



LIGHT LEVELS AT MAES Y GROES, BANGOR ON DEE

Enfys ecology were commissioned to advise on the lights that have been erected at Maes Y Groes, Bangor-On-Dee to discharge the planning condition in relation to lights surrounding the horse menage. The lights which have been erected are LED flood lights. The lights are wide angle floodlights with no hoods available to fit onto the lights.

A site visit was carried out and the lux readings were taken on 26th September 2016.

Figure 1 below illustrates the location of the horse menage, the location of the lights (yellow circles) and the hedges. Lux meter readings were taken from point A-G and recorded.

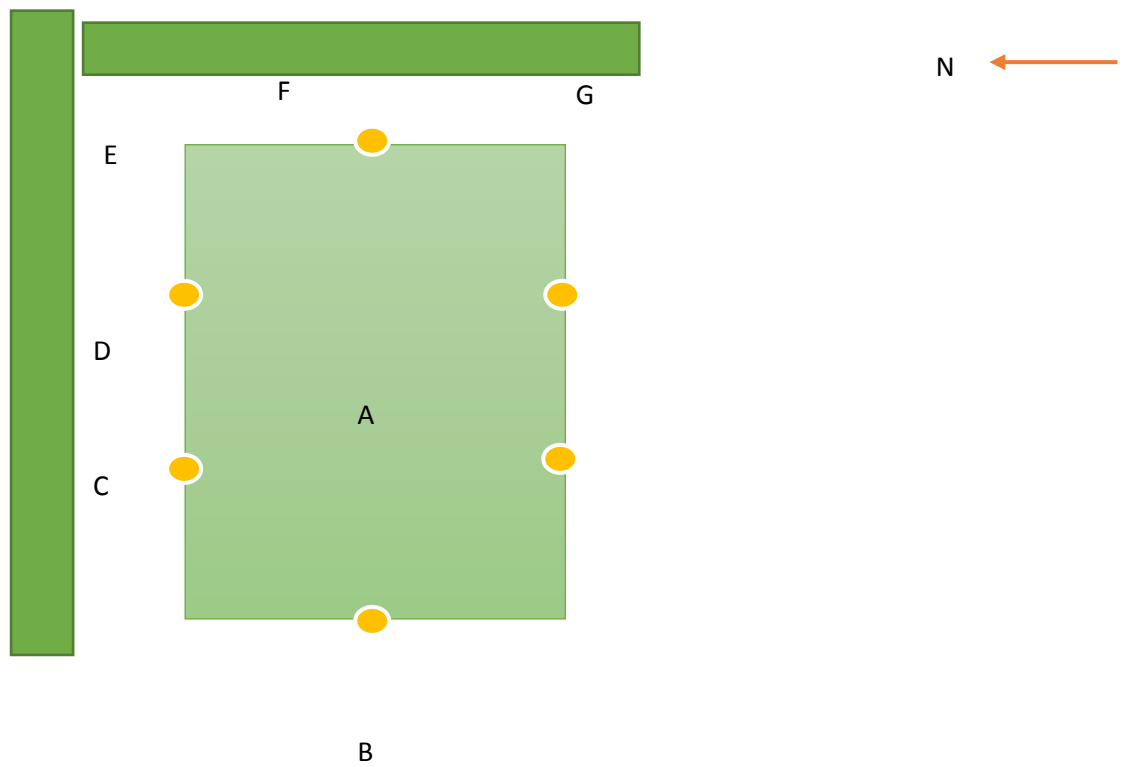


Figure 1 – locations of lights and lux monitoring

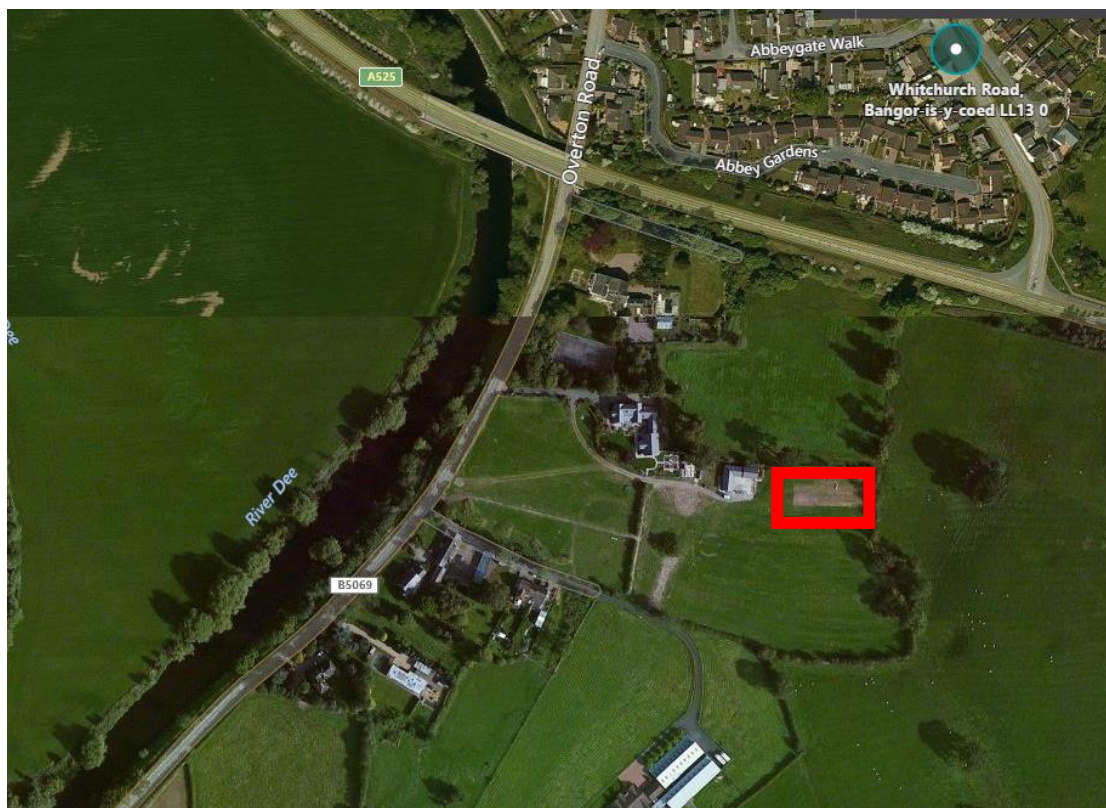


Figure 2 – location of the horse menage and surrounding habitat

Light levels were taken in the locations marked on figure 1, these light levels illuminated the hedgerows so the lights have now been adjusted to reduce the spill of light, however the reduction of light spill is at a low level. Table 1 illustrates the light levels at each location.

Location	Light level prior to adjustment	Light level after adjustment
A	062 266 – Highest	064 268 highest
B	040	038
C	033	030
D	029	027
E	015	012
F	008	007
G	011	009

Table 1 – Lux monitoring levels

After the alteration, the light levels on the hedge still remains relatively high, especially on the northern hedge (location C – E). The hedgerow to the east has much less light spill than the northern hedge. The northern hedge is a relatively new and was planted when the horse menage was built, so approx. 5/6 years ago, whereas the eastern hedgerow is an established hedgerow.

Pictures 1 – 3 illustrate the location of horse menage with regards to the hedges and illustrates the lights used.



Picture 1 – Hedgerow to the north of the horse menage, illustrating the closeness of the menage and lights to the hedge.



Picture 2 – The LED lights to the east of the menage



Picture 3 – The LED lights to the south of the menage

The erected lights are LED lights with no hoods, the main impact the lights will have are on the commuting routes for bats as the hedges are currently lit by the lights (north and east side of the menage). According to Stone, 2014, lights have a low impact on certain species for foraging and commuting, but a high impact on other species. According to BCT, 2009, the use of asymmetric beam floodlights oriented so that the glass is parallel to the ground will ensure that the light is cast

in a downward direction and avoids horizontal spill. As no UV is emitted insects will not be attracted to the lights, some bats use lights attracting insects to feed round.

As the light spill is quite high especially to the north and the north east corner, the lights may have an effect on other nocturnal species.

Impact Behaviour	High	Medium	Low
Maternity roost	All species	-	-
Night roost	<i>Rhinolophus hipposideros</i> <i>Rhinolophus ferrumequinum</i> <i>Myotis</i> spp. <i>Plecotus</i> spp.	<i>Pipistrellus</i> spp. <i>Nyctalus</i> spp. <i>Eptesicus serotinus</i> <i>Barbastella barbastellus</i>	-
Emergence	All species	-	-
Foraging	<i>Rhinolophus hipposideros</i> <i>Rhinolophus ferrumequinum</i> <i>Myotis</i> spp. <i>Plecotus</i> spp.	-	<i>Pipistrellus</i> spp. <i>Nyctalus</i> spp. <i>Eptesicus serotinus</i> <i>Barbastella barbastellus</i>
Commuting	<i>Rhinolophus hipposideros</i> <i>Rhinolophus ferrumequinum</i> <i>Myotis</i> spp. <i>Plecotus</i> spp.	-	<i>Pipistrellus</i> spp. <i>Nyctalus</i> spp. <i>Eptesicus serotinus</i> <i>Barbastella barbastellus</i>
Swarming	All species	-	-
Hibernation	All species	-	-

Figure 3 – Effects of lights on different species of bats

LEDs are narrow beamed light and are more directions so can have little spill. Due to their flexibility LEDs provide flexibility for mitigating ecological impacts of lighting as composite bundles of LED lights within a lamp can be switched off to direct light where it is needed (Stone, 2014), however after discussion with the manufacturer it does not appear that switching off part of the lamp is possible in this case.

The impacts caused by bats is likely to be on their foraging habitats and commuting routes. As the lights are only proposed to be used between 4-8 pm for evening riding, this will limit their use to over winter when bats will be in hibernation for a large period of the time, however it is still possible it will affect their behaviour in autumn and early spring. It is also possible that the lights may affect other nocturnal species such as barn owls and badgers.

Suggestions

As the light levels are relatively high on the east edge it is recommended to reduce these levels that cowls are retrospectively attached to the lights to reduce the light spill.

References

Stone, E.L, 2014 *Bats and Lighting Research Project, University of Bristol*

BCT, 2009 *Bats and lighting in the UK*