for Councils

Council Implementation of Solar Access for Lots Guide through Development Controls

Councils in NSW can apply the tool as a voluntary or mandatory control mechanism for new subdivisions. This tool has been developed to replace the existing Solar Access for Lots tool in the Energy Smart Homes Policy. It is anticipated that Councils may use the tool as a compliance check for new subdivisions and development applications for dwellings on those subdivisions. The process of submitting the outcomes of applying this tool is described below.

Subdivision Application

A Subdivision Plan would be submitted to Council showing Solar Access Zones on each lot. Alternatively, a table on the drawing showing dimensions of Zones and the relevant height controls on the lots could also be submitted. The assumed heights in Step 4: Dimensions for Solar Access Zones apply unless otherwise negotiated with council. The Subdivision Plan may then form part of Council's controls for that subdivision via a Site Specific Development Control Plan [DCP] or Area Plan or a reference in the overall DCP to the Subdivision Plan. The DCP would then be referred to in a 149 Certificate for each lot in the subdivision.

Development Application

Council should conduct a compliance check at development application stage to ensure both the proposed house and the Minimum Solar Access Zone [MSAZ] can be accommodated on the lot. In certain circumstances the house may have to be mirrored around the axis perpendicular to the street to accommodate the MSAZ. In a small number of cases, the proposed dwelling may not be appropriate for the lot (i.e. it cannot accommodate the MSAZ on the lot) because it would either be overshadowed or create overshadowing problems for adjacent dwellings.

Controls on Future Additions

Council may also use these guidelines to ensure additions and alterations to dwellings in the subdivision did not create future overshadowing problems. The details of this are yet to be resolved, however if an addition was within the height controls on the lot, Council may permit it. Generally, double storey additions to a single storey dwelling are more likely to avoid overshadowing of private open space and living room windows if they are placed towards the front of the dwelling.

Further Information

Solar Access for Lots Guide

Visit www.energysmart.com.au or contact Energy Smart Information Centre on **1300 138 638**

For information on applying the Solar Access for Lots Guide

Sustainable Energy Development Authority
Ph: **02 9249 6160**
email: councils@seda.nsw.gov.au

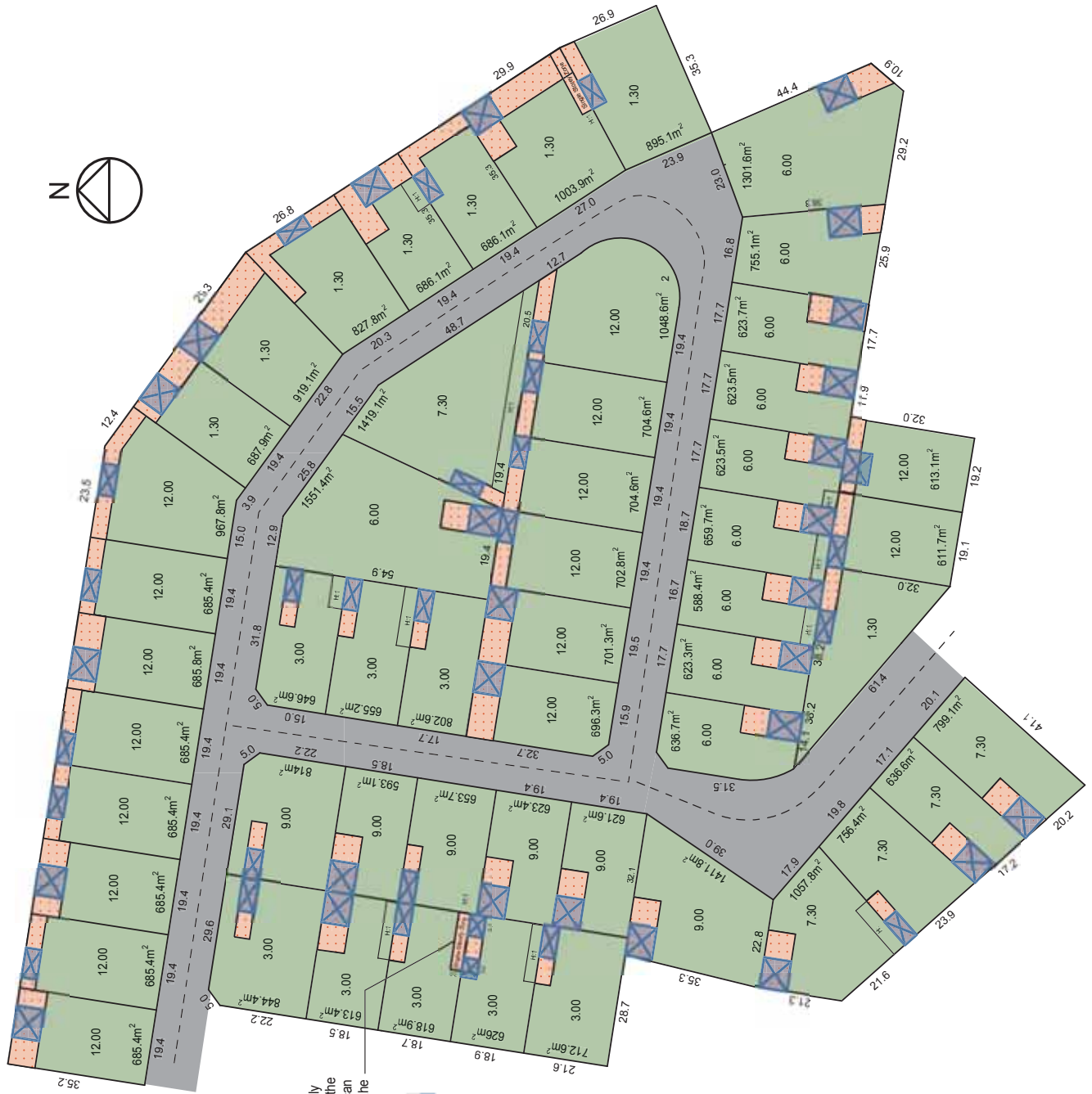
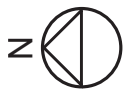
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Solar Access for Lots Tool, Energy Victoria 1998
[incorporated into SEDA's Energy Smart Homes Policy]

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Tony Proust, Strategic Planner, Lake Macquarie Council

Area Plan – version 1



Assuming Sydney setback figures, the area in which only single storey is permitted to the north of a shallower MSAZ can be configured with either of the following options:

For C - shaped houses with courtyards OR For L - shaped houses with yard at rear

Figure 7

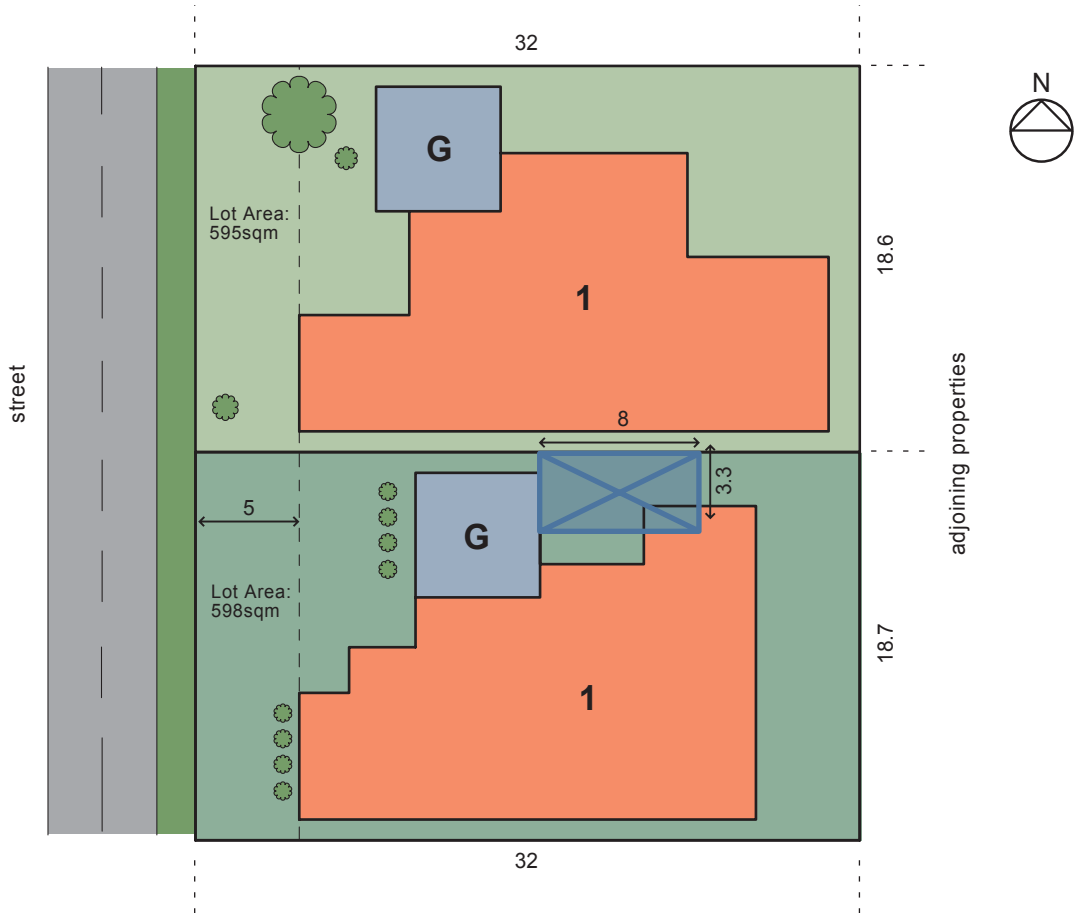
Area Plan – version 2



Figure 8

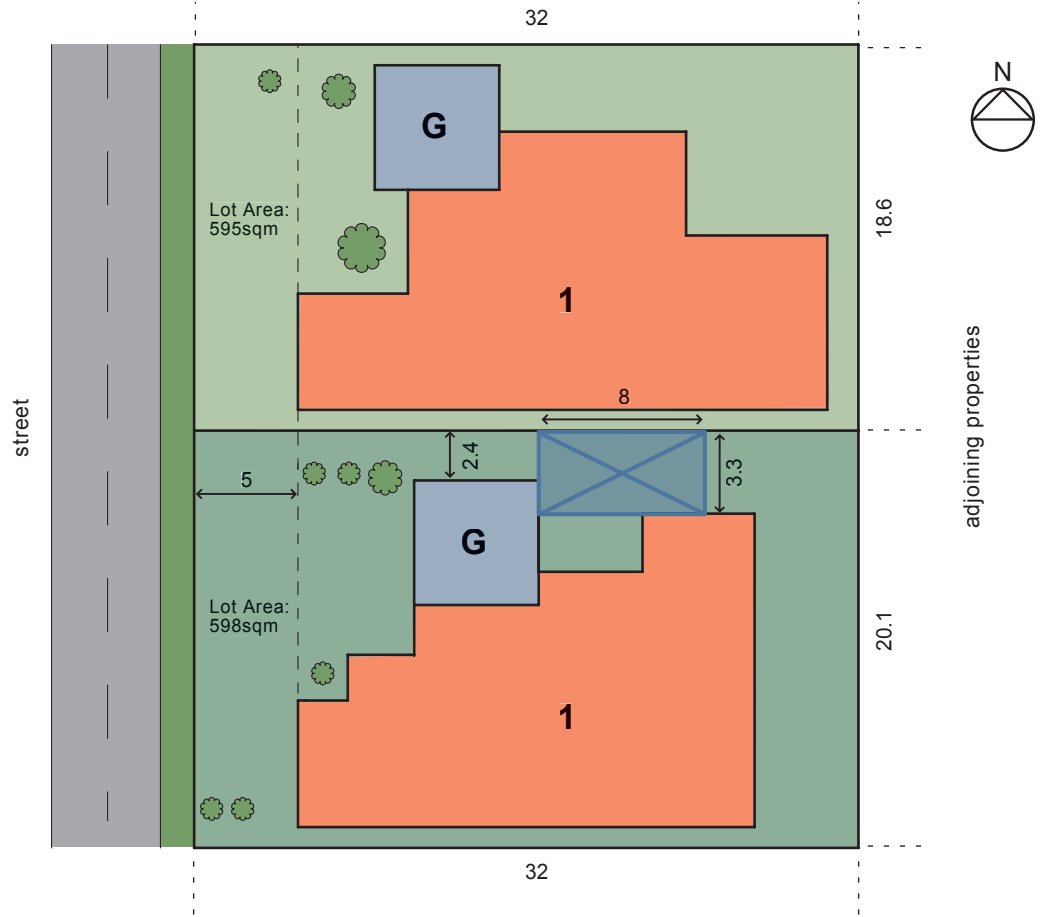
Examples of Houses on Lots

Example 1 Non-complying

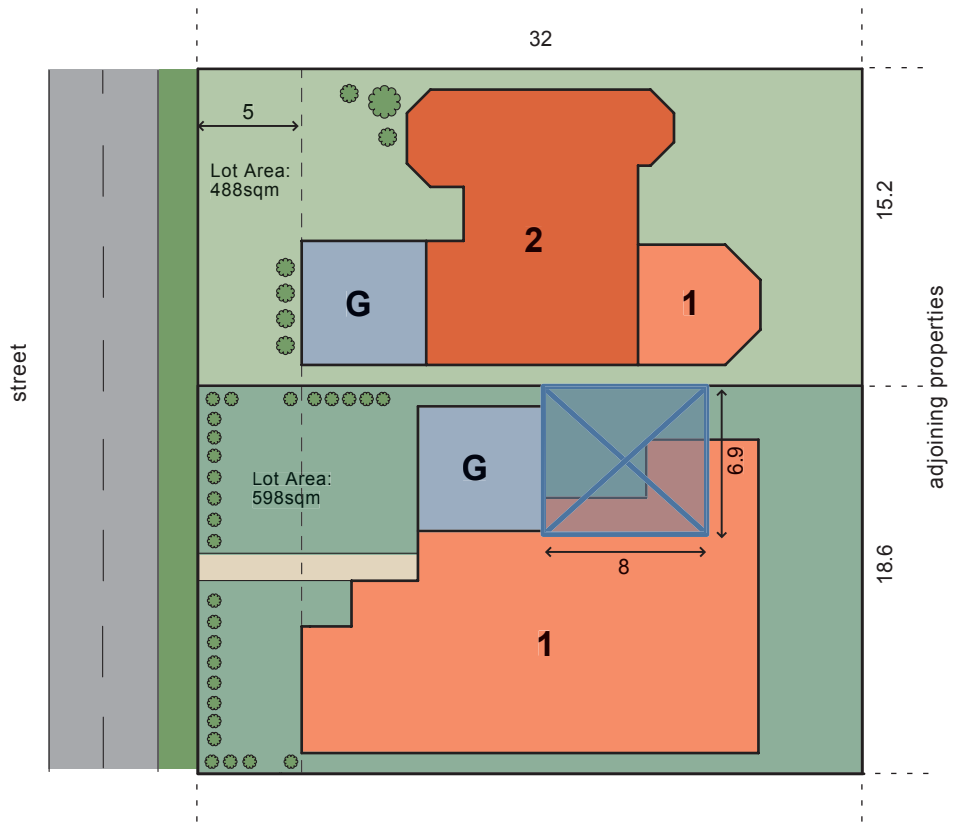


- 1 - Single Storey
- 2 - Double Storey
- G - Garage
- ☒ Minimum Solar Access Zone

Example 2 Complying



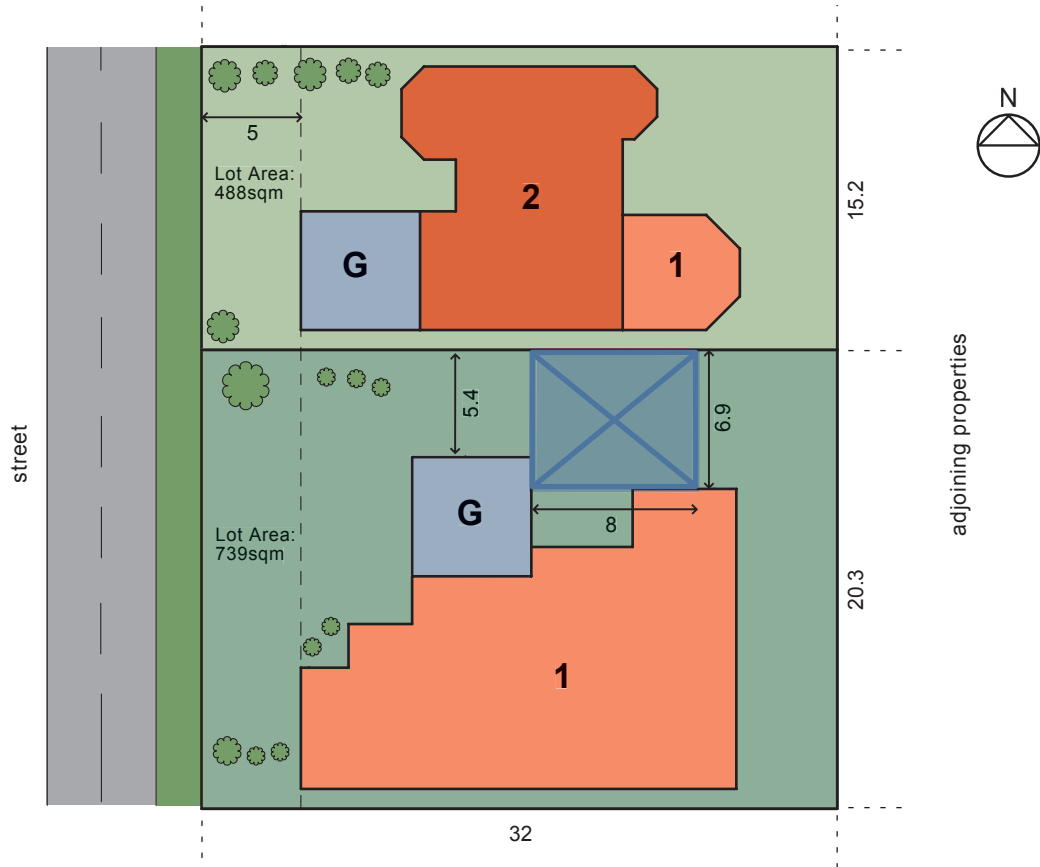
Example 3 Non-complying



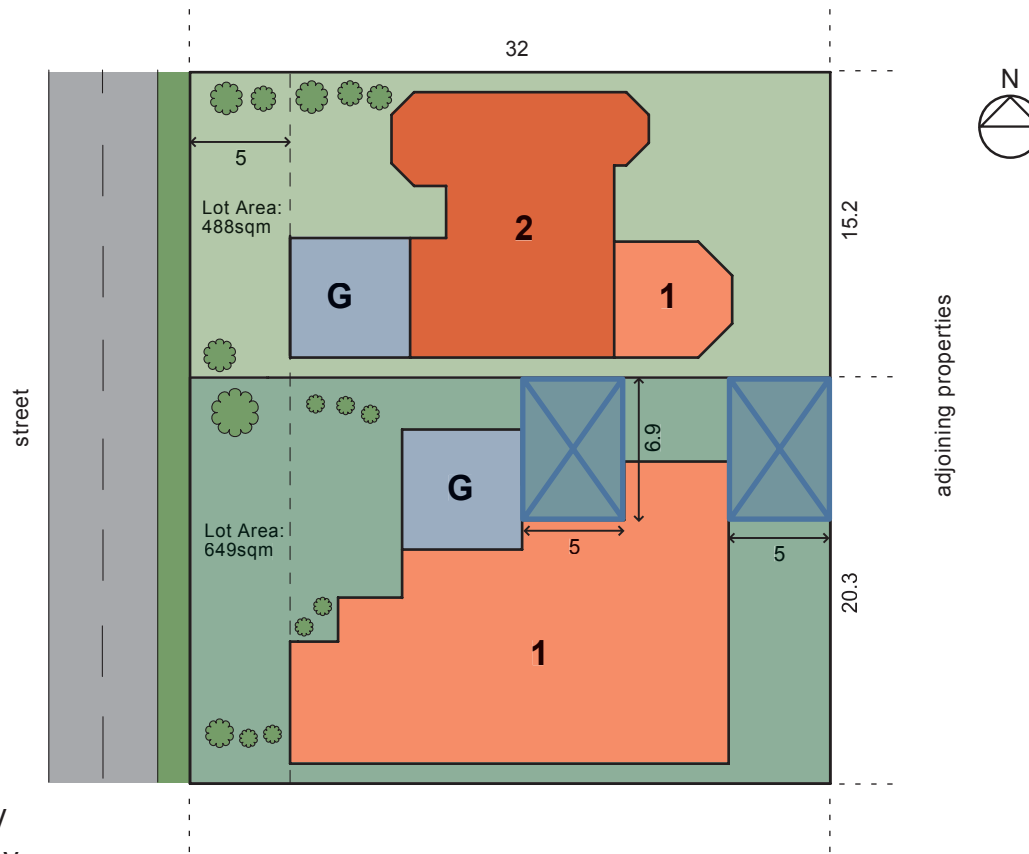
- 1 - Single Storey
- 2 - Double Storey
- G - Garage

 Minimum Solar Access Zone

Example 4 Complying

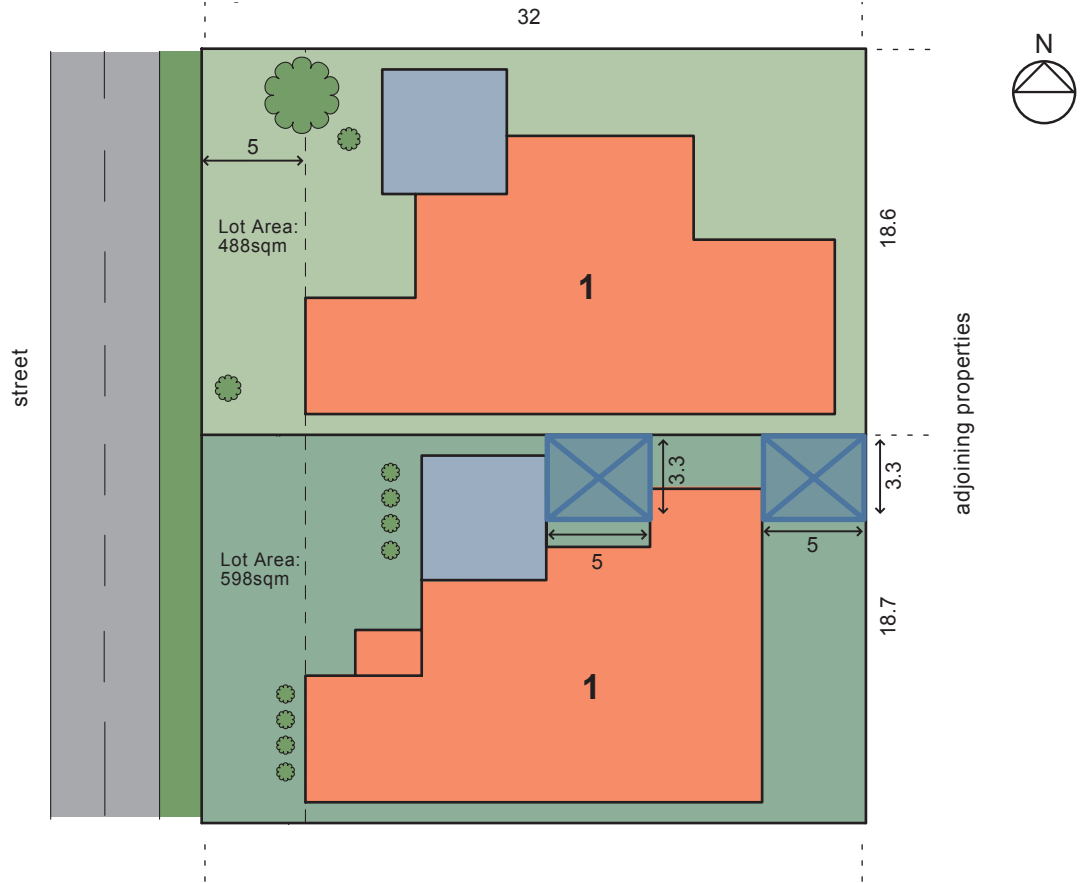


Example 5 Complying



- 1 - Single Storey
- 2 - Double Storey
- G - Garage
- ☒ Minimum Solar Access Zone

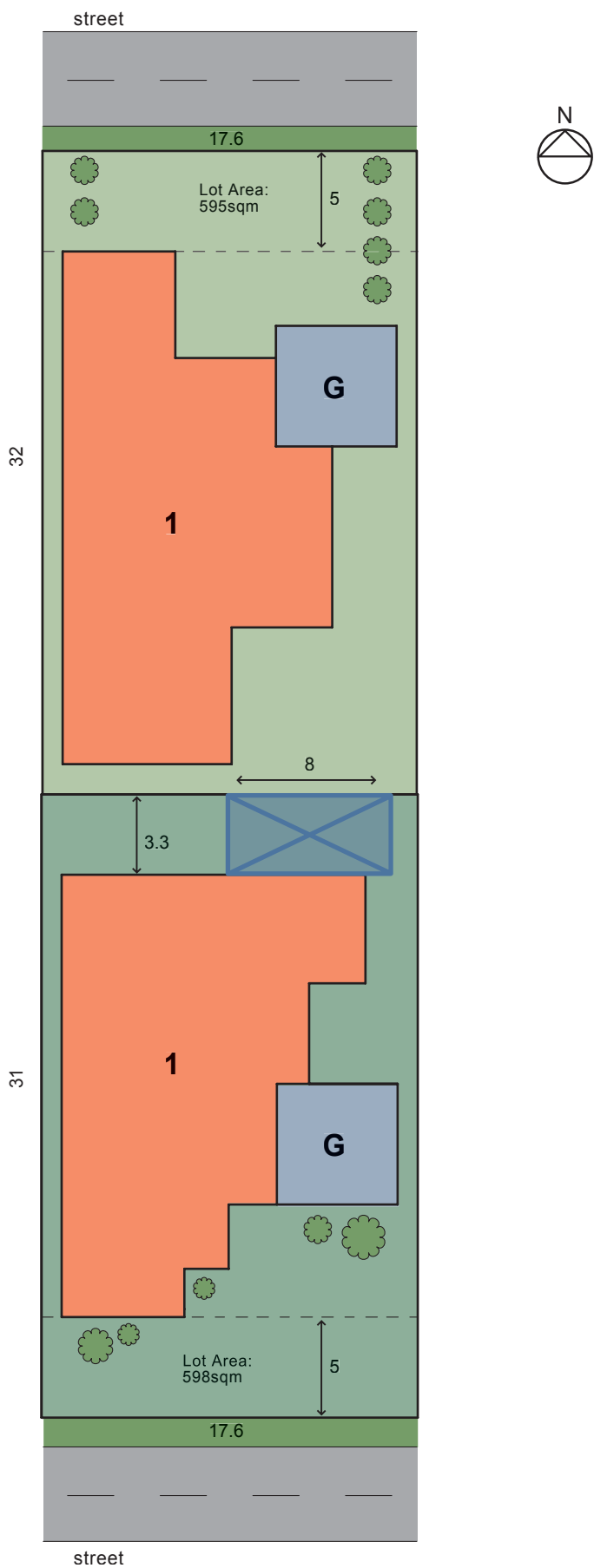
Example 6 Complying



- 1 - Single Storey
- 2 - Double Storey
- G - Garage
- ☒ Minimum Solar Access Zone

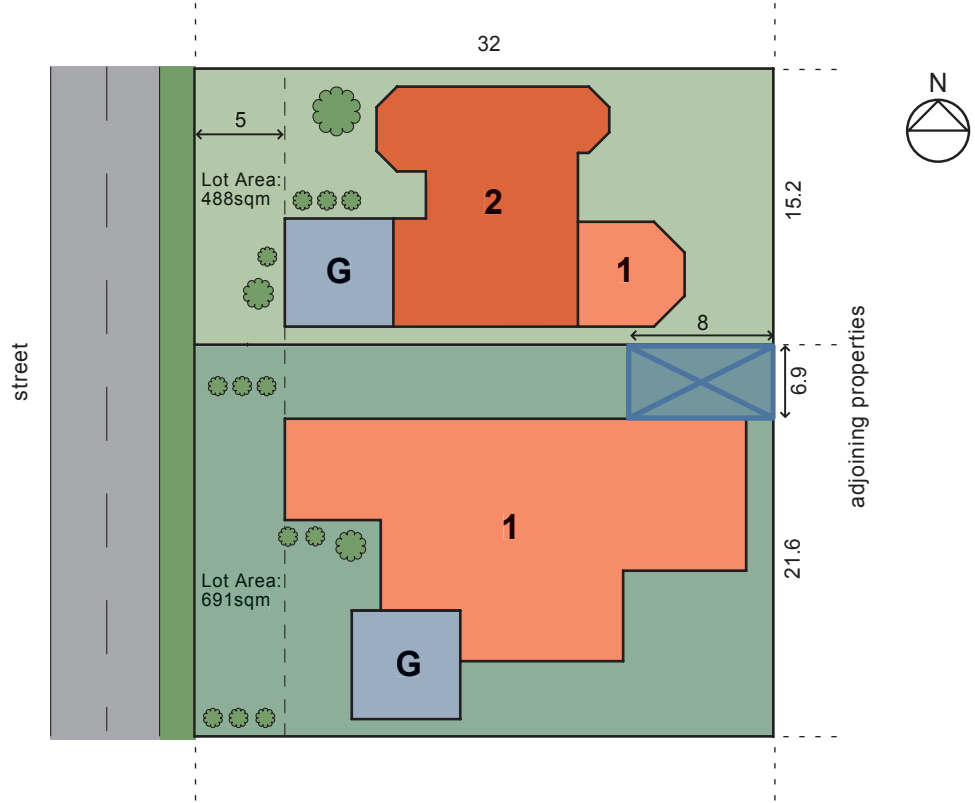
Example 7

Complying



- 1 - Single Storey
- 2 - Double Storey
- G - Garage
- ☒ Minimum Solar Access Zone

Example 8
Complying



Example 9
Complying



- 1 - Single Storey
- 2 - Double Storey
- G - Garage
- ☒ Minimum Solar Access Zone

Glossary

Boundary Set Back Figures

Distance from which a building or part of a building must be set back from the relevant boundary.

Lot Size

Area in square metres of the lot.

Lot Yield

The number of lots provided in a subdivision area.

Solar Access

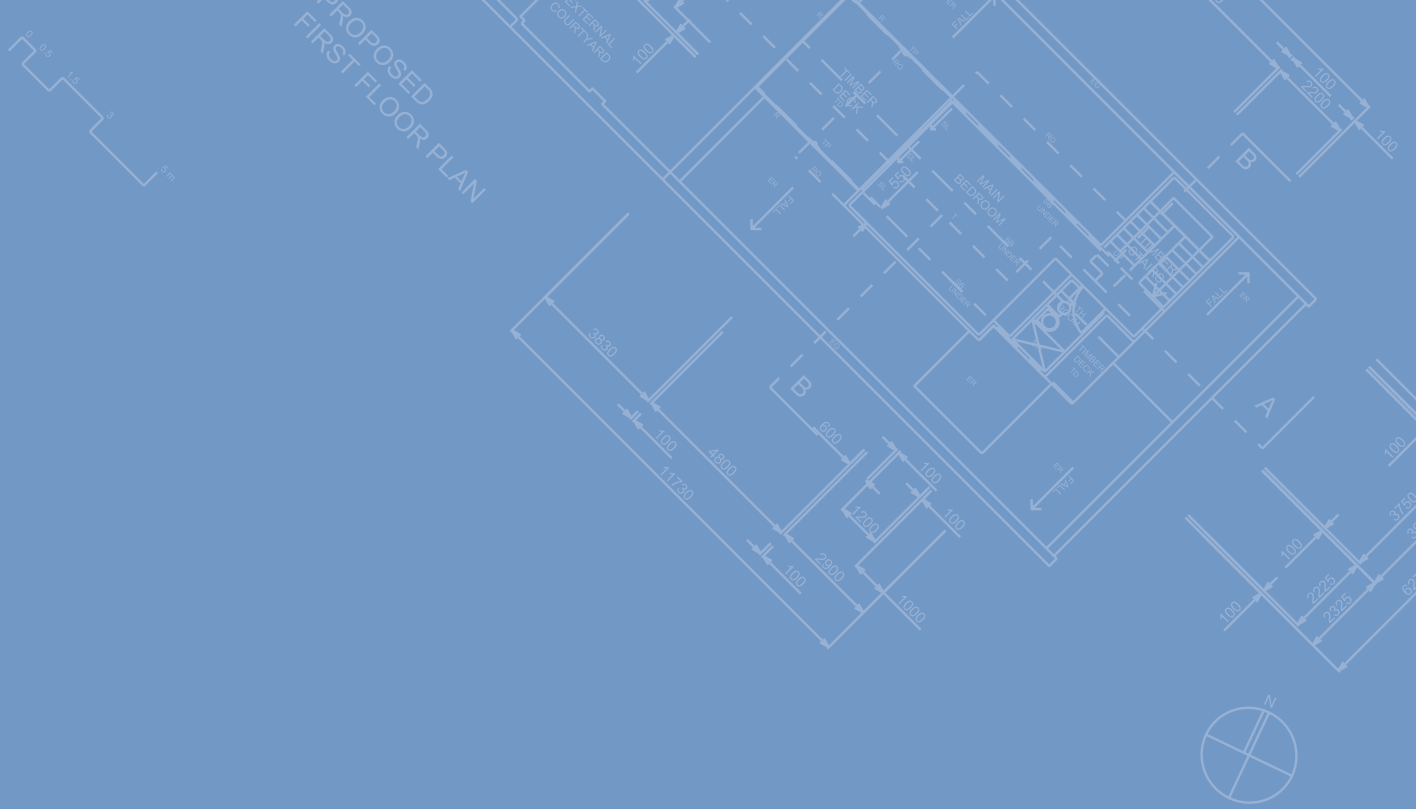
Potential of a lot to receive adequate sunlight in order for certain areas of a dwelling to receive the sun's energy, ie private outdoor spaces, solar water heaters, glazing to living areas, and outdoor clothes drying areas.

Solar Access Zone

Developed for the SAL Guide, a Solar Access Zone represents a reserved area of a lot, protecting the solar access for outdoor spaces and living area glazing.

Zero Lot Line

A part of the lot boundary where buildings can be built up to the boundary.



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PROPOSED FIRST FLOOR PLAN