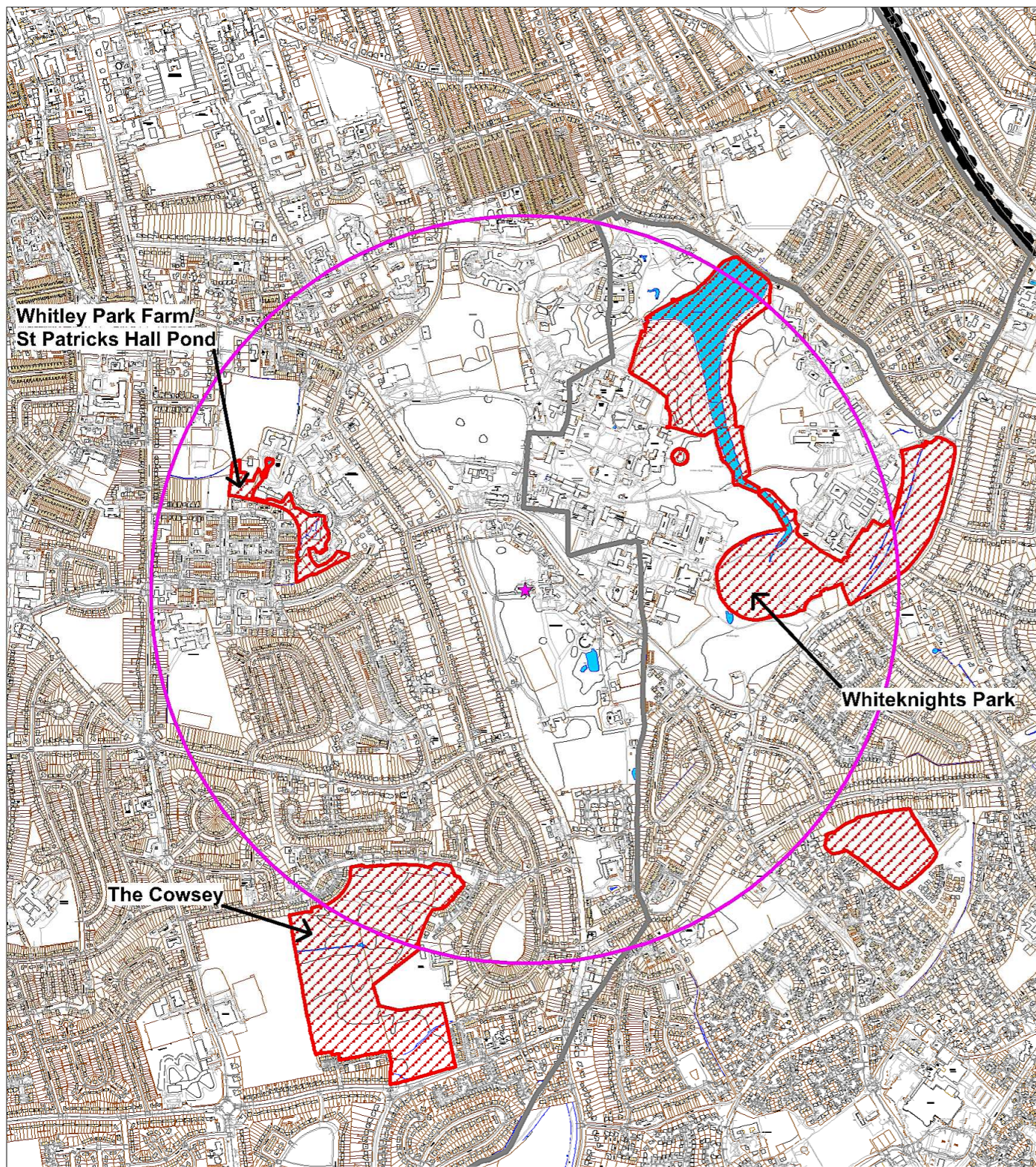


APPENDIX I DESK-STUDY INFORMATION RECEIVED FROM TVERC

Leighton Park School, Reading Designated Wildlife Sites Map



★ Site central grid reference

Scale: 1:15,000

 Search Area

 Local Wildlife Site

Map produced by Thames Valley Environmental Records Centre in 2015

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APPENDIX II TARGET NOTES TO ACCOMPANY PHASE 1 HABITAT SURVEY MAP

Target Note	Description/Comment
<i>Birds seen/ heard:</i> Blackbird, House Sparrow, Carrion Crow, Dunnock, Blue Tit, Wood Pigeon.	
1	Two storey building of brick construct with a flat roof. Small number of raised areas of roofing material noted along the roof line but these appeared to be sealed beneath and did not lead to gaps or cavities suitable for use by roosting bats. No other gaps or holes suitable for use by roosting bats noted. Roof space above building houses stage lighting associated with the school hall below. Lights left on throughout the day and roof space very light as a result. No gaps or holes noted which could allow bat access and no evidence of roosting bats found. Boiler room with louvre vent leading to outside was light internally with vents covered in cobwebs and no evidence of roosting bats noted. Building of negligible bat potential.
2	Small demountable building of plastic construction. No gaps or holes suitable for use by roosting bats and building is of negligible bat potential.
3	Group of semi-mature Oak trees with Norway Maple immediately outside site boundary to the south. No gaps or holes noted in any trees which would be suitable for use by roosting bats. All category 3 bat trees. Associated ornamental shrub planting includes species such as <i>Mahonia sp.</i> , Holly, <i>Photinia sp.</i> , Rose and Smoke Bush.
4	Regularly managed amenity grassland of limited species diversity. Species present include Perennial Rye-grass, Annual meadow Grass, Broadleaved Plantain, Daisy, White Clover and Yarrow.
5	Mature Oak tree. No obvious gaps or holes suitable for use by roosting bats. Category 2 bat tree.
6	Mature Oak tree. Evidence of past pruning works and limb removal. Numerous cracks, rot holes and woodpecker holes present. Category 1 bat tree.

APPENDIX III ADVICE SHEET ON THE USE OF STREET LIGHTING AND BATS

The following advice in relation to residential lighting where bats may be an on-site or influencing factor is based up on information contained within an article by Emery (2008) and available via Urbis lighting (<http://www.urbislighting.co.uk/>).

Firstly in terms of light source, the use of Low Pressure Sodium (SOX) is recommended, as these lamps emit light at a single wavelength with a very low amount of UV meaning that very few insects are attracted to this light source. This light also has a minimal effect on the bats. However, the use of these light sources is currently being phased out.

Next best would be High Pressure Sodium (SON) as these lamps emit light over a slightly broader wavelength spectrum attracting more insects but as these are a more intense light source they have a greater effect on bats. There are ranges of metal halide lamps available and they are classed as white light sources, these emit light at wavelengths across the colour spectrum but can also emit high levels of UV. These can attract large numbers of insects and are also a closer match daylight meaning these have an even greater impact on bats (avoid these types).

The lighting types recommended would be 8m Column heights (rather than 10m - however, see notes below) using (in order of preference) external rear louvres, or internal rear louvres, or 120mm rear shields. Either flat or curved glass protectors may be used with the former being preferred, as light spillage is marginally less than curved. However, there may be conflicts with using some louvres (plus, spacing will be reduced and so more lighting columns may be required, therefore increasing costs).

Units may be obtained from numerous suppliers, as the above-mentioned items are standard items. However, talking to Matt Emery from Urbis Lighting with regards to bats is recommended. He is a lighting engineer firstly with an interest in bats and how light influences their behaviour and this information is also recommended by the Institute of Lighting Engineers (ILE) <http://www.ile.org.uk/>.

FURTHER NOTES

Lower Mounting Height

This option is easily implemented and would generally result in a reduced column cost.

In comparison studies between 10m and 8m column heights, the overall spread of light has been reduced by lowering the column height, however due to the lower mounting height the intensity of the light on the road has been increased with the higher illuminance values spreading further. This option reduces the column spacing by 20% resulting in more columns being required thereby neutralising the benefit of the lower unit costs.

Louvres - External

External louvres are used with a flat protector so there is no spacing constraint from the optic. As with the shields mentioned below, these are externally mounted so there are increased stresses on the supporting columns and brackets from additional wind loading. As with the internal louvres (see below) an additional unit cost will incur.

In comparative studies, the external louvre almost completely blocks all the light emitted behind the units. However, this does have a greater effect on the column spacing achievable as large amounts of light are being blocked. Excellent for light sensitive species of bats (i.e. *Myotis sp.*). Urbis therefore recommends the use of its ZX2 and ZX3 product designs that have been proven to reduce light on a road scheme in the Sirhowey Valley, Caerphilly.

Louvres - Internal

Internal louvres are not available with a flat protector due to the limited space available inside the optic. Louvres are a specially designed accessory with each one requiring testing resulting in higher additional costs per unit than any of the other options described here.

In comparative studies, the internal rear louvre greatly reduces the spread of light behind the units. However it does reduce the column spacing achievable, this is because the louvre is blocking the light emitted from the optic making the luminaire less efficient.

Rear Shield

Shields are becoming more widely available on a range of luminaires but as they are an accessory they incur an extra cost per luminaire. The longer the length of the shield the more effective it is, however the increased surface area causes greater stresses on the supporting column and bracket due to wind loading.

In comparative studies, the shield has helped reduce the spread of light behind the lighting column by almost 40%. However, the column spacing is reduced by 20% resulting in the possibility of more columns being required and also there is an increased unit cost for the accessory.

Using Flat Glass Protectors

The majority of Traffic Route luminaires are available with a flat glass protector option, so this method of limiting light emitted at high angles is easily available at little or no extra cost on unit prices. However the range of protectors typically used on traffic route lighting include curved bowls due to their less restrictive light distribution.

In comparison studies results show that there is little effect on the spread of light when a flat protector is used to light roads. This is due to the decreased column spacing required to still achieve the required lighting specification on the road increasing the intensity of the light in the area. The decrease in column spacing will also mean that extra columns could be required on longer stretches of road increasing costs.

REFERENCES

Bat Conservation Trust. (2008). *Bats and Lighting in the UK; Version 2, January 2008*. <http://www.bats.org.uk/>

Emery, M. (2008). *Effect of Street Lighting on Bats*. Urbis Lighting Ltd., 2 January 2008. <http://www.urbislighting.com/>