## Agar Grove Estate Redevelopment Solarium Design Note

## Rev B

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1.0 Solarium Design Note



## 1.0 SOLARIUM DESIGN NOTE

The new buildings at Agar Grove are being designed and constructed as certified Passivhaus buildings. Passivhaus is a set of standards, design tools, and processes for designing and delivering high thermal comfort, low energy consumption buildings.

The original design of Block JKL, submitted for planning in 2013, featured inset balconies. Inset balconies pose several challenges to low-energy building design, and their impact is captured and quantified in the Passivhaus energy modelling tool, PHPP. They:

- Increase the total heat loss area of the building (this particularly applies to mid-wall balconies)
- Generally have fixings to the primary structure of the building. These fixings pass through the insulation, and create thermal bridges which increase heat loss.
- Provide large amounts of shading to the windows on the floor below, which limits the useful solar heat gains in the winter
- Limit the internal floor area which can be achieved for a given building footprint. The energy metrics in Passivhaus use annual energy consumption per square meter of treated floor area.

For Block JKL an alternative to the inset balcony has been developed: solariums. These are akin to a winter garden, but with the thermal line continuing along the façade of the external wall. Examples are shown below, for both mid-wall and corner condition:



External envelope

- To one side if solarium
- To three sides if inset balcony



The solariums proposed for block JKL address the issues identified above: they limit the heat loss area, thermal bridging and shading, and provide increased internal floor area for the same building massing. They are also simpler to construct and pose fewer airtightness challenges. Can we say that they are more cost-effective? Arcadis to comment following cost-plan discussion.

The criteria being applied for the solariums at present are:



Criteria	Rationale	
Certified Passivhaus buildings	Inset balconies have increase thermal bridging and shading,	
	which negatively impact the heating energy demand of the	
	building, as reflected in the Passivhaus assessment	
Opening area is a significant proportion of	The solarium is intended to provide a strong connection to	
glazed area in solarium (circa 2/3, we	outside, so large amounts of opening area are required. This is	
should refine this with some detail for the	also needed to provide plentiful natural ventilation to help offset	
framing, hinges etc.)	the solar gains of the large windows.	
Internal floor surface treatment is	The solarium is intended to have a different character from the	
different from the adjacent spaces	adjacent spaces.	
At least one partition separating solarium	Occupants should be clear on where the thermal line of the	
from the adjacent spaces is not insulative	building is. This is to avoid a scenario where they leave the	
	solarium windows open, and an internal partition closed, and the	
	building then loses a lot of heat.	
Summer comfort modelling	The design passes the current industry-standard summer	
	comfort design standard, CIBSE TM59.	
	Predicted future weather files for 2050 have been modelled, and	
	measures for achieving compliance identified.	

For Block JKL the following options have been tested against the current design:

Scenario	Annual heating demand	Comments
Base case (with solariums) heating	14.0 kWh/(m².a)	A pass
demand		
Corner solariums turned in to balconies	15.2 kWh/(m².a)	A marginal pass: the target is 15 kWh/(m <sup>2</sup> .a), so this only passes by
		Touriumg
Mid-wall solariums also turned in	18.0 kWh/(m².a)	A fail
to balconies		

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