



AVENIR HOMES LIMITED

6600

External Lighting Analysis Report

The Green Quarter

Proposed Strategic Housing Development

Cartrontrooy,
Kilnafaddoge
Lissywollen and
Ardnaglug (townlands),
Athlone
Co. Westmeath

Avenir Homes Limited

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1 Introduction

1.1 Report purpose

This report gives information on the external lighting installation in connection with the new proposed project covering the proposed illumination categories, the resultant illumination levels and proposed light fittings.

1.2 Instruction

DKPartnership (DKP) have been commissioned by Avenir Homes Limited to carry out the analysis and report for the proposed development at Cartronroy, Kilnafaddoge, Lissywollen and Ardnaglug (townlands), Athlone, Co. Westmeath.

1.3 Development description

Avenir Homes Limited. intend to apply to An Bord Pleanála for permission for a strategic housing development at Cartronroy, Kilnafaddoge, Lissywollen and Ardnaglug (townlands), Athlone, Co. Westmeath. The development will consist of:

The construction of a mixed use residential development of 122 no. residential units with ancillary creche, 46 no. student apartments consisting of 283 bed spaces, and all associated site development works. The proposed development makes provision for 60 no. dwelling houses comprising 38 no. 2-storey 3-bed townhouses, 7 no. 2-storey 4-bed townhouses, 7 no. 3-storey 4-bed townhouses, 6 no. 2 storey 4-bed semi-detached and 2 no. 2 storey 4-bed detached. The proposed development includes 62 no. apartments / duplexes to be provided as follows: Block R1 containing 38 no. apartments (16 no. 1 bed units and 22 no. 2 bed units) in a 3-6 storey building, and Block R2 containing 20 no. duplex units (10 no. 2 bed units and 10 no. 3 bed units) over 4 storeys with 4 no. apartments (4 no. 2 bed units) in one 5th storey feature area. The proposed student accommodation makes provision for 283 no. bed spaces in 3 no. blocks to be provided as follows: Block S1 containing 18 apartments with 117 bed spaces over 5-6 storeys, Block S2 containing 16 apartments with 107 bed spaces over 6-7 storeys, and Block S3 containing 12 apartments with 59 bed spaces over 4-5 storeys.

The proposed development will provide for two new vehicular accesses as well as pedestrian entrances onto Lissywollen Avenue east-west access road (as permitted under An Bord Pleanála Reference ABP-309513-21). Minor modifications to ABP-309513-21 are proposed to cater for these access points, alterations to cycle/pedestrian paths, the removal of a central island to facilitate the south-eastern entrance, and provision of bus stop infrastructure. Ancillary site works include public and communal open spaces, hard and soft landscaping, pedestrian / cycleways, car parking, cycle parking, bin storage, public lighting, solar panels, ESB substation and supporting distribution kiosks, and all other ancillary works above and below ground. The proposal includes pedestrian and cycle linkages onto the Old Rail Trail Greenway to the south and Blackberry Lane (L40061) to the west.

In addition to the above specified works within the red-line boundary, Westmeath County Council are facilitating some offsite works to support the project for which the applicant has confirmed written consent. These include:

Resurfacing Blackberry lane along the western extent of the site. A special development contribution has been agreed with the applicant for such purposes.

Facilitating works to complete connections to the Old Rail Trail Greenway, including

Completion of pedestrian/cycle path between Blocks R1 and S1 to the surfaced area of the greenway to the south, and;

Replacement of existing gated access between the greenway and Blackberry Lane (southwest of the site) with a revised arrangement with dedicated cycle/pedestrian access. Final works to be agreed with Westmeath County Council.

2 Executive summary

2.1 Analysis conducted

This report analyses the illumination calculation results of the proposed lighting design in respect of new project circulation roads, adjacent public carparking, access pathway to Blackberry lane and the access pathway to the existing Old Railway Greenway and the BlackBerry Lane itself.

2.2 Design considerations

The external lighting design has been executed using the European design standard EN 1332201 class P3 for the proposed circulation roads, adjacent public carparking and access pathways to Blackberry lane / the existing Old Railway Greenway. The lighting design for blackberry lane is targeted at P3 but adjusted to lower the light spill into possible bat foraging areas immediately to the East of blackberry Lane inline with recommendations asset out in the Bat Conservation Ireland 2010, (Stone 2013) documents.

2.3 EN132201 External lighting calculation data

From appendix A, B, C, D, E representing the illumination calculations and illustrations we note the average illuminance for the proposed circulation roads, adjacent public carparking, access pathways to Blackberry lane and access pathway onto the Old Railway Greenway and Blackberry Lane using the proposed fittings is 8.01 Lx and minimum illuminance is 1.69Lx both in excess of the minimum P3 targets. The illumination calculation results are based on using the following 3 types of light fittings ;

Type A Phillips Luma 24W 3000K on a 4m pole > the site in general

Type B ThorLux Starbeam Narrow, 31W 3000K on a 4m pole > See Blackberry Lane note below.

Type C ThorLux Starbeam Wide Road, 48W 4000K on a 6m pole > Main entrance roads to the site

Type B where applied in Blackberry Lane are fitted with asymmetric diffusers only casting the light forward with little of no light spill backwards into the potential bat foraging areas and mounted on a lower 3.5m pole again to reduce spill..

2.4 Calculation data results

From appendix A, B, C, D, E representing the illumination calculations and illustrations we note the average illuminance for the proposed circulation roads, adjacent public carparking, access pathways to Blackberry lane and access pathway onto the Old Railway Greenway and Blackberry Lane using the proposed fittings is 8.01 Lx and minimum illuminance is 1.69Lx both in excess of the minimum P3 targets.

| Element | E avg min (lx) | E min (lx) | E max (lx) |
|------------------------------|----------------|------------|------------|
| EN13201 standard P3 (target) | 7.50 | 1.5 | Na |
| Site average (achieved) | 7.93 | 1.68 | 23.11 |

2.5 Conclusion

The external (public) lighting design covering the proposed circulation roads, adjacent public carparking, access pathways to Blackberry lane and access pathway onto the Old Railway Greenway and lighting design for the Blackberry Lane outside the proposed development as per illumination contour layouts and illuminance calculation data appendix A,B,C,D,E meets the criteria set out in EN13201 for lighting class P3 whilst in Blackberry Lane obtaining the recommendations for the possible bat foraging area immediately to the East of the lane as set out in the Bat Conservation Ireland 2010, (Stone 2013) documents by using light fittings with asymmetric light beam only casting the light forward with little of no light spill into the potential foraging areas. We, DKP, therefore deem the external lighting design to be in compliance with the applied standards and recommendations.

2.6 Mitigation measures / actions

No mitigation measures required for compliance to lighting standards

3 Geographical overview

3.1 Project overview

Image 3.1, the (google maps) site map below shows the approximate location of the site with proposed development approximately outlined in the area site map.



Image 3.1 Approximate proposed development site.

4 Approach and methodology

4.1 Analysis approach

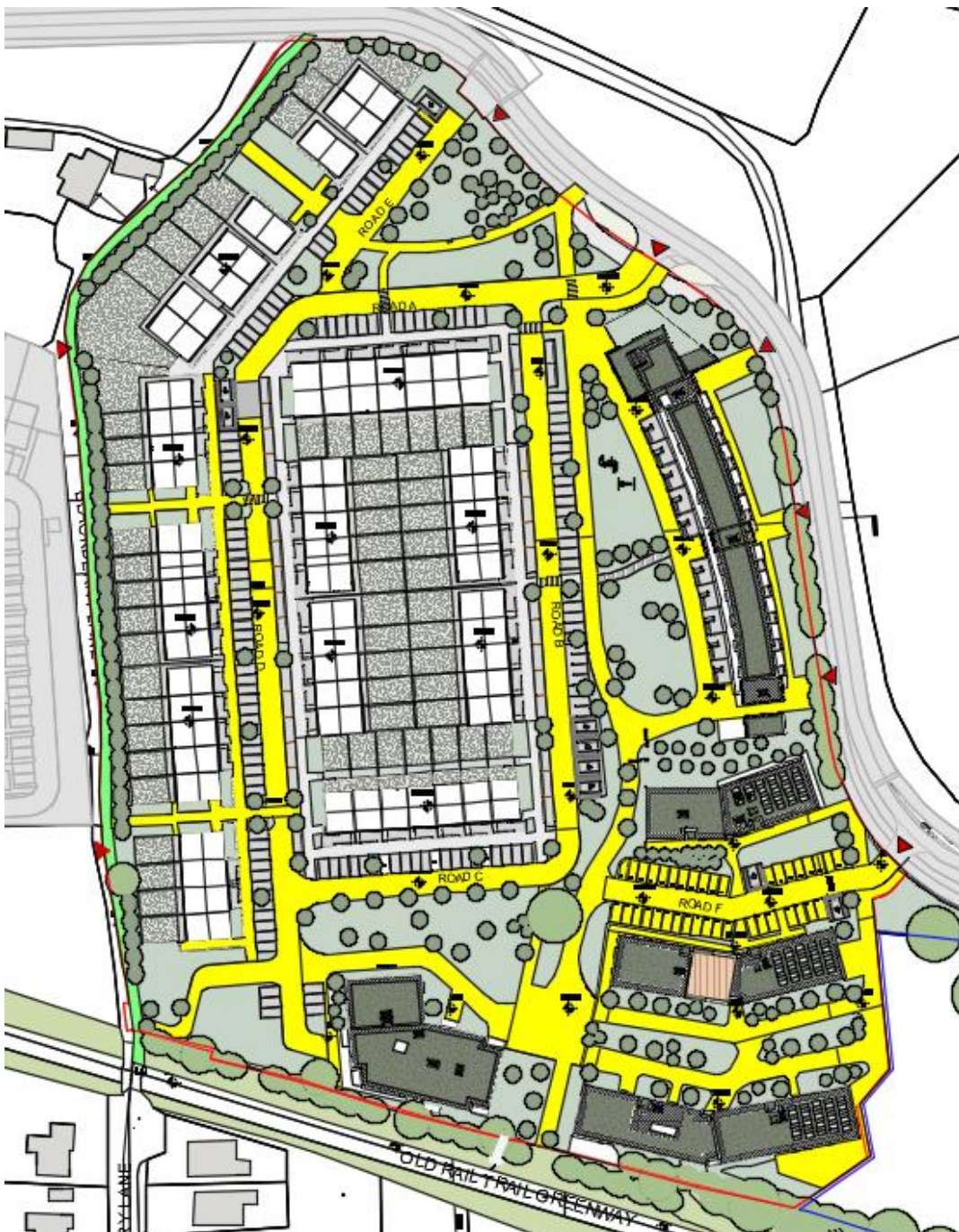
The external lighting design covers the proposed circulation roads, the adjacent public car parking, the access path ways from /to blackberry Lane and the access path way to/from Old railway Greenway but also details the proposed lighting on the existing Blackberry Lane to the West of the new proposed development which is outside the development red line boundary. Whereas the circulation roads, relevant car parking and access path ways from /to blackberry Lane and the Old railway Greenway will be designed using the P classes as defined under EN132201, the Blackberry Lane is approached differently as the lane has been identified of possibly having a Bat community foraging area within the vegetation or tree barriers immediately to the East of the lane.

4.2 The extend of the external lighting sections

The following area have been including in the external (public) lighting design in the image below ;

A = New proposed lighting covering the general cisrculation roads (yellow)

B = New proposed lighting on existing Blackberry Lane (green) + Foraging area



4.3 EN132201 external lighting data and targets

The design of the external public lighting for the proposed circulation roads, the adjacent public car parking, the access path ways from /to blackberry Lane and the access path way to/from Old railway Greenway has been based on the lighting standard EN132201 using the class P3. All illumination calculations are based on the same P3 class covering the circulation roads, adjacent public car parking and the access pathways to Blackberry lane and the Old Railway Line Greenway.

The table below indicates the P class minimum EN13201 illumination targets ;

| CLASS | E avg min (lx) | E min (lx) |
|-------|----------------|------------|
| P1 | 15.0 | 3.00 |
| P2 | 10.0 | 2.00 |
| P3 | 7.50 | 1.50 |
| P4 | 5.00 | 1.00 |
| P5 | 3.00 | 0.60 |

Table 4.1 Lighting standard EN132201 P class categories with P3 highlighted.

4.4 Bat foraging areas

The design of the external public lighting for the existing Blackberry Lane to the West of the new proposed development which is outside the development red line boundary will be targeted as a P3 class under EN132201 but adjusted to suit the following; The ecologists Ecology Ireland Ltd have stated there currently is no evidence of any bat roost areas on the site of the new proposed development however given the nature of the vegetation and tree line immediately to the East of the Blackberry Lane there always is the possibility of such area.

As there is no evidence of any bat roost areas at the moment no mitigation measures regarding these animals are needed during the proposed works. There is also no requirement for a National Parks and Wildlife Service derogation licence application to allow the planned works.

To be prudent the public lighting in BlackBerry Lane is designed to take in account the possible bat foraging area immediately East of the lane hence the light fitting type will be specified accordingly. Lighting types that emit a narrow spectrum with no UV attract relatively less insects than broad spectrum types with high UV ; see Bat Conservation Ireland 2010, Stone 2013). Therefore, the narrow spectrum types with no UV have a relatively lower impact on bats by not attracting their insect prey base away from the nearby habitats where bats will be searching for prey. The use of directional lighting and luminaire accessories (shield, louvre) are also very successful approaches to reducing light spillage nuisance into the surrounding environment in relation to bats. Where artificial lighting is managed and/or designed to avoid light spillage into the wider environment, potential effects on foraging/commuting bats would be considered neutral imperceptible. In this case, this would include avoiding light spillage onto the existing tree-dominated western and eastern boundaries and new woody planting areas proposed as part of landscaping such as open space tree planting.

Taking the above into account we applied asymmetric beam light fittings at the Blackberry Lane as opposed to standard symmetric ones, casting the light orientated so that the glass of the luminaries is positioned parallel to the ground as recommended. This will ensure that the light is cast in a downward direction and avoids horizontal spillage of the light. The use of LED lighting with no/low UV component due to the phosphors within an LED lamp converting UV to white light will also play a great part to keep disruption to foraging areas at a low level. If acceptable to the local authority the lights can be fitted with a dimming function reducing the illumination after a certain time. Height of the columns have been reduced from 6 to 4 metres to further reduce light spill or trespass.

5 Calculation data and conclusion

5.1 EN132201 External lighting calculation targets

The overall average, maximum and minimum external lighting illumination calculations for the proposed circulation roads, adjacent public carparking, access pathways to Blackberry lane and access pathway onto the Old Railway Greenway have been executed to achieve the P3 class as defined under EN 1332201 where as The overall average, maximum and minimum external lighting illumination calculations for the Blackberry Lane have been executed to achieve the P3 class as defined under EN 1332201 but have been tailored to take on board the recommendations as set out in the Bat Conservation Ireland 2010, Stone 2013 documents.

5.2 Calculation data results

From appendix A, B, C, D, E representing the illumination calculations and illustrations we note the average illuminance for the proposed circulation roads, adjacent public carparking, access pathways to Blackberry lane and access pathway onto the Old Railway Greenway and Blackberry Lane using the proposed fittings is 7.93 Lx and minimum illuminance is 1.68Lx both in excess of the minimum P3 targets. The illumination calculation results are based on using the following 3 types of light fittings ;

| | | | |
|--------|----------|----------|---|
| Type A | Phillips | Luma | 24W 3000K on a 4m pole |
| Type B | ThorLux | Starbeam | Narrow, asymmetric 31W 3000K on a 4m pole (3.5m in Blackberry Lane) |
| Type C | ThorLux | Starbeam | Wide, 48W 4000K on a 6m pole |

- Type A is mainly used around the site for road ways and parking,
- Type B is mainly used in the Blackberry Lane but has also been applied on the site near areas where tree rows and dense vegetation is proposed. Type B where applied in Blackberry Lane is fitted with asymmetric diffusers casting the light forward only with little or no spill going backwards into potential bat foraging areas. The pole height is also kept relatively low at 3.5m again to reduce light spill.
- Type C is used at the vehicular entrances to/from external main access roads.

Targets and achieved illuminance ;

| Element | E avg min (lx) | E min (lx) | E max (lx) | E min / E max | E min / E avg |
|------------------------|----------------|------------|------------|---------------|---------------|
| EN13201 standard P3 | 7.50 | 1.50 | Na | Na | Na |
| Achieved (site) grid 1 | 8.15 | 1.68 | 22.33 | 0.08 | 0.21 |
| Achieved (site) grid 2 | 7.76 | 1.70 | 23.41 | 0.07 | 0.22 |
| Achieved (site) grid 3 | 7.76 | 1.75 | 23.59 | 0.07 | 0.23 |
| Achieved (site) grid 4 | 7.67 | 1.61 | 23.24 | 0.07 | 0.21 |
| Achieved (site) grid 5 | 8.31 | 1.65 | 22.96 | 0.07 | 0.20 |
| Average (site) | 7.93 | 1.68 | 23.11 | 0.07 | 0.21 |

5.3 Overall site with light fitting type locations



NB : This map is only for illustration as the scale does allow for accurate reading. Refer to the full size PDF or cad/dwg drawings for details.

5.4 Light fittings applied for the purpose of illumination calculation

The details below represent a summary of the light fitting schedule applied for the illumination calculations.

Type A ; Luminaire A Phillips Luma (micro) 24W 3000K - 4.0m pole 35 no.



Type B ; Luminaire B Thorlux Starbeam NR 24W 3000K - 3.5 & 4.0m pole 60 no.

Type C ; Luminaire C Thorlux Starbeam WR 48W 4000K - 6.0m pole 14 no.



5.5 Conclusion

The external (public) lighting design covering the proposed circulation roads, adjacent public carparking, access pathways to Blackberry lane and access pathway onto the Old Railway Greenway and lighting design for the Blackberry Lane outside the proposed development as per illumination contour layouts and illuminance calculation data appendix A,B,C,D,E meets the criteria set out in EN13201 for lighting class P3 whilst in Blackberry Lane obtaining the recommendations for the possible bat foraging area immediately to the East of the lane as set out in the Bat Conservation Ireland 2010, (Stone 2013) documents by using light fittings with asymmetric light beam diffusers only casting the light forward with little of no backward light spill into the potential foraging areas. We, DKP, therefore deem the external lighting design to be in compliance with the applied standards and recommendations.

5.6 Mitigation measures / actions

No mitigation measures required for compliance to lighting standards.