



Technical Manual
Subdivision
(Updated 2014)

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prepared by the City of Newcastle.

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Part A - Engineering Specifications for Development Design and Construction

Newcastle City Council's engineering specifications for development design and construction are based on the AUS-SPEC series of contract documents for Local Government and are designed to be used by Council or an accredited certifier, in conjunction with Council's Standard Drawings and Specifications.

From 2007, NATSPEC has been the organisation responsible for updating, developing and distributing the AUS-SPEC range of specifications. NATSPEC, founded in 1975, is a not-for-profit organisation that is owned by the design, build, construct and property industry through professional associations and government property groups. Its major service is the comprehensive national specification system endorsed by government and professional bodies. The 2007 version restructures AUS-SPEC into the national classification system.

Council's Engineering Specifications for Development Design and Construction comprise the following AUS-SPEC worksections:

	SUBGROUP	WORKSECTION	AUS-SPEC REF.	AMENDED BY NCC/DATE OF AMENDMENT
00 PLANNING AND DESIGN (AUS-SPEC)	002 Open space	0021 Site regrading	#1 DDSS D6	
	004 Roadways	0042 Pavement	#1 DDSS D2	
		0043 Subsurface drainage	#1 DDSS D4	
	006 Bridges	0061 Bridges and other structures	#1 DDSS D3	
	007 Public utilities	0074 Stormwater drainage (Design)	#1 DDSS D5	
01 GENERAL	016 Quality assurance	0160 Quality - design (AUS-SPEC)	#1 DM DQS	
		0161 Quality - construction (AUS-SPEC)	#1 DCSS CQS #1 DCSS CQC #2 QS #2 QC	
	017 General requirements	0179 General requirements (Construction)	#1 DCSS C101 #2 100, 101	
02 SITE, URBAN AND OPEN SPACES	025 Landscape cultivation	0250 Open space - landscaping (AUS-SPEC)	#1 DCSS C273 #2 273	
	026 Landscape finishes	0261 Landscape - furniture and fixtures		
	029 Retaining walls	0292 Masonry walls	#2 274	
		0293 Crib retaining walls	#2 276	

	SUBGROUP	WORKSECTION	AUS-SPEC REF.	AMENDED BY NCC/DATE OF AMENDMENT	
03 STRUCTURE	031 Concrete	0310 Minor concrete works (AUS-SPEC)	#2 271		
		0311 Concrete formwork			
		0312 Concrete reinforcement			
		0314 Concrete in situ			
		0315 Concrete finishes			
		0316 Precast concrete			
		0318 Shotcrete			
11 CONSTRUCTION - ROADWAYS (AUS-SPEC)	110 General	1101 Control of traffic	#1 DCSS C201 #2 200, 201		
		1102 Control of erosion and sedimentation	#1 DCSS C211 #2 211		
	111 Formation preparation	1111 Clearing and grubbing	#1 DCSS C212 # 2 212		
		1112 Earthworks (Roadways)	#1 DCSS C213 #2 213		
		1113 Stabilisation	#1 DCSS C241 #2 241		
		112 Rainwater collection	1121 Open drains including kerb and channel gutter	#1 DCSS C224 #2 224	
		113 Pavement and subbase and base	1132 Mass concrete subbase	#1 DCSS C247 #2 247	
			1133 Plain and reinforced concrete base	#1 DCSS C248 #2 248	
			1136 Cold milling of asphalt and base course	#2 251	
	114 Pavement		1141 Flexible pavements	#1 DCSS C242 #2 242	
			1143 Sprayed bituminous surfacing	#1 DCSS C244 #2 244	
			1144 Asphaltic concrete (Roadways)	#1 DCSS C245 #2 245	
			1145 Segmental paving	#1 DCSS C254 #2 254	

	SUBGROUP	WORKSECTION	AUS-SPEC REF.	AMENDED BY NCC/DATE OF AMENDMENT
		1146 Bituminous microsurfacing	#1 DCSS C255 #2 255	
	117 Pavement moisture control	1171 Subsurface drainage	#1 DCSS C230 #2 230	
		1172 Subsoil and foundation drains	#1 DCSS C231 #2 231	
		1173 Pavement drains	#1 DCSS C232 #2 232	
		1174 Drainage mats	#1 DCSS C233 #2 233	
	119 Traffic facilities	1191 Pavement markings	#1 DCSS C261 #2 261	
		1192 Signposting	#1 DCSS C262 #2 262	
		1193 Guide posts	#1 DCSS C263 #2 263	
		1194 Non-rigid road safety barrier systems (Public domain)	#1 DCSS C264 #2 264	
		1195 Boundary fences for road reserves	#1 DCSS C265 #2 265	
13 CONSTRUCTION - PUBLIC UTILITIES (AUS-SPEC)	135 Water cycle management	1351 Stormwater drainage (Construction)	#1 DCSS C220 #2 220	
		1352 Pipe drainage	#1 DCSS C221 #2 221	
		1353 Precast box culverts	#1 DCSS C222 #2 222	
		1354 Drainage structures	#1 DCSS C223 #2 223	
	139 Others	1391 Service conduits	#2 300, 303	
		1392 Trenchless conduit installation	#2 305	

Key:

DDSS - AUS-SPEC #1 Development Design Specification Series
 DCSS - AUS-SPEC # 1 Development Construction Specification Series
 DM Design Manual

Obtaining the Documents

All worksections may be accessed by NATSPEC subscribers at www.natspec.com.au.

As part of the subscription service, NATSPEC provides updates to the specifications on a six-monthly basis. Subscribers to NATSPEC can therefore ensure that they have access to the most up-to-date versions. Refer to www.natspec.com.au for further information on subscription.

All specifications are subject to a licence agreement between Council and NATSPEC. Under the terms of the licence, Council may distribute, in non-editable formats, amended relevant worksections to consultants, contractors or designers who undertake works for Council or works which Council later accepts, such as residential subdivisions, and will not be in contravention of the licence agreement.

Non-subscribers may obtain non-editable versions of relevant worksections by contacting Council's Development and Building Services Team.

Amended Worksections

If the above Table indicates that the worksection has been amended by Council, refer to the amendment tables below for details of changes. These amendments override the corresponding clause in the AUS-SPEC worksections.

Amended Tables

Nil

Newcastle City Council Specifications

Details of Council's standard specifications can be found in Council's [Standard Drawings Register](#).

Part B: Solar Access for Lots - Guidelines for Solar Efficient Residential Subdivision in NSW

SOLAR ACCESS FOR LOTS

Guidelines for Solar Efficient Residential Subdivision in New South Wales

WHAT IS SOLAR ACCESS?

Solar access is a measure of how much solar energy (sunshine) is available to assist with the heating of a building.

In Winter north facing windows gain heat from the sun thereby helping to heat the home. In Summer, they have the advantage of being able to be easily shaded to keep the house cool. By ensuring the windows to heated parts of the house face north, occupants can benefit from free solar heating which reduces energy bills and helps the environment. If the sun cannot shine on these north windows due to overshadowing (e.g. by surrounding buildings) then the free solar heating is lost.

SUBDIVIDING FOR SOLAR ACCESS

This brochure provides information about how to design subdivisions to minimise the overshadowing of neighbouring north windows. It incorporates information on:

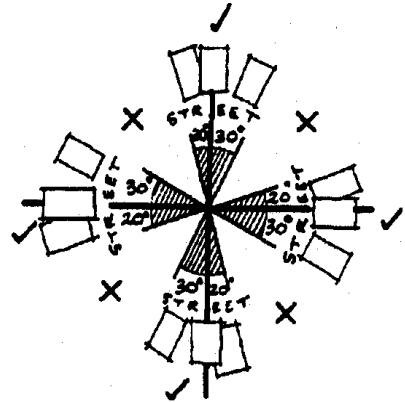
- how to maximise solar access through the careful design of the orientation and size of house lots;
- how to site each house to ensure that it has solar access; and
- how to measure solar access on a scale from 1 to 5 stars.

DESIGN GUIDELINES FOR SOLAR ACCESS

To maximise solar access the design of residential subdivisions should be based on the following principles:

1 Street layout

- Align streets east-west and north-south wherever possible.
- Aim for north south streets within 20° west and 30° east of true north.
- Aim for east-west streets within 30° south and 20° north of true east.



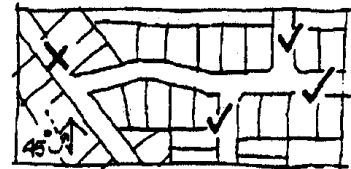
2 Land uses and densities

- Concentrate smaller lots on north slopes or adjacent to lightly treed open space.
- Locate larger lots, non-residential uses or public open space where solar access is poor.

3 Laying out the lots

Lot shape and orientation

- Where streets are within the acceptable orientation range use rectangular lots.
- Locate as many long lot boundaries as possible within the permissible orientation range.
- Where the street is not within the orientation range use skewed lots.

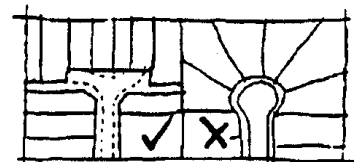


Use the Solar Lot Width Guidelines

Select the appropriate lot width from Tables 1 and 2 .

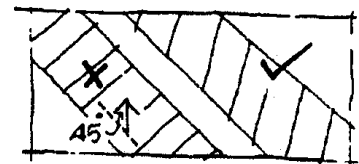
Show the setback on the lot plan

Help builders, designers and home buyers to make best use of the sun by showing the preferred setback line for each lot on the subdivision plan.



Street orientation, lot width and rating

- Locate the narrowest lots on the north side of east-west streets.
- Lots on the south side of east-west streets need to be wider to accommodate car access.
- East-west lots need to be wider unless two storey construction is to be restricted.
- East west lots can be narrower if there is road or open space to the north (eg. a corner lot).



Adjust the lot ratings to reflect the impact of the slope

Lots on south facing slopes need more open space to the north to protect solar access while lots on north facing slopes need less open space (see Table 3).

4 Additional Controls

Where narrow lot widths are involved limiting the height of buildings relative to the south boundaries provides additional protection of solar access.

5 Matching the House to the Lot

An energy efficient house can still be built on a lot with poor solar access. By raising window sill heights or using clerestory windows actual overshadowing of windows can be minimised. Where solar access is limited insulate to higher levels, minimise air leakage, and keep glass areas to moderate sizes.

RATING SOLAR ACCESS

Solar Access Star Ratings

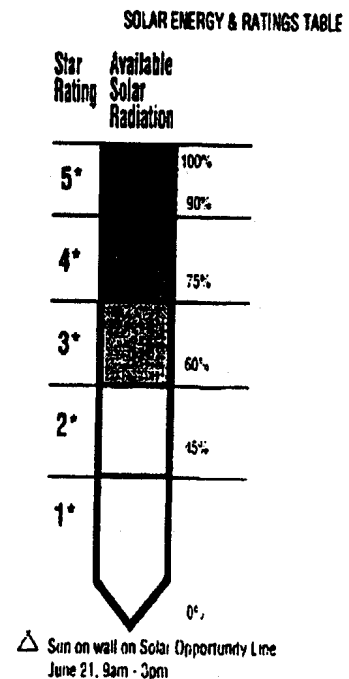
The Solar Access 5 star rating provides a measure of the amount of solar radiation available to assist in the heating of a house. The adjacent chart shows the rating thresholds as a percent of the solar radiation which would enter a house through north windows with no overshadowing.

Applicability of the rating

This rating system only applies to separate lots which are 300 - 1000 m² in area. For smaller lots solar access must more closely integrated with building design and siting. Lots larger than 1000 m² have a greater opportunity to achieve good solar access, however, buildings should still be set back the recommended distance from the north boundary.

Various lots receive only a 1 star rating. These are:

- Lots with all their long boundaries outside the permissible orientation range. This may not stop the house being correctly oriented. However, as most houses are built parallel to boundaries, in order to achieve good solar access, clear guidelines for house siting will need to be provided.
- Lots with a slope of 20% or more (1:5). Such lots should be avoided through better subdivision layout and are therefore only given a 1 star rating.



⇒ Step 1 Determining Lot Orientation

Tables 1 and 2 on the next page show how lot rating depends on the lot's predominant orientation and width. This orientation is determined by the bearing of the longer boundaries on the lot, and the general orientation of the lot to the street. (see also Figure 2)

Lot Width

Lot width is measured at right angles to the long boundary of the lot which falls within the acceptable orientation range.

For East/West facing lots the required lot width is determined by taking into account:

- the minimum setback of buildings sited to the north,
- the distance between buildings required to achieve the rated solar access, and
- an allowance for a minimum building width and setback from the south boundary of the lot.

For North/South lots the required lot width is determined by taking into account:

- the amount of northern facing wall available for north facing windows, and
- the distance required between buildings to the east and the west to minimise their overshadowing of northern windows and to achieve the rated solar access.

⇒ Step 2 Determining the Star Rating

Lots are rated on their ability to accommodate a house with good solar access. The width of the lot is an indicator of its ability to provide sufficient open space to the north of the house to ensure that surrounding buildings will not block out the sun. The tables below show the minimum lot width required to achieve the various star ratings depending on the orientation of the street frontage.

Table 1 Determining the star rating

Lot orientation	Minimum lot width (metres)				
	Star Rating				
	★★★★★	★★★★	★★★	★★	★
East/West					
(Coastal NSW)	> 16.9	15.7-16.8	14.8-15.6	14.0-15.5	< 14.0
(Inland NSW)	> 17.5	16.2-17.4	15.0-16.1	14.4-14.9	< 14.4
North					
(Coastal NSW)	> 13.6	11.7-13.5	10.9-11.6	10.5-10.8	< 10.5
(Inland NSW)	> 14.2	12.2-14.1	11.1-12.1	10.5-11.0	< 10.5
South					
(Coastal NSW)	> 15.6	13.7-15.5	12.9-13.6	12.5-12.8	< 12.5
(Inland NSW)	> 16.2	14.2-16.1	13.1-14.1	12.5-13.0	< 12.5

TABLE 1
USE THIS TABLE IF THE HEIGHT OF BUILDINGS TO THE NORTH IS NOT LIMITED.

Definitions

- East / West:** Bearing of one long side within 250 and 300°, street on east or west side
- North:** Bearing of one long side within 340 and 30°, street on southern side
- South:** Bearing of one long side within 340 and 30°, street on northern side, note that greater lot widths are to allow for car access to north.

It will be noted from Table 1 that reducing lot width results in a reduction in the solar access star rating. This need not be the case. Lot width can be reduced without impacting on the solar access rating by placing height restrictions to houses on the north boundaries.

Table 2 below shows the ratings of lot widths were the height of buildings on the lot to the north are known to be one storey.

Table 2 Determining the star rating (dwellings to the north one storey high)

Lot orientation	Minimum lot width (metres)				
	Star Rating				
	★★★★★	★★★★	★★★	★★	★
East/West					
(Coastal NSW)	> 12.8	11.7-12.8	11.0-11.6	10.4-10.9	< 10.4
(Inland NSW)	> 13.0	11.8-12.9	10.9-11.7	10.4-10.8	< 10.4
North					
(Coastal NSW)	> 13.2	11.6-13.1	10.8-11.5	10.3-10.7	< 10.3
(Inland NSW)	> 13.4	11.7-13.3	10.7-11.6	10.4-10.6	< 10.4
South					
(Coastal NSW)	> 15.2	13.6-15.1	12.8-13.5	12.3-12.7	< 12.3
(Inland NSW)	> 15.4	13.7-15.3	12.7-13.6	12.4-12.6	< 12.4

TABLE 2
USE THIS TABLE IF IT'S KNOWN THAT BUILDINGS TO THE NORTH WILL BE LIMITED.

⇒ **Step 3 Allowing for easements, public open space & road reserves**

Where there is guaranteed open space to the north of the lot the lot width and required setback (shown below) may be reduced accordingly. For example if the lot to the north has a 3 m. easement on its south boundary the lot width and setback may be reduced by 2.1 m. as a 0.9 m. setback has already been assumed.

⇒ **Step 4 Siting Your House To Achieve Solar Access**

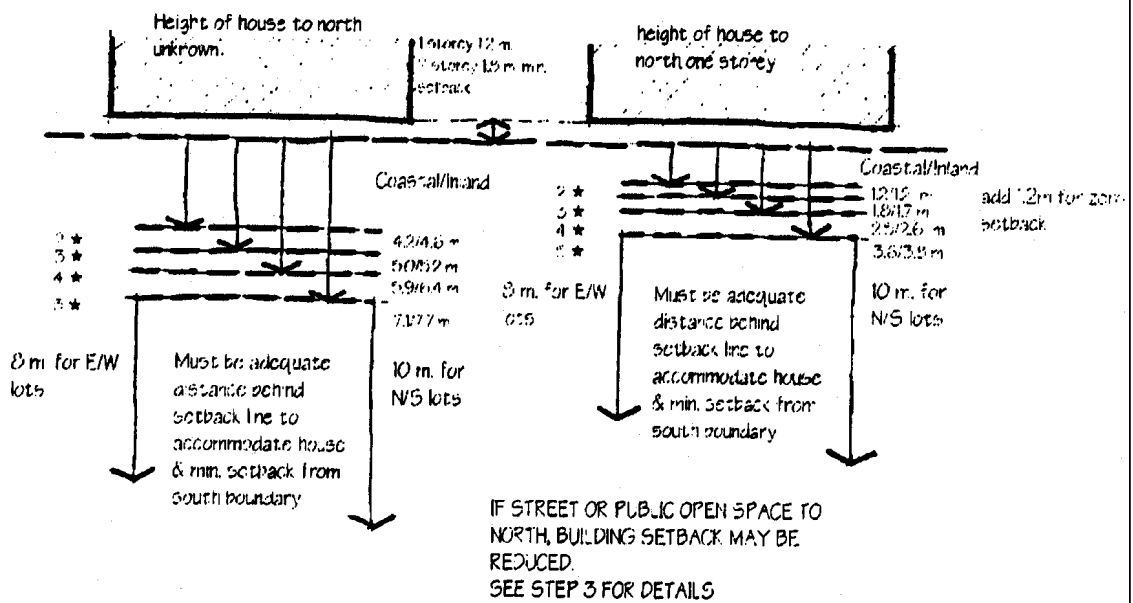
Setback from the north boundary

Having sufficient lot width alone will not guarantee solar access. A house must be sited so that its north facing windows are sufficiently set back from the north boundary of the lot to ensure they will not be overshadowed by surrounding houses. Figure 1 shows the setbacks required to achieve solar access potential at each star rating given the height of buildings to the north. The minimum building size and setback of adjacent buildings and the minimum building dimensions in the lot width tables assumed are also shown.

Showing setback lines on subdivision plans

It is suggested that subdivision plans show the setback line for the maximum rating obtainable - allowing for building height on lots to the north after allowance is made for the minimum building width and setback from the south boundary. Note that only those heated areas of the house need be setback to this line.

Figure 1 Building setback from north boundaries required to achieve various star ratings



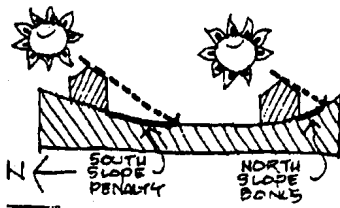
What about slope?

The setback (and lot width for East/West lots) required can be adjusted to allow for the slope of the land. South facing slopes will need larger setbacks to protect solar access while north facing slopes can have reduced setbacks. Add the figures below for south slopes and subtract for north slopes to obtain the appropriate setback from the north boundary.

Table 3 Slope Adjustments to lot width (metres)

Degree of Slope	Star Rating			
	★★★★★		★★★★ or less	
	1 storey	2 storey	1 storey	2 storey
5 < 10% (1:20, 1:10) All zones	0.8	0.8	0.6	0.6
10 < 15% (1:10, 1:6.7) All zones	1.0	1.5	0.8	1.2
15 < 20% (1:6.7, 1:5) All zones	1.4	2.1	1.1	1.7

East/West slopes reduce the amount of solar radiation available to north windows in the morning and afternoon. As the radiation is much less at these times such slopes are ignored. Note that with extreme East/West slopes this may not be true and detailed calculations would be required to determine actual solar access.



⇒ **Step 5 Designing an Energy Efficient House**

After following the above steps to provide good solar access to a dwelling, the next step to consider is the design of the actual house. In designing an energy efficient house refer to Energy Victoria's Home Energy Rating software. The Home Energy Rating will assist in optimising orientation of rooms and windows, choosing building fabric and in minimising heat loss in winter and heat gain in summer.

Height of windows above ground

Prior to undertaking the house design, the sill height of overshadowed windows can have an impact upon the setback.

The information on setbacks and lot widths required to maintain solar access in these guidelines assume that the window sill is positioned at ground floor level. Overshadowing is greater on the portions of the window closest to the ground. The Solar Access of the house can be improved on poorly rated lots by raising the sill level to eliminate the most overshadowed sections of the windows. The table opposite shows the reduction in setback allowable if sill levels are raised. Clerestory windows and upper floor windows can be rated construction to the north where 2 storey construction is allowed on the lot to the north.

Reduction in setback allowed for increasing sill height Coastal Zone

sill height above floor	Star Rating	
	★★★★ or more	★★★ or less
300	0.4	0.4
600	0.9	0.7
900	1.5	1.0

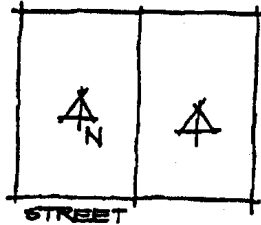
Reduction in setback allowed for increasing sill height Inland Zone

sill height above floor	Star Rating	
	★★★★ or more	★★★ or less
300	0.5	0.4
600	0.9	0.7
900	1.5	1.0

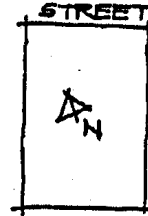
HOW TO USE THE SYSTEM

**1 CHECK THAT LONG BOUNDARY IS WITHIN PERMISSIBLE ORIENTATION. (P.1)
CHECK PREDOMINANT ORIENTATION. (P.2)**

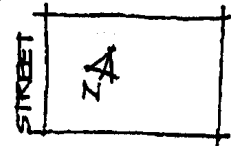
**NORTH - SOUTH LOT
NORTH SIDE OF STREET**



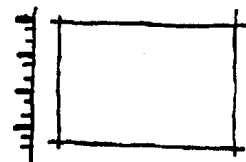
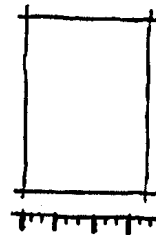
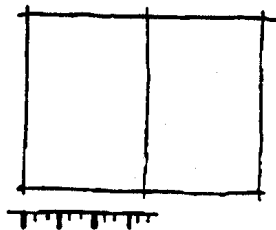
**NORTH - SOUTH LOT
SOUTH SIDE OF STREET**



EAST WEST LOT

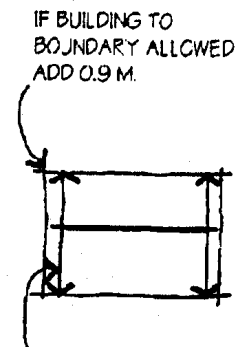
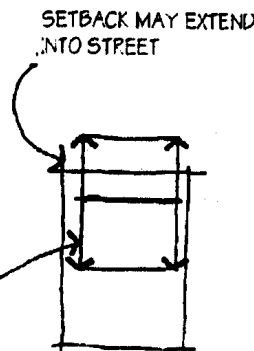
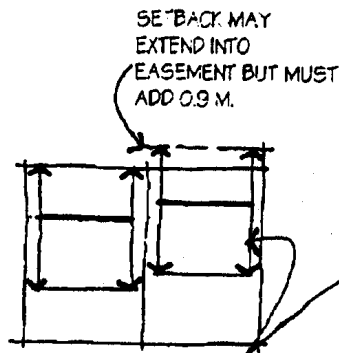


2 MEASURE LOT WIDTH AND DETERMINE RATING. (TABLE 1)



3 IF DESIRED, MODIFY LOT WIDTH OR USE HEIGHT LIMIT ON LOT TO THE NORTH (TABLE 2) TO IMPROVE RATING.

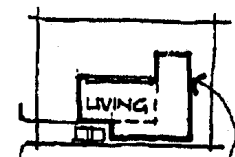
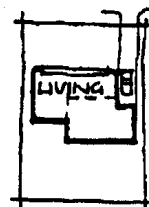
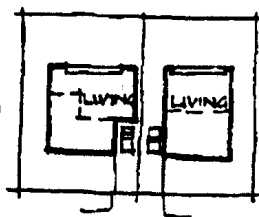
4 SHOW THE SETBACK REQUIRED TO ACHIEVE THE RATING ON THE PLAN OF SUBDIVISION.



ALLOW 10 M. BUILDING ZONE FOR NORTH/SOUTH LOTS

8 M. BUILDING ZONE FOR EAST/WEST LOTS

5 THE SETBACK CAN THEN BE USED AS A STARTING POINT TO SITING AND SELECTING AN ENERGY EFFICIENT HOUSE



NOTE: UTILITY ROOMS NEED NOT BE SETBACK.



CONCENTRATE HIGHEST DENSITY (SHALLOWEST LOTS) ON NORTH SLOPES

RECTILINEAR LAYOUT AT COURT HEAD PROMOTES EFFICIENT, ENERGY SMART NORTH - SOUTH LOTS

ORIENT CORNER LOTS NORTH - SOUTH FOR GOOD SOLAR ACCESS

SOUTH SIDE OF STREET - EXAMPLE OF HOUSE SET BACK TO GAIN PRIVATE AREA TO NORTH

SOUTH SIDE LOT WIDER TO ALLOW FOR CAR PARKING & ENTRIES

WIDER LOTS NEEDED WHEN EAST - WEST

ONE WAY OF HANDLING TRICKY SITUATIONS IS 2" LOTS

LOTS ON SOUTH FACING SLOPES MAY NEED TO BE DEEPER

EAST - WEST LOTS CAN BE NARROWED ON CORNERS WHERE NORTH SOLAR ACCESS IS GOOD

SPECIAL DESIGN (INCLUDING BUILDING TO THE BOUNDARY) ON NARROWER EAST - WEST LOTS

EAST - WEST STREETS PROMOTE ENERGY SMART NORTH - SOUTH LOTS

ATTACHED HOUSING CAN WORK WELL WHERE EACH DWELLING CAN FACE NORTH

IF 45° STREETS ARE UNAVOIDABLE THEN ANGLING LOTS TO THE STREET CAN IMPROVE SOLAR ACCESS

NON RESIDENTIAL USES ON DIFFICULT SITES

BATTLEAXE LOTS USED TO ACHIEVE NORTH - SOUTH ORIENTATION

