Attachment 10

Solar Access Compliance Assessment

Clause 35 – *Solar access and design for climate* and the associated clause 50 development standards at subclause (e) have been considered in detail, warranting amendments to the original villa designs to improve solar penetration to dwellings.

Amendment Process:

16 August 2018: Initial solar access assessment by Council officer did not correspond with applicant's calculations (78.2%) with a combined compliance of 54.5%.

15 February 2019: Amended plans provided by applicant and updated Solar Compliance Schedule (Issue E). A summary of the design amendment process has been provided by the applicant as follows:

Correspondence from Council by email dated 16th of August 2018, identified the following dwellings as being in question for solar compliance:

1, 6, 8, 11, 13, 19, 24, 26, 29, 31, 37, 42, 44, 47, 49, 60, 65, 69, 71, 73, 75, 87, 92, 96, 105, 119, 121, 123, 125, 130, 136 and 140.

Although these dwellings had been identified by the applicant as compliant, Council expressed concern with whether the design of the dwellings would meet standards for adequate solar access. The following advice specifically considers the provision of solar access to these dwellings identified by Council.

3) Design amendments to Villas

In response to Council's concerns, a meeting was held with the applicant and architects Jackson Teece on Monday 6 August 2018. A number of design amendments were made by Jackson Teece to increase internal solar access to dwellings. These are discussed by villa type in Table 1, below.

Table 1 ***Solar Access Compliance Amendments***

Villa Type	Plan Change
Type A	Type A villas have been deleted from the plans. The six villas that were previously identified as Type A have been modified to Type B (Villas 101, 102, 151, 152) or Type C (Villas 135, 136). Refer to revised Masterplan (Jackson Teece, Drawing DA-003 Issue D).
Type B	1. Increase size of front living room window 2. Rear patio dividing wall reduced to 1.4m high 3. Roof line change over rear patio 4. Addition of kitchen window (side) 5. Provide splashback window to kitchen
Type C	1. Move kitchen to centre of villa 2. Extend front window to floor level
Type D	1. Move kitchen to centre of villa 2. Extend front window to floor level 3. Addition of side window to rear living space 4. Rear patio dividing wall reduced to 1.4m high 5. Roof line change over rear patio
Type E	1. Change roof line for both attached & detached villas

Villa Type	Plan Change
Type F	1. Add side window to living/dining room and move wall by 150mm to accommodate new window
Type G	1. Roof line change over rear patio 2. Rear patio dividing wall reduced to 1.4m high 3. For detached villa add side window
Type H	1. Add window next to entry door 2. Remove privacy screen from upper level deck 3. Modify rear balcony walls to planter boxes
Type I	1. Remove privacy screen from upper level deck 2. Increase width of balcony sliding door from 2.4m to 3.2m, to increase solar access to dining room.

As a result of the design modifications outlined in Table 1, solar access to living areas within the dwellings has been increased. These changes have resulted in amendments to the attached Solar Penetration Study Schedule. The Schedule (Dwg 617 Issue E) is provided for Council's review.

The modifications have resulted in 25 of the 32 dwellings identified in Council's correspondence being now compliant with the SEPP 2004 standards for internal solar access:

1, 6, 8, 11, 19, 24, 26, 29, 37, 42, 44, 47, 49, 65, 69, 75, 87, 92, 96, 119, 121, 123, 125, 130, 136.

The compliance of these dwellings is confirmed by the ILU Sun Penetration drawings produced by Jackson Teece, showing three hours of solar penetration to internal living areas of these dwellings at various hours of the day, between 9am and 3pm.

It is agreed that the remaining 7 dwellings do not comply with the provision of a complete three hours of solar access between 9am and 3pm on the winter solstice. These are:

13, 31, 60, 71, 73, 105, 140.

These dwellings have been identified on the Solar Penetration Study Schedule as non-compliant. In addition, a further 27 dwellings are identified on the Schedule as non-compliant. The total number of dwellings providing non-compliant internal solar access to living areas is 34. The remaining 122 of the 156 dwellings provide compliant solar access

to living areas, bringing compliant internal solar access to 78.2% of dwellings. This complies with the provisions of the SEPP 2004.

Planning Principle – solar access

The revised Planning Principle expressed in *The Benevolent Society v Waverley Council* [2010] NSWLEC 1082 has been considered by both the applicant and Council to form an opinion on the interpretation of 'adequate' and 'substantial' in clause 35 as they relate to solar penetration to living areas and sunlight to areas of private open space. This case revised the Planning Principle on a matter relating to interpretation of the *Seniors SEPP*. Principles relating to impacts on existing (or proposed) neighbouring properties are not relevant due to the separation distance between the development and neighbouring boundaries and have, therefore, not been considered.

Previous Planning Principle	Revised Planning Principle
Parsonage	*Benevolent Society*
Solar Penetration	Solar Penetration
To be assessed as being in sunlight, the sun should strike a vertical surface at a horizontal angle of 22.5^o or more. (This is because sunlight at extremely oblique angles has little effect.) For a window, door or glass wall to be assessed as being in sunlight, half of its area should be in sunlight.	*For a window, door or glass wall to be assessed as being in sunlight, regard should be had not only to the proportion of the glazed area in sunlight but also to the size of the glazed area itself. Strict mathematical formulae are not always an appropriate measure of solar amenity. For larger glazed areas, adequate solar amenity in the built space behind may be achieved by the sun falling on comparatively modest portions of the glazed area.*
Private Open Space	Private Open Space
For private open space to be assessed as being in sunlight, either half its area or a useable strip adjoining the living area should be in sunlight, depending on the size of the space. The amount of sunlight on private open space should be measured at ground level.	*For private open space to be assessed as receiving adequate sunlight, regard should be had of the size of the open space and the amount of it receiving sunlight. Self-evidently, the smaller the open space, the greater the proportion of it requiring sunlight for it to have adequate solar amenity. A usable strip adjoining the living area in sunlight usually provides better solar amenity, depending on the size of the space. The amount of sunlight on private open space should ordinarily be measured at ground level but regard should be had to the size of the space as, in a smaller private open space, sunlight falling on seated residents may be adequate.*

Where guidelines dealing with the hours of sunlight on a window or open space leave open the question what proportion of the window or open space should be in sunlight, and whether the sunlight should be measured at floor, table or a standing person's eye

level, assessment of the adequacy of solar access should be undertaken with the following principles in mind, where relevant:

Revised Principle	Comment – Council Assessment Process
Solar Penetration	
For a window, door or glass wall to be assessed as being in sunlight, regard should be had not only to the proportion of the glazed area in sunlight but also to the size of the glazed area itself. Strict mathematical formulae are not always an appropriate measure of solar amenity. For larger glazed areas, adequate solar amenity in the built space behind may be achieved by the sun falling on comparatively modest portions of the glazed area.	Assessment of what constitutes 'adequate daylight to the main living areas of residents' as expressed in clause 50 (e): living rooms for a minimum of 70% of dwellings receive a minimum of 3 hours direct sunlight between 9am and 3pm in mid-winter has been interpreted to mean solar penetration into the living areas such as to allow residents to enjoy the internal benefits of sunlight. The previous Planning Principle in ***Parsonage*** expressed this 'solar penetration' by reference to the angle of the sun on a horizontal plane (which would allow sunlight to enter the living room through the glazing). Where the angle is more oblique, sunlight may touch the glazing but not enter the living room to any beneficial extent, i.e. windows of living rooms will be in sunlight but the living room itself may not. The revised Planning Principle still makes reference to adequate solar amenity in the built space behind [the glazing] so it is interpreted that solar penetration into the living rooms is still required.
For private open space to be assessed as receiving adequate sunlight, regard should be had of the size of the open space and the amount of it receiving sunlight. Self-evidently, the smaller the open space, the greater the proportion of it requiring sunlight for it to have adequate solar amenity. A usable strip adjoining the living area in sunlight usually provides better solar amenity, depending on the size of the space. The amount of sunlight on private open space should ordinarily be measured at ground level but regard should be had to the size of the space as, in a smaller private open space, sunlight falling on seated residents may be adequate.	Where the POS allocation is larger (corner dwellings and POS on southern aspect) sunlight has been considered adequate where substantial areas are in sunlight regardless of whether the sunlight is directly adjoining the living area. Where the POS allocation is a strip of land, sunlight has been considered adequate where the sunlight is directly adjoining the living area. Sunlight has been assessed as measured at ground level.
Overshadowing by fences, roof overhangs and changes in level should be taken into consideration. Overshadowing by vegetation should be ignored, expect that vegetation may	The model takes into consideration changes in level, fencelines and roof overhangs. Vegetation has not been considered in the assessment.

be taken into account in a qualitative way, in particular dense hedges that appear like a solid fence.	

Other relevant considerations

The applicant notes the reference to AMCORD in clause 35 as a resource document to establish adequate solar access and dwelling orientation appropriate to the climatic conditions. Maitland is considered to be a temperate climate with the following building performance criteria:

Table 2 AMCORD Performance Criteria

Performance criteria – In temperate climates	Acceptable solutions
P9. Buildings are sited and designed to maximize solar access to north-facing windows of living areas and principal areas of open space, having regard to slope, views, existing vegetation and over shadowing.	A9.1 Windows to north-facing living areas receive at least 3 hours of sun between 9am and 5pm on 21 June over a portion of their surface.

Of relevance is the extension of solar access to living areas to 5pm on the winter solstice in this climate category.

SEPP65 – Residential Flat Buildings: Apartment Design Guidelines & Technical Note for Solar Access

The applicant further references the Technical Note in this Policy although it is acknowledged that this Policy does not apply to this development. The relevant extract is reproduced below.

a) **Apartment Design Guidelines and State Environmental Planning Policy No 65 – Design Quality of Residential Apartment Development.**

The Apartment Design Guidelines (ADG) is to be read in conjunction with State Environmental Planning Policy No 65 - Design Quality of Residential Apartment Development (SEPP 65). The development subject to this development application is not for apartments, therefore SEPP 65 and the ADG do not apply. However, the ADG provides

some valuable tools in regard to assessing solar access. Part 4 Designing the building, Objective 4A-1 of the Design Guidance (p78) of the ADG states:

> *To maximise the benefit to residents of direct sunlight within living rooms and private open spaces, a minimum of 1m² of direct sunlight, measured at 1m above floor level, is achieved for at least 15 minutes.*

This guidance assumes that sunlight is best enjoyed internally at 1m above ground as that is likely where people would be when sitting on the lounge or at a table.

The SEPP 65 technical note 'Solar access requirements in SEPP 65' outlines the purpose of the guidance on measuring direct sunlight. It states:

> *This guidance is provided as the amount and location of sunlight will vary during the 2 or 3 hour time period that applies. It quantifies an amount of sunlight that will be useable and provide real benefits to residents within the 2 or 3 hour period. It means that this amount of sunlight will be provided at a point within the 2 or 3 hour period so that a resident can for instance pull up a chair and read a book in the sunlight in their living room/private open space.*[2]

The practice note identifies that where the sunlight falls and can be utilized is important. If each dwelling can provide sunlight that can be effectively utilized by the resident, the amount of sunlight may not be as important as where the sunlight falls. If the sunlight falls on an internal wall or area that cannot contain furniture placed within, it may not be as beneficial to the occupants as a smaller amount which falls on a lounge or sitting area.

Assessment Comments:

The relevant provisions referenced by the applicant and considered by council officers in the final assessment establish the following assessment criteria for solar access into living rooms:

- **Solar penetration into living rooms is required to ensure compliance;**
- **The ability of residents to utilise sunlight penetration into living rooms, not just the extent of sunlight into living rooms, is a key consideration to achieve compliance; and**
- **In consideration of the AMCORD guidelines, solar penetration into living rooms in a temperate climate may be extended to 5pm mid-winter and be considered to achieve compliance.**

The revised Solar Access Diagrams and 3D model images have been reviewed against Council's identified non-compliant dwellings and the substituted villas types for the deleted Type 'A' dwellings – i.e. Dwellings 101, 102, 135, 136, 151 and 152.

<u>Assessment Conclusion</u>

Where substantial sunlight penetration extends into dwellings at 8:30am, this additional ½ hour has been considered in the overall calculation as the morning sunlight in mid-winter is considered to be more beneficial than late afternoon.

Assessment by the relevant Council officer concludes that a further two dwellings (8 and 26) to those identified by the applicant do not comply with solar penetration requirements and a number of additional POS areas. The final calculation by the applicant (78.2% compliance) is considered to be reduced to 71.8% compliance by Council. That being said, the amended plans are a significant improvement on the initial 54.5% compliance and are considered to be satisfactory in terms of clause 50(e) in the *Seniors SEPP*. The application does not warrant refusal on the grounds of solar access.

In total, assessment by Council officers indicates the following non-compliance which for each criterion and marked on the maps attached for ease of identification.

Dwelling	Type	Solar Access	POS
8	I (over)	X	
13	H (under)	X	
18	I (under)	X	
26	I (over)	X	
31	H (under)	X	
36	I (under)	X	
54	I (under)	X	
60	G	X	
67	F		X
68	F	X	
71	C	X	
73	B	X	
85	G	X	X
86	G	X	X
89	D	X	
93	G	X	
94	G	X	
104	B	X	
105	E	X	
107	F		X
108	F	X	X
111	G	X	X
112	G	X	X
113	G	X	X
114	G	X	X
115	E	X	
123	C		X
124	G	X	X
126	E	X	
127	G	X	X
128	G	X	X
131	G	X	X
132	G	X	X
137	G	X	
138	G	X	

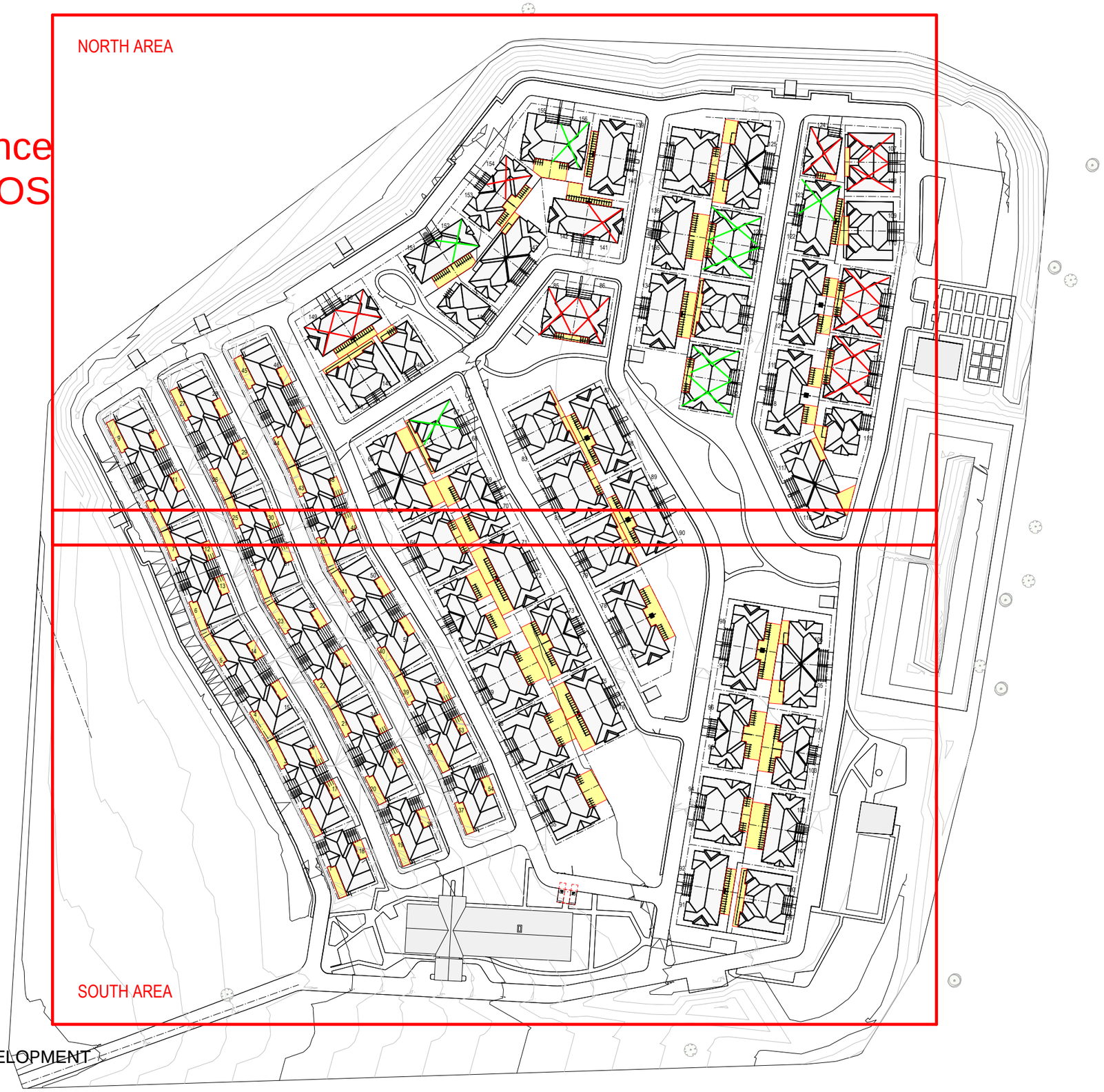
139	C	X	
140	C	X	
141	C		X
149	C		X
150	C		X
152	B		X
154	B		X
155	G	X	
156	G	X	X
Total		36	21
Combined	44/156		

Applicant

Council non-compliance (additional POS areas)

TOTAL = 21/156 do not comply with POS requirements.

Therefore, 135/156 comply = 86.6%.



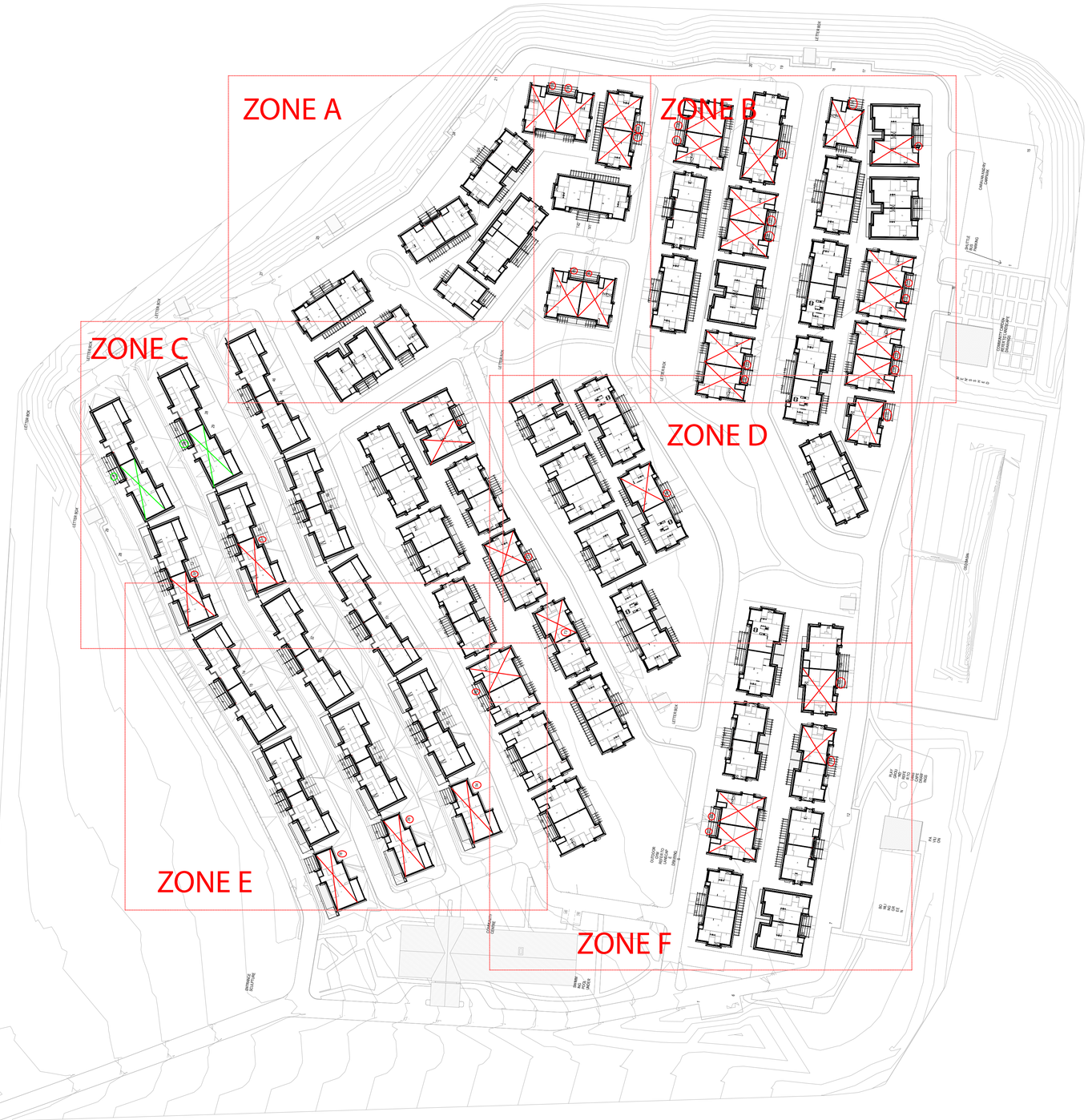
THORNTON SENIOR LIVING DEVELOPMENT
DA-17-2593
PRIVATE OPEN SPACE SOLAR ACCESS DIAGRAM

Applicant

Council Non-Compliance
(additional dwellings)

Total 36/156 do not comply with solar access into living areas.

Therefore, 120/156 comply = 76.9%

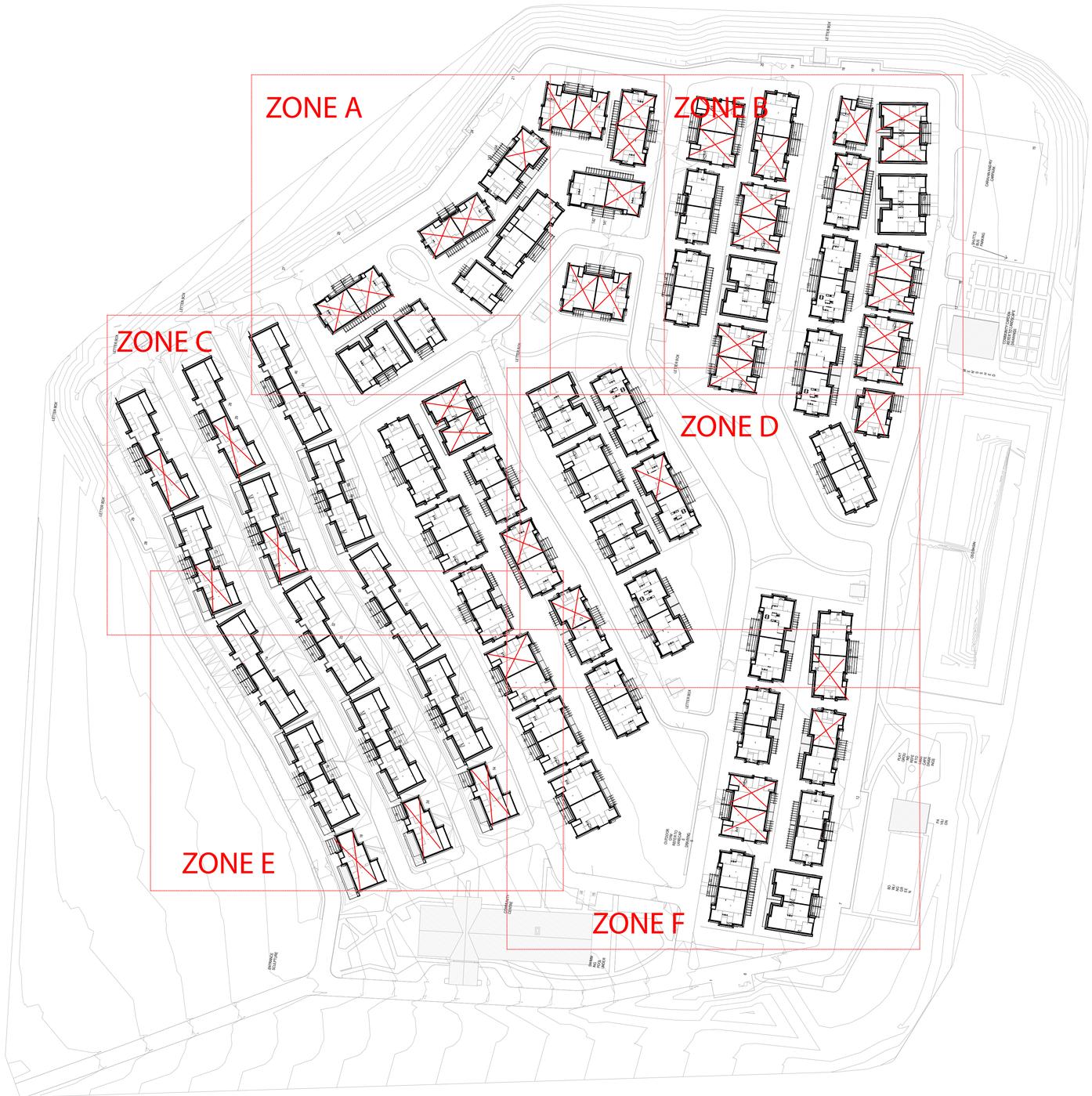


THORNTON SENIOR LIVING DEVELOPMENT
DA-17-2593
SOLAR ACCESS DIAGRAM KEY PLAN

Combined Non-Compliance

44/156 dwellings and POS do not comply.

Therefore, 112/156 comply = 71.8%



THORNTON SENIOR LIVING DEVELOPMENT
DA-17-2593
SOLAR ACCESS DIAGRAM KEY PLAN