ATTACHMENT 2: EXEMPLAR HOUSE – LIGHT SPILL MODELLING

Caveat

The following examples, of potential spill light effects that could be generated by indoor and outdoor lighting provide, in my opinion, a reasonably conservative indication of what could be expected for a single story house adjacent an SNA.
The considerable number of potential variables are such that I do not propose, nor recommend, the use of specific calculated values in ODP rules.
The model assumes that all lights are operating in every room facing the SNA at 100% output. In my opinion this is unlikely to occur on most occasions as in practice, lighting tends only to be turned on in rooms that are in use at the time.

Basis of Model

The model assumes a significant area of glazing as shown, with 80% light transmittance and no attenuation from curtains, blinds, planting, etc other than as noted. Relatively high interior illuminance values of approximately 90-150 lux average have been assumed. Also, the interior surface reflectance used ignores potential losses from furniture and the reflectance values are conservative in my opinion (Ceiling: 80%, walls: 50% & floor: 20%).

Possible variables

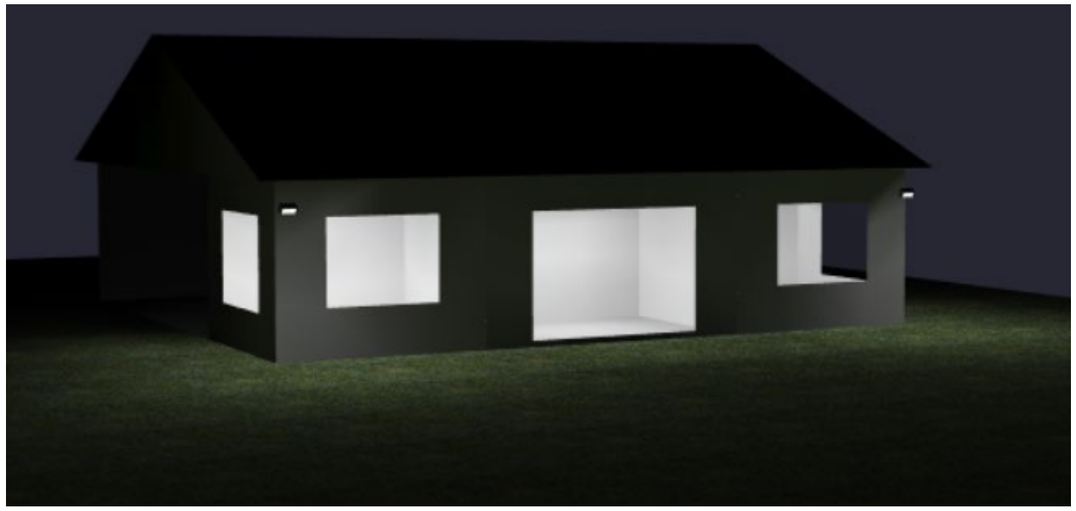
While not exhaustive, variables could include;

- Interior & exterior lighting types, quantities, aiming, age, cleanliness and actual room average illuminance
- Glazing area & light transmittance
- Screening
- Overall house dimensions and separation from the SNA
- Proximity of neighbouring houses
- Building height and number of stories
- Site topography

Summary of Results

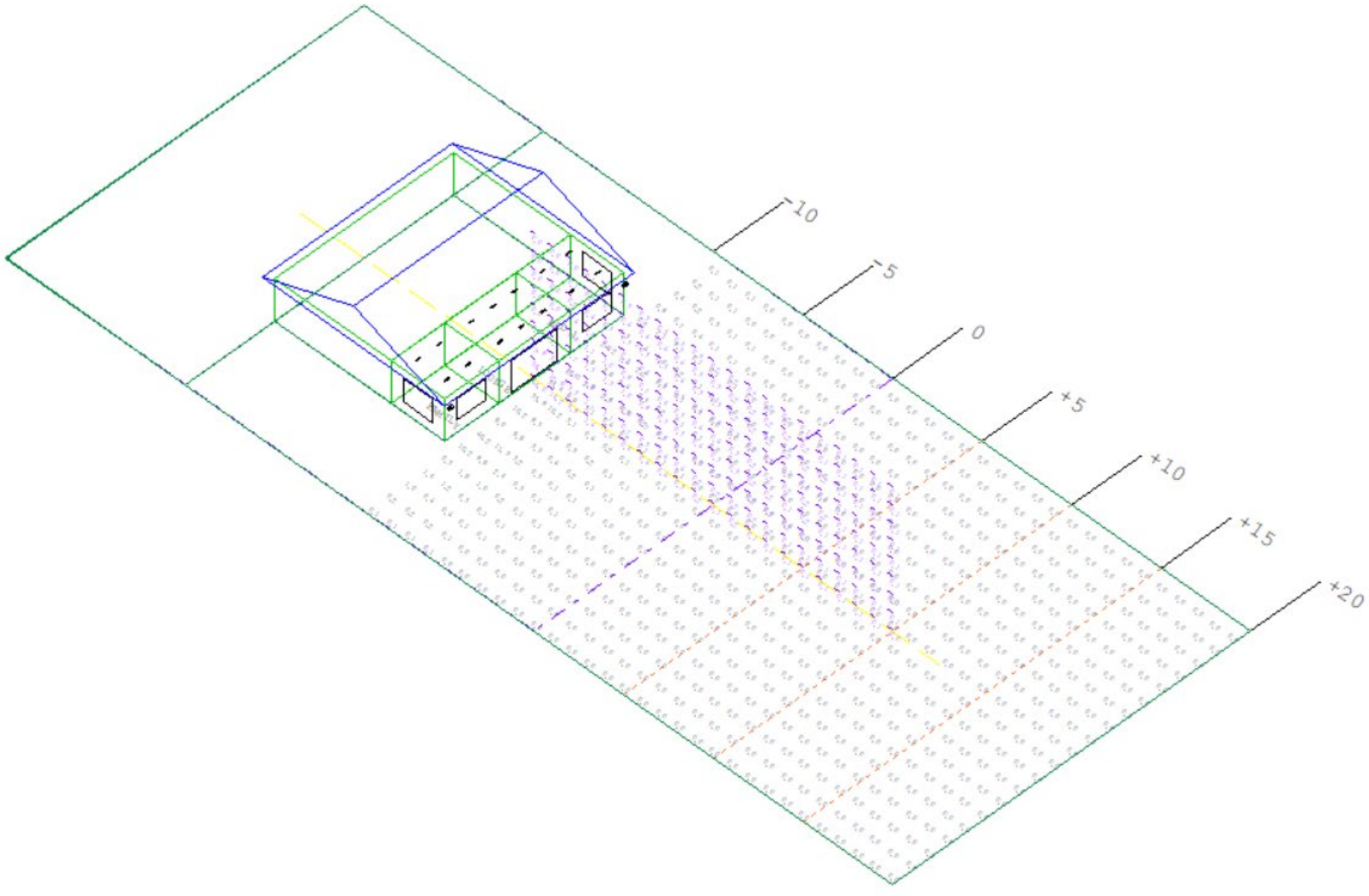
SCENARIO	DESCRIPTION	DISTANCE FROM HOUSE TO 0.3 LUX	
		HORIZONTAL	VERTICAL
1	All interior lights ON. No screening. All exterior lights OFF	4.5m	11m
2	All interior lights ON. No screening. All exterior lights ON	14.5m	29m
3	All interior lights ON. Curtains closed (90% screening). All exterior lights OFF	3.3m	4m

Rendered view – rear of building (similar for all scenarios)

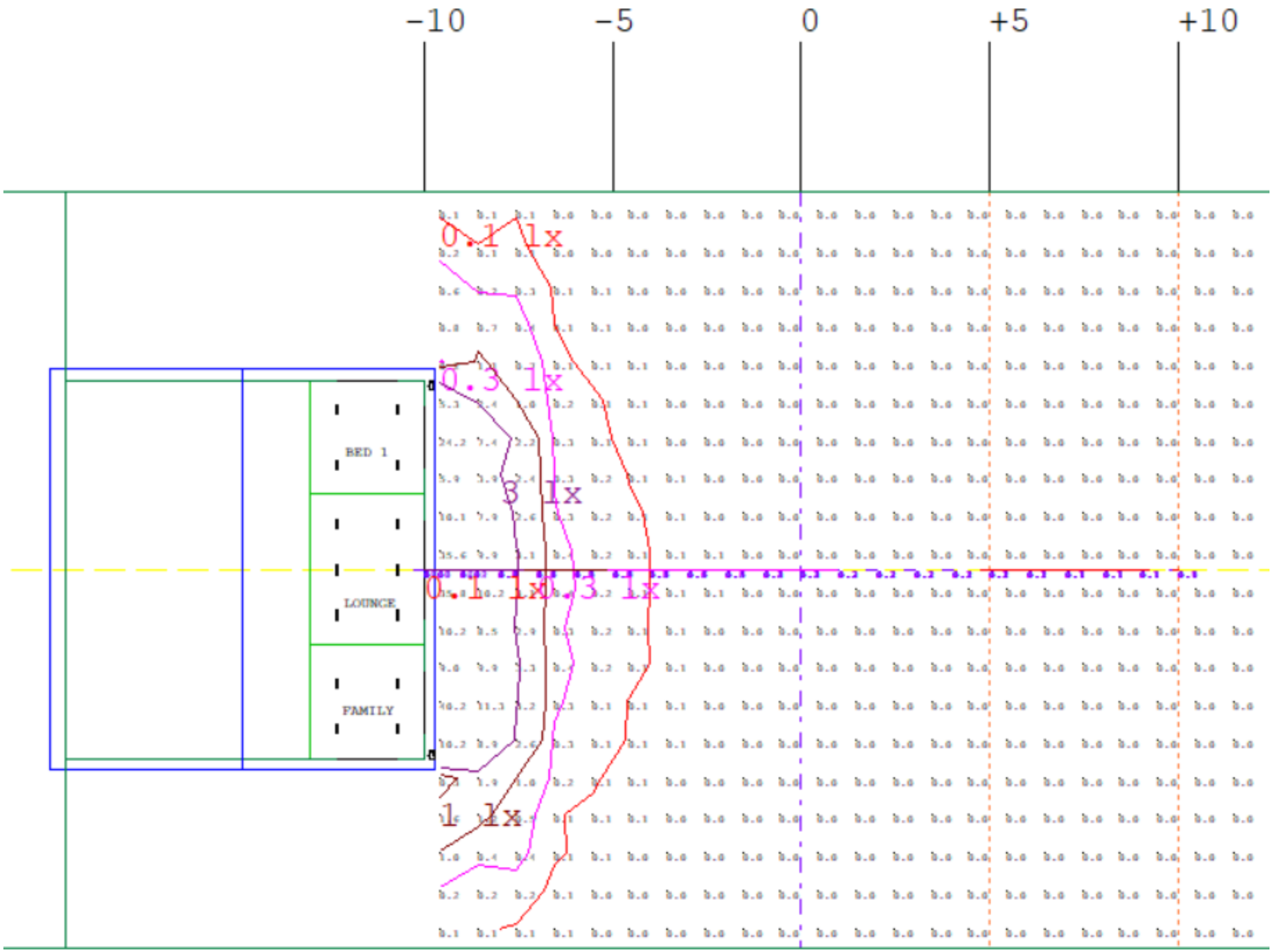


<u>SCENARIO 1:</u> All interior lights ON. No screening. All exterior lights OFF.

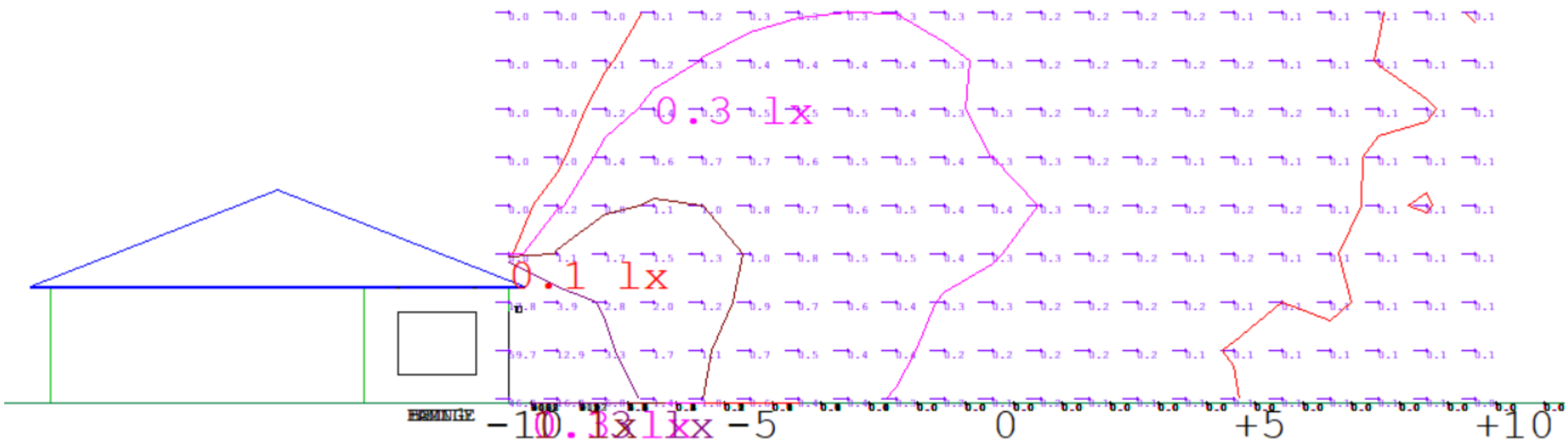
1.0 Isometric view (to aid understanding of calculation planes)



1.1 Plan view (Horizontal illuminance [lux] – ground level – 1m x 1m grid):

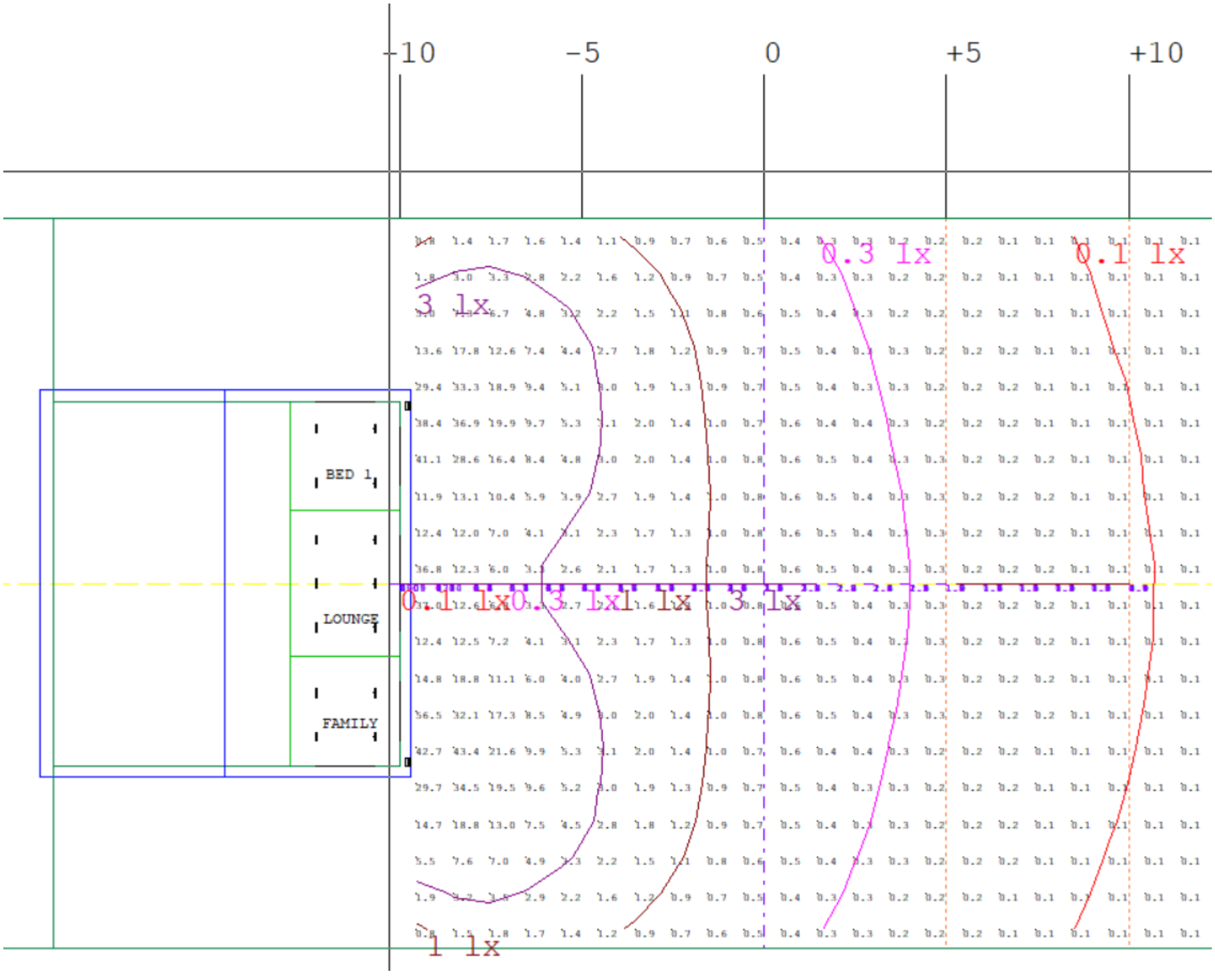


1.2 Side view (Vertical illuminance [lux] – 0m to 8m high – 1m x 1m grid):

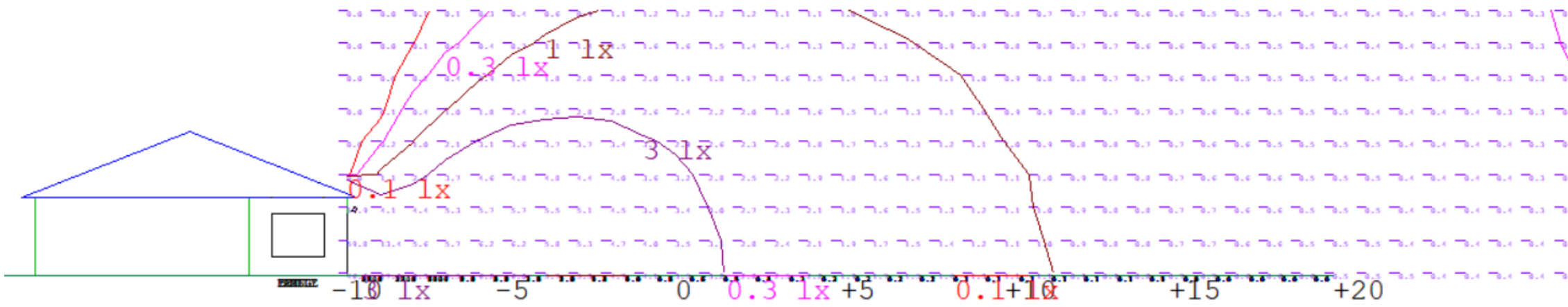


<u>SCENARIO 2:</u> All interior lights ON. No screening. All exterior lights ON.

2.1 Plan view (Horizontal illuminance [lux] – ground level – 1m x 1m grid):

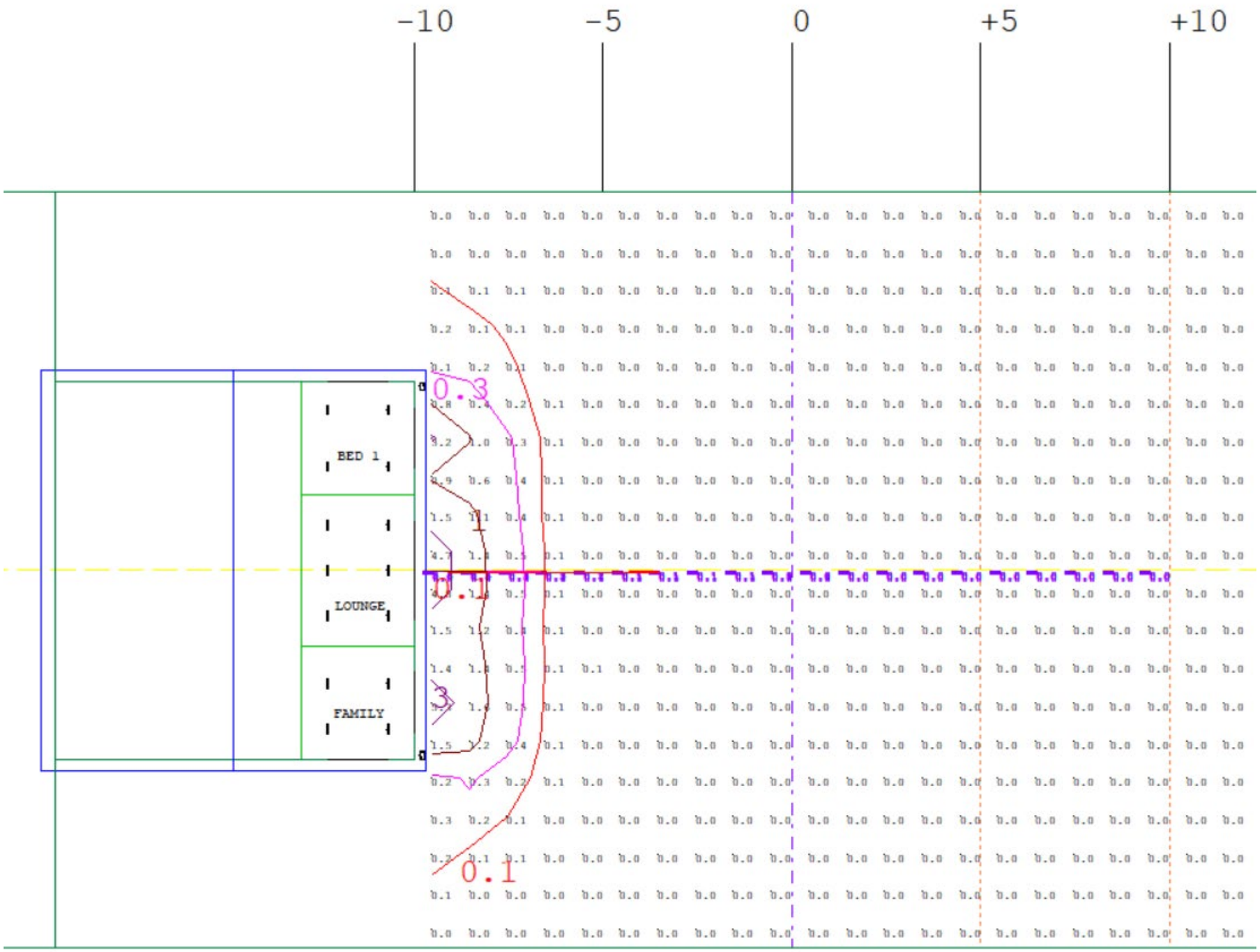


2.2 Side view (Vertical illuminance [lux] – 0m to 8m high – 1m x 1m grid):



<u>SCENARIO 3:</u> All interior lights ON. Curtains closed (90% screening). All exterior lights OFF.

3.1 Plan view (Horizontal illuminance [lux] – ground level – 1m x 1m grid):



3.2 Side view (Vertical illuminance [lux] – 0m to 8m high – 1m x 1m grid):

ATTACHMENT 3: EXEMPLAR 3 STORY BUILDING – LIGHT SPILL MODELLING

Caveat

The following examples, of potential spill light effects that could be generated by indoor lighting extrapolate the cumulative light spill effect for identical interior lighting effects generated per level for 1, 2 or 3 stories.

For the sake of simplicity, the light spill for any one level has been normalised to 0.3 lux at 5m from the building.

Basis of Model

As per the model in Appendix B.

Possible variables

As per the model in Appendix B.

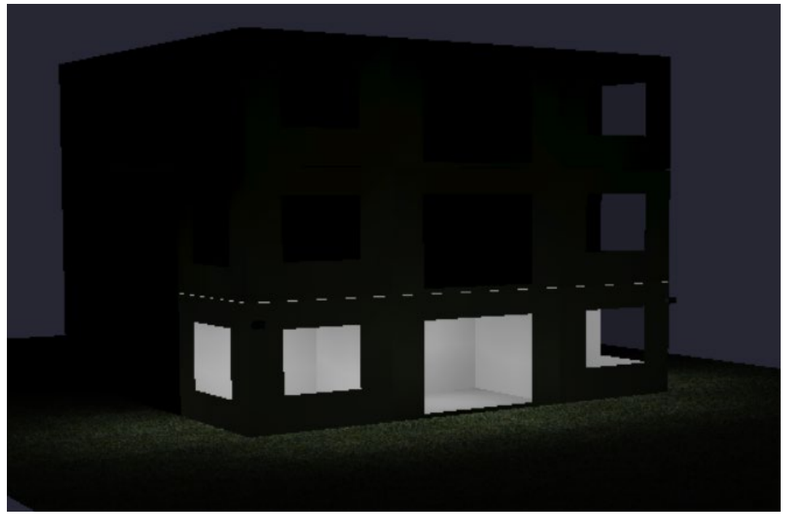
Summary of Results

Since the exemplar house has established that the vertical plane illuminance will consistently be greater than that in the horizontal plane, the vertical plane results are summarised below.

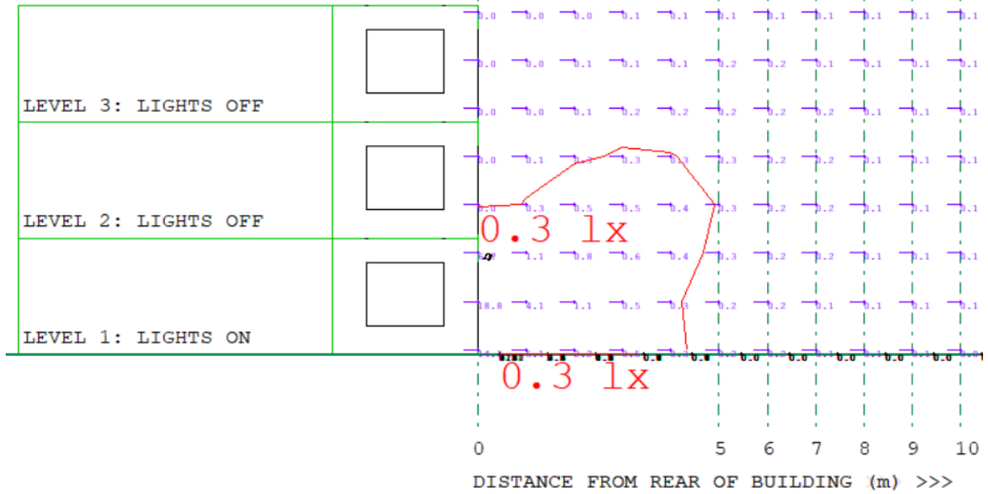
SCENARIO	DESCRIPTION	DISTANCE FROM BUILDING TO 0.3 LUX
1	Lights on: 1 storey	5m
2	Lights on: 2 stories	7.5m
3	Lights on: 3 stories	10m

LIGHTS ON: LEVEL 1 ONLY

Rendered view – rear of building

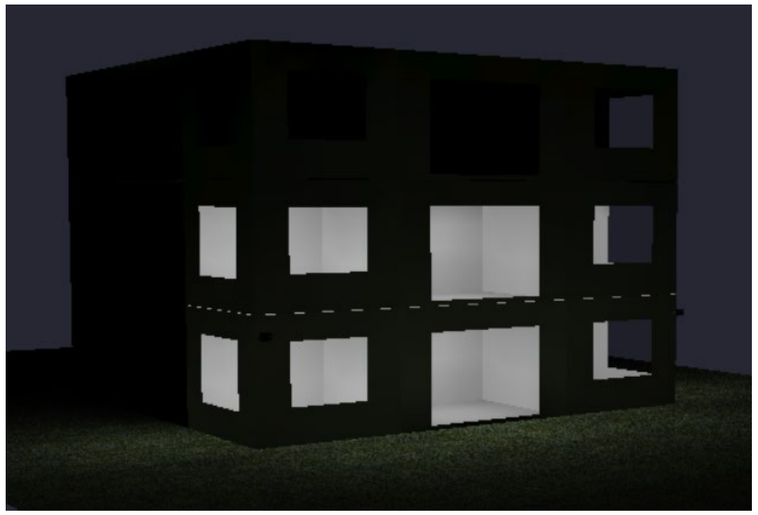


Light Spill (lux) – vertical plane along the centreline of the building – Side view

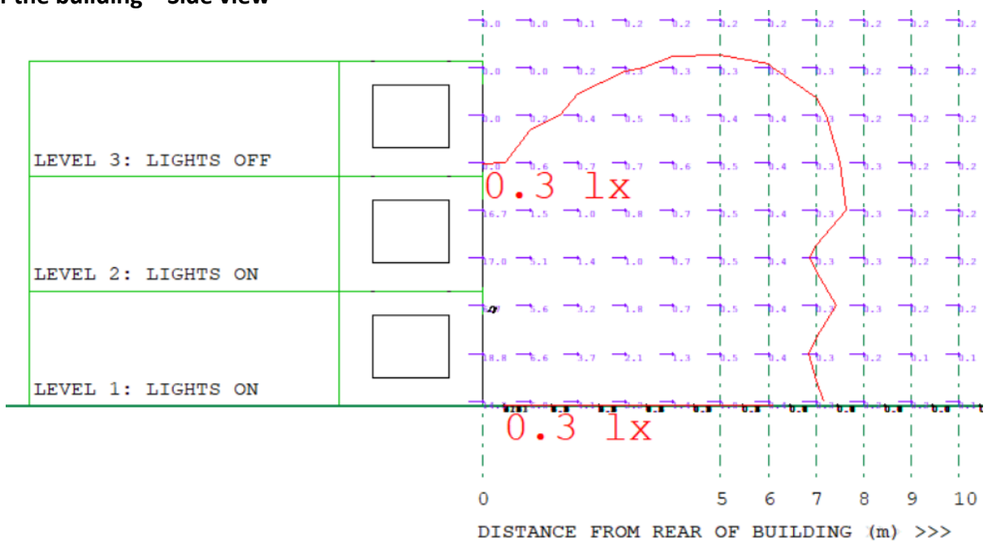


LIGHTS ON: LEVELS 1 + 2

Rendered view – rear of building

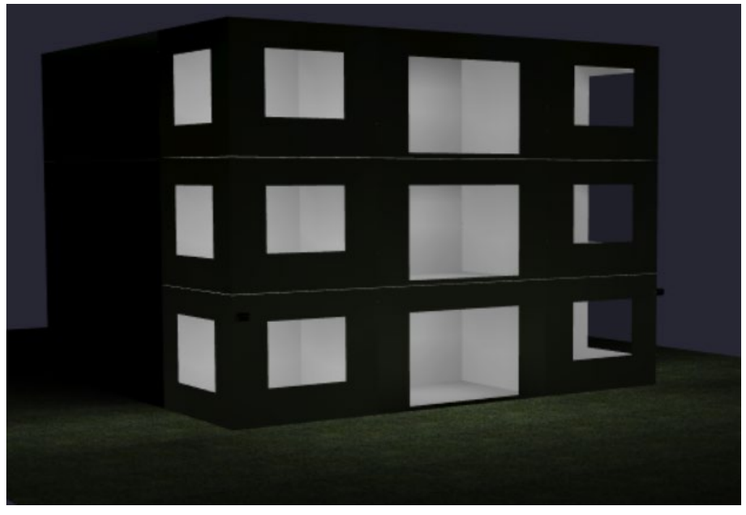


Light Spill (lux) – vertical plane along the centreline of the building – Side view



LIGHTS ON: LEVELS 1 + 2 + 3

Rendered view – rear of building



Light Spill (lux) – vertical plane along the centreline of the building – Side view