Building with Nature: Devon Technical Guidance

Maintaining dark corridors through the landscape for bats

Beta format during 2022

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Image by John Walters

Acknowledgements

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Dartmoor National Park Authority, Devon County Council, Teignbridge District Council, Torbay Council, South Hams District Council and Natural England.

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Professor Fiona Mathews, Andrew McCarthy, DCC Lighting Engineers

The document will be updated in line with any new evidence and as we gain experience of creating and maintaining dark corridors. It is being published in a beta state for 2022 to ensure that it is fit for purpose. Please send comments and suggestions to Sarah Jennings, County Ecologist, DCC at: nature@devon.gov.uk.

1. Purpose

This Guidance has been written to assist developers, planning agents, project managers, planning officers and ecological consultants in maintaining dark corridors and foraging habitat for bats across Devon. It is applicable to all Devon planning applications, including outline, where there are potential impacts from artificial lighting on bat flight lines / foraging habitat.

This Guidance aims to summarise key requirements from national guidance as well as highlighting Devon specific requirements, particularly relating to the minimum width of dark corridors (see Section 4). The latest national guidance should always be followed – see the Bat Conservation Trust (BCT) website[1].

2. Context

All species of bat rely on a range of habitats for foraging (feeding), commuting and roosting.

Flight lines: Bats largely use linear features, such as hedgerows, woodland edges, and watercourses, to navigate between different roosts and between roosts and foraging areas. These features provide dark, sheltered, safe corridors and sources of insects for foraging.

Foraging: Bats use a variety of habitats for foraging including grasslands, woodlands, hedgerows, stream corridors and waterbodies. Different species will use different habitats, and individual species will use different habitats at different times of year.

Roosts: A range of structures are used for roosting e.g. buildings, caves, bridges, and trees. Different species will use different structures and move between them throughout the year as needed for hibernating, raising young, mating, feeding etc.

Impacts of lighting:
The latest information on the impacts of artificial lighting on bats can be found on the BCT website. Key issues include:

- Different species of bat respond differently to lighting. Insects such as moths are attracted to the UV wavelengths in lighting and fast-flying bats, such as pipistrelles, noctules and serotines, can be attracted to lights to feed on the insects. In contrast, slower flying, broad winged bats (horseshoes, barbastelles long-eared bats and myotis bats) are often light averse and avoid lit areas. However, research shows that even bat species that will forage under lights have been recorded avoiding well-lit areas (Hale et al., 2015).
- As insects are attracted to lit locations, any nearby dark areas can become depleted in insects, so reducing the food available for light sensitive bats.
- Recent research (Boyes et al., 2021) has shown that streetlights have detrimental effects on local caterpillar assemblages and that artificial lighting is likely to be contributing to overall declines in the moth population, reducing prey availability for all bat species.
- LEDs can offer greater control over the type, intensity and spread of light. However, recent studies have shown that light sensitive bats avoid LED lights even when dimmed (Rowes et al., 2016), and that continuous lighting along roads introduces barriers that some bat species cannot cross (Fure, 2012).
- In addition to impacts on movement and feeding, light falling on a bat roost access point can delay bats from emerging. This then reduces the time available for foraging. Lighting may also cause bats to abandon a roost.
- At a landscape scale, artificial lighting can disrupt navigation along linear features (as much as the physical removal of such features). Light spill onto commuting routes can force bats to use alternative

[1] At the time of writing this includes: *Guidance Note 08/18, Bats and artificial lighting in the UK,* Bat Conservation Trust (BCT) and Institution of Lighting Professionals (ILP), 2018.

routes (if available) and this can, in turn, result in an additional energetic burden on individual bats. If no alternative routes are available, roosts and foraging habitats may be abandoned. Lighting can, therefore, lead to bat populations becoming fragmented into smaller units which in turn become more vulnerable to local extinction.

- **In summary, lighting impacts are likely to have significant impacts for all bat species, potentially affecting reproductive, foraging, and roosting opportunities. At population and ecosystem levels, impacts may affect the overall genetic pool of bat species and their prey species** (BCT and ILP, 2018).

We need to:
• **Maintain a network of dark corridors and bat foraging habitats (at a maximum of 0.5 lux) through our landscapes, avoiding impacts such as direct loss, fragmentation, disturbance and lighting.** • **Avoid the use of artificial lighting as much as possible, including lighting only where it is absolutely essential for health and safety reasons. Warm amber lighting should be used to reduce impacts on wildlife.** • **Where lighting cannot be avoided altogether then it must be designed to avoid light spill onto roosts, foraging habitat and commuting routes.**

3. Headline essential requirements at each stage of the planning process

a. Feasibility and scoping

- Industry guidance (BCT and ILP, 2018; and Eurobats, 2018) stresses the importance of considering bats and lighting at the earliest stage of the project design process. This will require integrated professional lighting and specialist ecological input from the outset. Attempts to retrofit mitigation measures can lead to delays and uncertainty.

- A list of ecological consultants working in the Devon area can be found at Finding a Consultant | CIEEM or https://www.devon.gov.uk/environment/wildlife/wildlife-and-geology-planning-guidance.

b. Project design – identify impacts and mitigation requirements

- **Assessment:** Impact assessment must be carried out by a suitably qualified/experienced bat consultant and follow national guidance. If bat activity survey is needed it must be tailored to the site and potential impacts.

- **Early communication:** The ecological consultant must provide all relevant professionals (lighting engineers – including DCC Street Lighting Engineers – urban designers, landscape architects, etc) with lighting and dark corridor/foraging habitat requirements as soon as possible so that these can be built into the site layout and relevant strategies, such as Lighting Strategies, Master Plan, Green Infrastructure etc.

- **Avoid impacts:** In keeping with the Mitigation Hierarchy (National Planning Policy Framework, 2021), development must initially seek to protect and enhance existing bat flight lines and foraging habitat and to manage these appropriately for the lifetime of the development. In some situations (especially relating to rare bats or impacts on SAC bat populations) an application may be refused where impacts cannot be avoided. In other situations, new habitats should be created and managed to maintain connectivity and to ensure no overall loss of foraging habitat.

- **Avoid the use of lighting:** All lighting has an impact on bats and other wildlife. Lighting should be avoided as far as possible and only used when essential for health and safety. Where lighting cannot

be avoided altogether, it must be designed to avoid light spill onto roosts, foraging habitat and commuting routes (see Section 5).

- **Warm lighting:** Where lighting cannot be avoided, it should be warm coloured LEDs (maximum 3000 kelvin) to reduce insects being attracted away from the dark corridor.

- **All current national guidance** (e.g. Bats and Artificial Lighting in the UK, BCT & ILT (2018)) must be followed and any deviations justified.

- **Dark corridors and buffers should:**
    - Be built into the design from the outset and be incorporated into any dark public open space (e.g. allotments) to ensure effective long-term management.
    - Meet the requirements set out in Section 5.
    - Be established / protected before any impacts on existing flight lines occur.
    - Be in place for the lifetime of the development.
    - Be designed to avoid impacts from potential future lighting e.g. garden / security lighting / cycle path lighting

c. Submitting the planning application

All relevant information must be provided to the LPA in the Ecological Impact Assessment (EcIA) report in order for the LPA to be able to determine the application. Whilst some details can be conditioned (and provided in a detailed Landscape and Ecological Mitigation Plan - LEMP), the developer needs to provide a clear commitment to meet the requirements set out in this guidance note and sufficient information for the LPA to know that the dark corridors / foraging areas required are achievable (e.g. where applicable written confirmation from DCC Lighting Engineers is needed to confirm that the dark corridor parameters are achievable).

The EcIA should include:

- A clear, annotated map, showing habitats currently used by bats, including details of use by light sensitive and rare species and how the habitats link to the surrounding landscape / any nearby bat roosts, where known.
- A clear, annotated map showing the protected and proposed flight lines and foraging habitats on site and how these link to the surrounding landscape / any nearby bat roosts. The plan should clearly show:
    - Minimum widths / area of bat corridors
    - Habitats (type of grassland / scrub / hedge etc)
    - Headline management requirements
    - Lux levels required
    - Road crossings for bats and habitat linking to these crossings

d. Determination

If planning permission is granted, any bat mitigation requirements will be secured through conditions/Reserve Matter conditions or a legal agreement. For larger schemes conditions are likely to require the submission of a Construction and Environmental Management Plan (CEMP) and a Landscape and Ecological Mitigation Plan (LEMP). These will need to include all details relating to habitat protection, creation, management, and monitoring.

e. Implementation and monitoring

Post construction compliance monitoring to be undertaken by the developer and provided to the LPA to evidence that the dark corridors are in place as per requirements set out in the conditions / legal agreement.

4. Dark corridor and buffer requirements

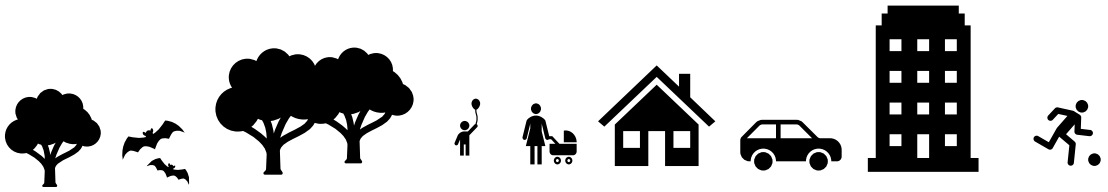

Fig 1. Dark corridor and buffer on the edge of the development site

AREA A (DARK CORRIDOR) REQUIREMENTS

i. In all cases every effort should be made to make Area A as wide as possible. The minimum widths specified below are for flight lines. If dark foraging habitat is required, Area A may need to be far wider and width, habitat and management requirements will be species and impact dependent. The ecological consultant will advise.

ii. For major developments[2] (which will generally have greater impacts on bat flight lines) there should be a minimum width of 10m of open grassy corridor maintained next to a natural linear feature such as a hedge, woodland edge, or vegetated watercourse. This distance must be clearly shown on an annotated map and scales cross section / profile drawings.

iii. For minor developments, or where a narrower dark corridor can be justified ecologically, Area A should be as above but a minimum of 5m wide.

iv. Wherever possible the dark corridor should be incorporated into the public realm rather than being a separate, isolated, corridor.

v. The dark corridor should be in a location already used as a bat flight line and ensure that connectivity both through the site and into the wider countryside is maintained. Any deviations to this must be justified. This connectivity should be shown on a plan.

vi. This corridor must be designed to allow a flail mower/collector access to cut the grass/scrub growth and trim the adjacent hedge/woodland edge to ensure that the flight line is kept unobstructed.

vii. The corridor must be as dark as possible but a maximum of 0.5 lux (Stone, 2009/2012) as shown on a horizontal illuminance contour plan, measured at 1.5m and at the height typically flown by any other relevant light sensitive species. The contour plan must show the dark corridors, be easy to read and produced by a suitably qualified lighting consultant (as per BCT/ILT, 2018). Impacts of lighting from outside the development site must obviously be considered.

viii. Lighting plans must consider both internal (e.g. dwellings) and external (e.g. street lighting) sources. Consideration should also be given to illuminance from sources which can't be modelled such as glare, reflections, car headlights.

ix. The dark corridor must be maintained for the lifetime of the development and be protected from the start of construction.

x. The grassland should be created and managed to maximise insect prey. To benefit moths, any grassland mix should be as species rich as possible (suitable to the soil type) and ideally include dandelion, dock, hawkweeds, plantains, chickweed, fat hen, mouse-ear, and other herbaceous plants (Littlewood, 2008).

[2] Statutory definition Town and Country Planning (Development Management Procedure) Order 2015

xi. The adjacent hedge or linear feature which forms the flight line should be in the control of the applicant (within the red or blue line) and should be managed following best practice for bats and other wildlife and to maximise insect prey e.g. bushy dense hedge at a minimum height of 3 metres with frequent standard trees (as GHB feeding perches)/ trim hedges between 31 December and 28 February and no more than one year in three. See the Devon Hedge Group website. If the critical linear feature is not in the control of the applicant, then a new hedge / linear feature should be planted.

xii. Dark corridors must be continuous. Where lit roads or cycleways become a barrier then an alternative dark corridor must be created to maintain connectivity.

AREA B (BUFFER) REQUIREMENTS

This is a buffer designed to ensure that the lighting requirements of the dark corridor (Area A) are met in perpetuity. Depending on risk this buffer could include shrubs, a bund/Devon hedge (with bank), fencing or wall.

When managing and creating Devon hedges please follow guidance on the Devon Hedge Group website.

The width and design of Area B (the buffer) will depend on the design of the adjacent development and risk e.g. if no lighting is proposed and there is no risk from future lighting then the buffer can be narrower than if adjacent to a housing scheme with street lighting, security lighting, cars etc. The buffer must future proof the dark corridor e.g. through ensuring no risk from future security lighting in gardens. The buffer must be achievable in the long term e.g. not be composed of private gardens over which there is no future control. See Step 4 in BCT/ILT, 2018.

Outline permissions: Where detailed final design will take place at Reserved Matters stage and there is uncertainty surrounding lighting impacts, the indicative layout and information submitted in the EcIA **should provide sufficient certainty that Area A is achievable.** Failure to do this is likely to lead to the application being refused.

Note that if a dark corridor is required in the middle of a development site (with a risk of lighting from both sides), or there is a risk of lighting from outside the development site, a sufficient buffer may be required on each side of the dark corridor to ensure functionality of Area A.

AREA C (DEVELOPMENT AREA) REQUIREMENTS

The development must be designed to ensure that the dark corridor requirements can be met, including through future proofing. Considerations include (also see Step 4 in BCT/ILT, 2018):

- The need for lighting. Lighting should be avoided wherever possible.
- Location of streets and street lighting / impacts from car headlights. Design roads and turning points to be as far from the dark corridor as possible.
- Lighting along access routes (cycle tracks / pedestrian routes etc). Consider motion sensor lighting.
- Building orientation and light spill from buildings, including light from windows (especially higher windows) and from potential future loft conversions.
- Any potential light spill from future security lighting in gardens and doors. Appropriate security lighting should be included as part of housing developments to help avoid future problems.
- Location of sports pitches and impacts from floodlights now and in the future.
- Design of lighting (location of columns, height of columns, use of baffles / directional luminaires to direct light spill, turning on and off times etc).
- Use warm colour LEDs – maximum 3000K.
- Light dimming and part-night lighting.
- Directed and motion triggered lighting.

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