



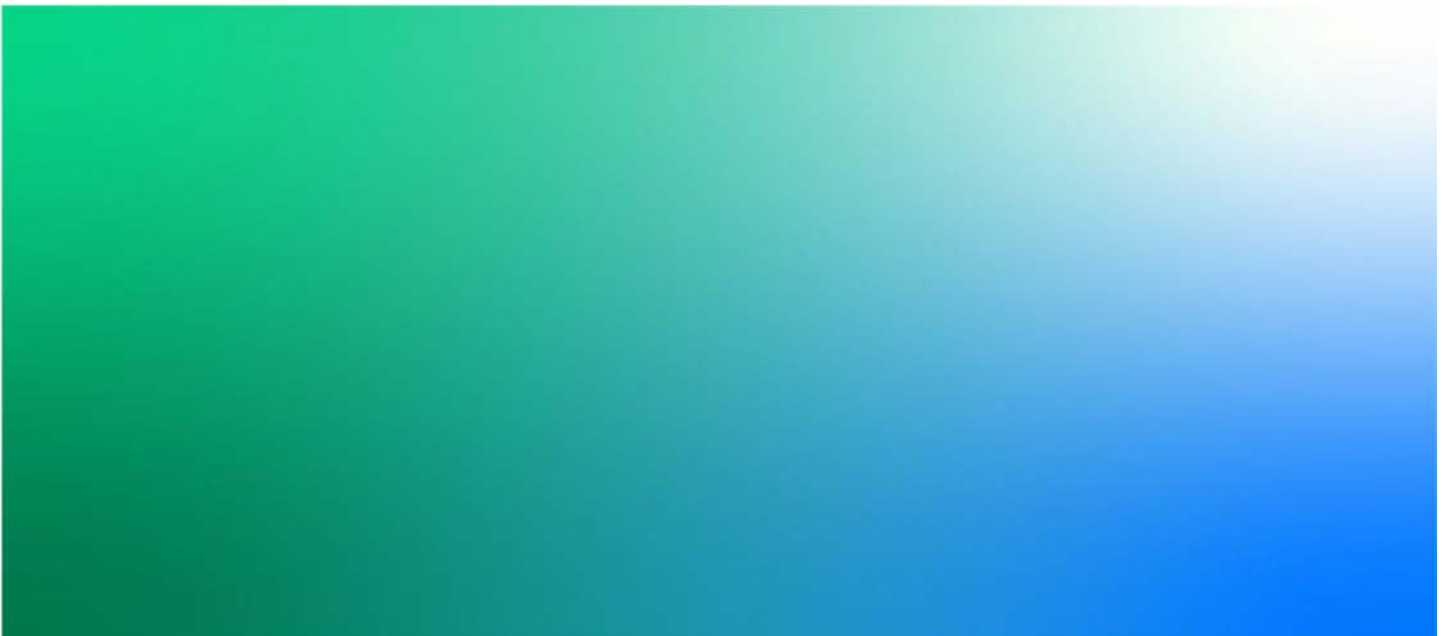
## Upton A38 Roundabout

Lighting Design Strategy for Biodiversity

B2367219-02-JAC-EGN-00-RP-LE-0003 | 1

September 2021

Worcestershire County Council



## Upton A38 Roundabout

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### Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
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# 1. Introduction

## 1.1 Background

Jacobs have been commissioned by Worcestershire County Council (WCC) to produce a Lighting Design Strategy for Biodiversity (LDSB) for the proposed construction of a new roundabout to replace the existing staggered A38 and A4104 Junction, located to the north-east of Upton-upon-Severn, Worcestershire (hereafter referred to as the 'scheme'), centred at National Grid Reference SO 8642541443 (hereafter referred to as the 'site'). The site boundary and location is shown on the Bat Survey Plan included as Appendix A to this LDSB.

## 1.2 Proposed Works

The scheme is located approximately 1.5 km east of Upton-upon-Severn town centre, approximately 300 m east of the residential area of Holly Green and 1.5 km west of the village of Baughton; within the administrative area of Malvern Hills District Council.

The scheme provides a new 4-arm roundabout, to replace the existing staggered junction arrangement which generates extensive queueing on both the A38 and A4104, particularly in peak time traffic.

In addition to the 4-arm roundabout, there is a need to realign the southern A4104 approach to tie in with the new roundabout arrangement. To ensure compliance with current standards, within the Design Manual for Roads and Bridges (DMRB), the new approach requires a length of 320 m (approximately) of new single lane carriageway to the north of the existing A4104.

In order to tie the northern A38 approach into the proposed roundabout, the carriageway here has been moved to the west by 30 m over a short length which will require the construction of a small section of additional carriageway.

Existing footway links which run along the existing A38 and along the existing A4104, are to be replaced through the provision of a 3 m wide shared footway / cycleway covering the extent of the junction. Uncontrolled pedestrian crossings shall be provided to allow pedestrian movements through the new junction arrangement.

The scheme will largely be located within arable land located directly to the west of the A38, due to limited existing highway boundary. Locating the new junction to the west of the existing also seeks to limit the potential for impacts upon existing residential properties located immediately to the east of the A38 at this location.

In addition to the construction of the roundabout, new section of highway and alterations to the existing highway, there will be changes to the current drainage arrangement, lighting, signage, bus stop arrangements and landscaping. It is anticipated that the existing A4104 (approximately 350 m from the settlement of Holly Green in Ryall to the existing A38/A4104 junction) south of the proposed new western arm of roundabout shall be stopped up and landscaped.

## 1.3 Planning Requirements

The scheme received planning permission on 5<sup>th</sup> February 2021 subject to conditions (reference 20/000032/REG3). Condition 8 relates to the production and submission for approval of an LDSB:

*"Prior to the development being brought into use, a lighting design strategy for biodiversity for areas to be lit shall be submitted to and approved in writing by the County Planning Authority. The strategy shall:*

*i. identify those areas/features on site that are particularly sensitive for bats and that are likely to cause disturbance in or around their breeding sites and resting places or along important routes used to access key areas of their territory, for example, for foraging; and*

*ii. show how and where external lighting would be installed (through the provision of appropriate lighting contour plans and technical specifications) so that it can be clearly demonstrated that areas to be lit would not disturb or prevent the above species using their territory or having access to their breeding sites and resting places.*

*Thereafter the scheme shall be implemented and maintained in accordance with the approved details."*

#### 1.4 Purpose and Scope of the Document

This LDSB has been prepared to discharge planning Condition 8, as described above and sets out the proposed lighting design strategy to be adopted for bats in relation to the scheme to minimise and where possible avoid impacts on bats from the scheme's operational lighting.

## 2. Legislation

All bat species and their roosts are protected in the UK under the Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife and Countryside Act 1981 (as amended). Taken together, these make it an offence to:

- Intentionally or deliberately kill, injure or capture bats;
- Deliberately or recklessly disturb bats;
- Damage, destroy or obstruct access to bat roosts; possess or transport a bat or any part of a bat, unless acquired legally; and
- Sell, barter or exchange bats, or parts of bats.

Seven bat species (barbastelle *Barbastella barbastellus*, Bechstein's bat *Myotis bechsteinii*, noctule *Nyctalus noctula*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus*, greater horseshoe *Rhinolophus ferrumequinum* and lesser horseshoe *Rhinolophus hipposideros*) are listed as Species of Principal Importance for the purposes of conserving biodiversity in England under S41 of the NERC Act 2006.

Where relevant, this EDSB takes account of the legislative protection afforded to bats.

## 3. Current Baseline

### 3.1 Current Lighting

The existing A38/A4104 junction is currently lit. Current light spill extents are displayed on the Proposed Lighting Extents and Existing Light Spill Plan in Appendix B.

Lighting provision is focused around the existing staggered crossroad junction. There is no lighting provision on either the A4104 Upton approach or A4104 adjacent to Blue Bell Farm.

Existing lighting comprises of TRT Aspect 48 Neutral White LED luminaires, 12.97 klm output mounted on 10 m lighting columns. Existing lighting has high level of blue light output.

Existing levels are estimated to be 13.77 lux Av for 33% uniformity.

### 3.2 Bat Activity

Habitats within the vicinity of the site are predominantly of low suitability for commuting and foraging bats, mostly comprising arable farmland and intensively managed hedgerows. However, an area of mature broadleaved woodland approximately 70 m north west of the site has high suitability for commuting and foraging bats, and garden hedgerows and mature trees adjacent to the A4104 east of the existing junction have moderate suitability.

Surveys undertaken in 2020 (Bat Survey Report, Jacobs, 2020) recorded seven species/groups of bat (common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, Nathusius' pipistrelle *Pipistrellus nathusii*, *Eptesicus-Nyctalus* sp., brown long-eared bat *Plecotus auratus*, barbastelle *Barbastella barbastellus* and *Myotis* sp.) commuting and/or foraging within vicinity of the site.

Some of the above bat species (bats from the *Myotis* species group, brown long-eared bat and barbastelle) are highly light sensitive.

Low to moderate levels of bat activity were recorded within the vicinity of the site during the transect surveys. The highest levels of activity were recorded along the southern boundary of the area of woodland to the north west of the junction, where common and soprano pipistrelles were foraging along the woodland edge, and over the fields to the east of the A38, where bats in the *Eptesicus-Nyctalus* species group were foraging. Almost no bat activity was recorded around the existing junction where it is currently lit.

Locations of all bat activity recorded during the surveys are displayed on the Bat Survey Plan in Appendix A.

### 3.3 Potential Bat Roost Features

Locations of all features with bat roost potential identified within the vicinity of the site (Bat Survey Report, Jacobs, 2020) are displayed on the Bat Survey Plan in Appendix A. No potential bat roost features are present within the site boundary.

#### 3.3.1 Trees

Thirteen trees with bat roost potential have been identified along the southern boundary of the area of woodland to the north west of the site (Trees 1-13), of which:

- Six of the trees have high bat roost potential (Trees 4, 5, 6, 8, 10 and 13);
- Three of the trees have moderate to high bat roost potential (Trees 2, 3 and 7); and
- Four of the trees have moderate bat roost potential (Trees 1, 9, 11 and 12).

Other trees present within the woodland could potentially have suitable bat roost features not visible from ground level.

The woodland is located approximately 80 m from the existing 0.5 lux contour extents associated with the lighting at the A38/A4104 junction at the nearest point.

Two mature oak *Quercus robur* trees (Trees 14 and 15) are present to the north of the A4104 east of the site. No evidence of roosting bats was identified within Trees 14 and 15 during the tree climbing inspections undertaken in 2020 (Jacobs, 2020). Tree 14 had low potential to support roosting bats, but Tree 15 had high bat roost potential, with numerous suitable roost features present.

Tree 14 is located approximately 60 m from the existing 0.5 lux contour extents associated with the lighting at the A38/A4104 junction at the nearest point (Tree 15 is located on the far side of Tree 14 from the site and so is further from any light spill).

### 3.3.2 Buildings

No evidence of roosting bats was found within the stables at Bluebell Farm during roost assessments undertaken in 2020 (Jacobs, 2020). However, the following features with potential to support roosting bats were identified:

- Numerous gaps between the roof tiles; and
- Gaps between the roof tiles and roof lining.

The stables are within the existing 3.0 lux contour extents associated with the lighting at the A38/A4104 junction and as such, they are considered to have low potential to support roosting bats due to high levels of disturbance from artificial lighting.



## 4. Lighting Design Strategy

### 4.1 Lighting Design Requirements

The proposed lighting design is displayed on the Proposed Lighting Layout and Proposed Light Spill Plan in Appendix C. Drawing: B2367219-02-JAC-HLG-00-DR-EO-1301.

#### 4.1.1 Lighting Extents - A4104 Pershore

A roundabout is a significant safety hazard, it is classed as a conflict area and requires lighting.

The A4104 Pershore arm of the junction is currently unlit. However, for visibility and safety purposes it is proposed it is illuminated to support Highways departures in the area.

To reduce impact, the 85<sup>th</sup> percentile speed has been used (37 mph) as opposed to speed limit (60 mph) in order to determine the lighting extents. Table 4.1 below is an extract from PLG02 (Refer to Table 4.1.) which highlights the reduction in lighting extents (5 seconds of driving at 60 mph (133 m) reduced to 40 mph (89 m), giving a total reduction of lighting extents of 44 m).

This will result in significantly less light spill reaching Tree 15 (high bat roost potential) relative to lighting extents based on 5 seconds of driving at 60 mph (<0.2 lux compared to >1.0 lux).

Table 4.1. PLG02 5 seconds of driving table

Speed Limit (MPH)	Speed Limit (KPH)	5 second at speed limit (m)
30	48	67
40	64	89
50	80	111
60	96	133
70	112	156

#### 4.1.2 Lighting Extents - A4104 Upton

To the west of proposed roundabout, running north to south and passing beneath the A4104 is an oil pipeline. To protect the pipeline from the road and associated civils activities a concrete slab is proposed to sit over the pipeline, for details of the slab refer to B2367219-02-JAC-HGN-00-DR-C-0120.

The pipeline owner will not permit buried services to be installed above the slab or pipeline and so to not impede their access insist all services are routed below the pipeline. This creates several risks and due to the costs/difficulties associated with installing/maintaining services below the pipeline, no lighting columns are currently proposed to the west of the oil pipeline on the A4104 Upton arm as power supply cannot be ascertained.

This reduces the proposed lighting extents relative to those recommended in guidance document PLG02 (5 seconds of driving shown in Table 4.1 above).

#### 4.1.3 Lighting Dimming

All columns are to have 5 core cable to allow for reprogramming of the ballasts and are to be dimmed, this value is specified on the drawing and timing will be determined by WCC on site. This will also help to reduce the

negative impact of the lighting beyond the peak hours of traffic flow. The variable lighting levels have been chosen in accordance with PLG08 *Guidance on the application of adaptive lighting within the public realm*.

#### 4.1.4 Lighting Specification

There is evidence to suggest that the use of long-wavelength lighting can have a lower impact on bats (Voigt et al, 2018). Lighting design and specification has been undertaken using red LED's to reduce impact on bats.

## 4.2 Recommended Lighting Levels

These recommendations are based on the guidelines provided in BS5489-1:2013 Table A.2 Lighting classes for traffic routes (speed limits above 40 mph).

### 4.2.1 A4104 Upton, M4 / C4

This recommendation is based upon the following factors:

- Single carriageway;
- Traffic Flow – Low to moderate is assumed (7,000 to 40,000 24 hr ADT);
- Very low ambient luminance; and
- Good visual guidance.

The above parameters suggest a lighting class of M3 / C3. However, given the schemes rural location, potential for sensitive ecology and existing light level baseline it is recommended these levels are relaxed to M4 / C4.

### 4.2.2 A4104 Pershore, M5 / C5

This recommendation is based upon the following factors:

- Single carriageway;
- Traffic Flow – Very low is assumed (<7,000 ADT);
- Very low ambient luminance; and
- Good visual guidance.

The above parameters suggest a lighting class of M4 / C4. However, given the schemes rural location, potential for sensitive ecology and existing light level baseline it is recommended these levels are relaxed to M5 / C5.

### 4.2.3 A38 North, M4 / C4

This recommendation is based upon the following factors:

- Single carriageway;
- Traffic Flow – Very low is assumed (<7,000 ADT);
- Very low ambient luminance; and
- Good visual guidance.

The above parameters suggest a lighting class of M4 / C4.

### 4.2.4 A38 (M50), M4 / C4

This recommendation is based upon the following factors:

- Single carriageway;

- Traffic Flow – Low to moderate is assumed (7,000 to 40,000 24 hr ADT);
- Very low ambient luminance; and
- Good visual guidance.

The above parameters suggest a lighting class of M3 / C3. However, given the schemes rural location, potential for sensitive ecology and existing light level baseline it is recommended these levels are relaxed to M4 / C4.

### 4.2.5 Roundabout, M4 / C3

Lighting levels for roundabouts are based on the most strenuous requirements of the approaching arm and the parameters suggest a lighting class of M4 and therefore is C3.

## 4.3 Landscape Measures

The habitats to be created as part of the scheme are displayed on the Final Development Layout Map in Appendix D, Drawing: B2367219-02-JAC-EGN-00-DR-C-008.

A woodland/tree belt is to be planted to the north west of the new roundabout. Once established, this new area of woodland will reduce light spill onto the existing woodland (including the trees with bat roost potential within the woodland) to the north west.

Hedgerows are to be planted along the new highway boundary and will connect with existing retained hedgerows to provide habitat connectivity for commuting/foraging bats.

## 4.4 Light Spill Extents

The predicted light spill extents during the operational phase of the scheme are displayed on the Proposed Lighting Layout and Proposed Light Spill Plan in Appendix C.

During the operational phase of the scheme, the 0.5 lux contour extents are predicted to be located approximately 60 m from the existing woodland (including the trees with bat roost potential within the woodland) to the north west at the nearest point, approximately 13 m from Tree 14 and approximately 28 m from Tree 15. These distances are less than the current baseline.

However, the scheme lighting has been designed so that none of the trees with bat roost potential are exposed to artificial light levels of more than 0.2 lux as a result of the scheme lighting. In most cases, the light spill onto trees with bat roost potential from the scheme lighting is predicted to be close to zero. The same is also the case for features likely to be of importance for commuting/foraging bats.

There will be a reduction in the light spill reaching the stables at Bluebell Farm relative to the current baseline (up to approximately 0.5 lux during the operational phase of the scheme compared to the current baseline of more than 3.0 lux).

## 5. References

BSI (2013) *BS 42020:2013 Biodiversity: Code of Practice for Planning and Development*. BSI Standards Publication.

BSI (2013) *BS5489-1:2013 Design of road lighting. Part 1: Lighting of roads and public amenity areas*. BSI Standards Publication.

Conservation of Habitats and Species Regulations 2017 (as amended). Her Majesty's Stationary Office.

Geckoella Ltd. (2020) *Preliminary Ecological Appraisal for the A38 Upton Junction (Holly Green Cross Roads)*. Report for Worcestershire County Council.

Institute of Lighting Professionals, Bat Conservation Trust (2018) *Bats and artificial lighting in the UK*. Guidance Note 08/18.

Jacobs (2020) *Upton A38 Junction: Bat Survey Report*. Report for Worcestershire County Council.

Natural Environment and Rural Communities Act 2006. Her Majesty's Stationary Office.

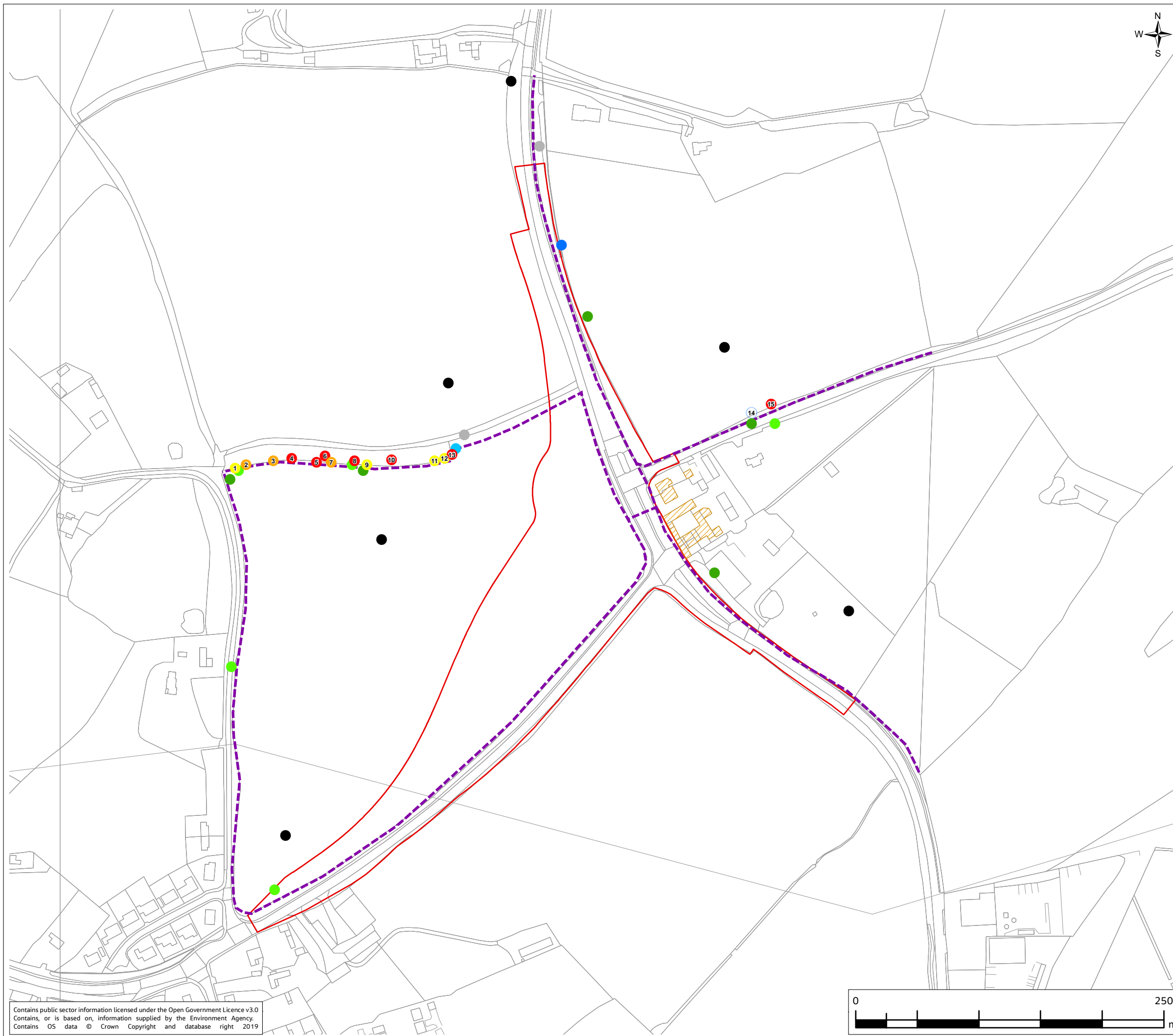
PLG02 The application of conflict areas on the highway

PLG08 Guidance on the application of adaptive lighting within the public realm

Voigt CC, Azam C, Dekker J, Ferguson J, Fritze M, Gazaryan S, Hölker F, Jones G, Leader N, Lewanzik D, Limpens HJGA, Mathews F, Rydell J, Schofield H, Spoelstra K, Zagamajster M (2018) *Guidelines for consideration of bats in lighting projects*. EUROBATS Publication Series No. 8. UNEP/EUROBATS Secretariat, Bonn, Germany, 62 pp.

Wildlife and Countryside Act 1981 (as amended). Her Majesty's Stationary Office.

## Appendix A. Bat Survey Plan



**Legend**

- Red Line Boundary
- Tree with Low Bat Roost Potential
- Tree with Moderate Bat Roost Potential
- Tree with Moderate to High Bat Roost Potential
- Tree with High Bat Roost Potential
- Tree Number
- Transect Route
- Building with Low Bat Roost Potential
- Static Detector Location 27.07.2020 to 03.08.2020
- Static Detector Location 03.08.2020 to 10.08.2020
- Common Pipistrelle (*Pipistrellus pipistrellus*) recorded during Transect Survey
- Soprano Pipistrelle (*Pipistrellus pygmaeus*) recorded during Transect Survey
- Eptesicus-Nyctalus sp. recorded during Transect Survey
- Myotis sp. recorded during Transect Survey



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Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

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Project **UPTON A38 ROUNDABOUT**

Drawing Title **BAT SURVEY PLAN**

Drawing Status **S2 - SUITABLE FOR INFORMATION**

Scale @ A3 **1:3,000** **DO NOT SCALE**

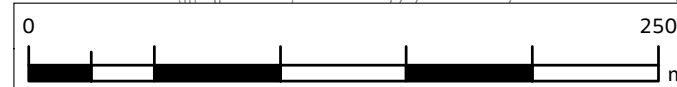
Jacobs No. **B2367219**

Client No. **CP01083**

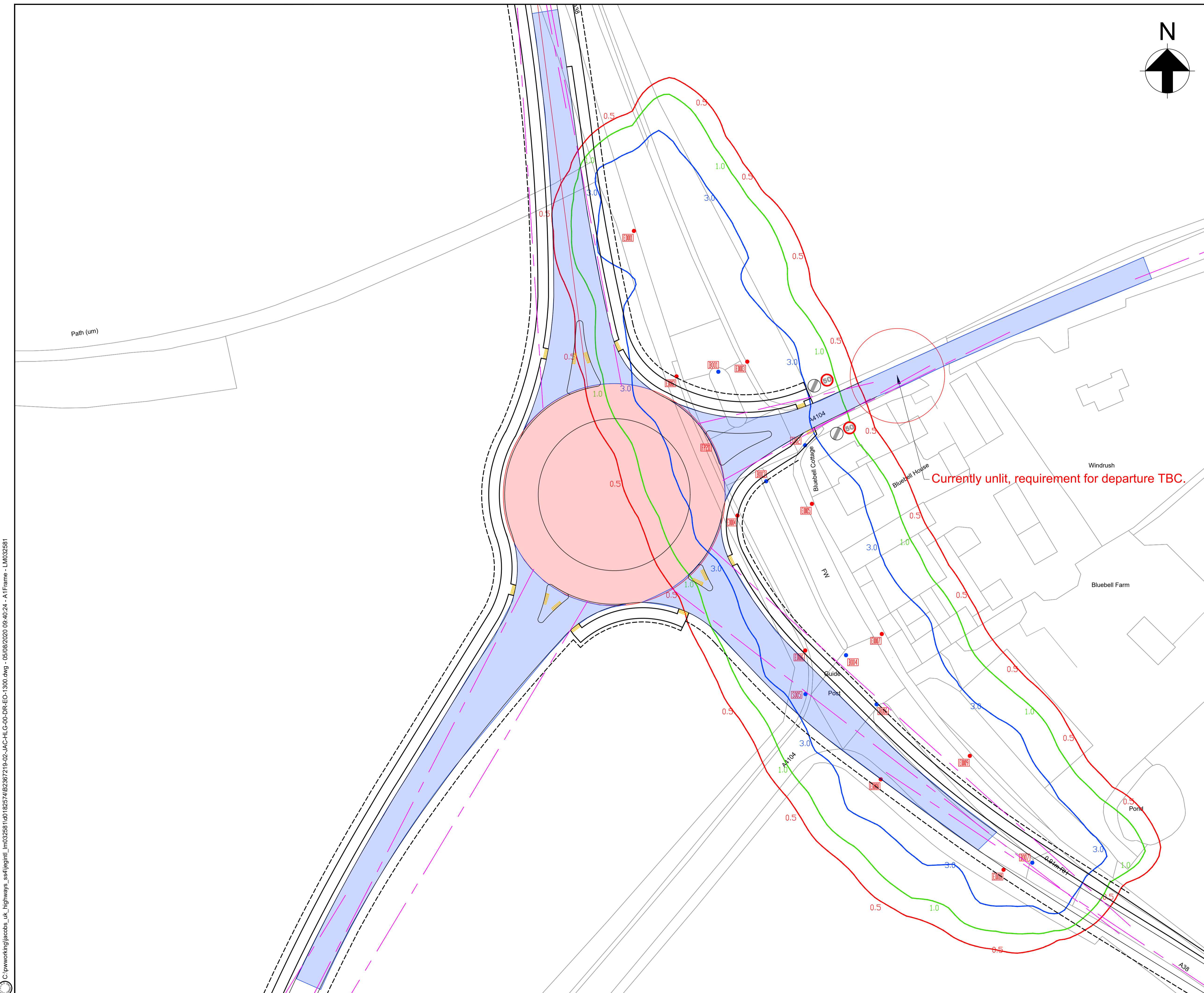
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## Appendix B. Proposed Lighting Extents and Existing Light Spill Plan

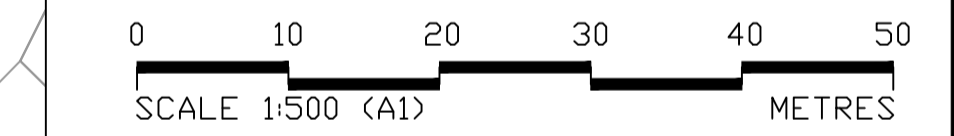


## NOTES

- DO NOT SCALE FROM THIS DRAWING.
- ALL DIMENSIONS ARE IN METERS UNLESS SHOWN OTHERWISE.
- BATS ARE SUSPECTED IN THE AREA AND ANY LIGHTING PROPOSALS ARE SUBJECT TO ECOLOGICAL APPRAISAL.
- LIGHTING EXTENTS ARE SUBJECT TO CHANGE AS THE DESIGN DEVELOPS THROUGHOUT THE DETAILED DESIGN STAGES, INCLUDING THE ADDITION OF PROPOSED LIGHTING CONTOURS.
- SIGNIFICANT STATUTORY UNDERTAKERS EQUIPMENT IS IN THE AREA WHICH MAY CLASH WITH LIGHTING EQUIPMENT INCLUDING:
- OVERHEAD HIGH VOLTAGE CABLES
  - OIL PIPELINE
  - ZAYO DUCTS
  - BT EQUIPMENT

## LEGEND

QTY	SYM	DESCRIPTION
11		EXISTING LED LUMINAIRES TO BE REMOVED.
7		EXISTING SIGN LIGHTING TO BE REMOVED.
		CONFLICT AREA.
		5 SECONDS OF DRIVING.
		EXISTING 0.5 LUX CONTOURS.
		EXISTING 1.0 LUX CONTOURS.
		EXISTING 3.0 LUX CONTOURS.



Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd
P01.1	05/08/20	ISSUED FOR REVIEW AND COMMENT	LM	SM	SM	JB

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Client: **worcestershire**  
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Project: **A38 UPTON ROUNDABOUT**

Drawing title: **PROPOSED LIGHTING EXTENTS AND EXISTING LIGHT SPILL PLAN**

Drawing status: **S3 - SUITABLE FOR REVIEW AND COMMENT**

Scale	1:500@A1	DO NOT SCALE
Jacobs No.	B2367219	Rev
Client no.	CP01083	<b>P01.1</b>

Drawing number: **B2367219-02-JAC-HLG-00-DR-EO-0001**

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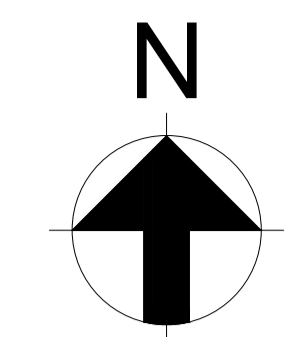


## Appendix C. Proposed Lighting Layout and Proposed Light Spill Plan

**LEGEND CONTINUED**

- SIGNS TO BE REMOVED.
- ▨ HIGH VOLTAGE OVERHEAD LINE - VICINITY ZONE.
- ▨ HIGH VOLTAGE OVERHEAD LINE - PROXIMITY ZONE.
- PROPOSED 0.2 LUX CONTOURS.
- PROPOSED 0.5 LUX CONTOURS.
- PROPOSED 1.0 LUX CONTOURS.
- CONTRACTOR TO EXCAVATE JOINT HOLE OVER WPD LV SERVICE CABLE AND TRENCH TO PROPOSED FEEDER PILLAR TO FACILITATE WPD LV SERVICE CABLE INSTALLATION. ENTRY INTO FEEDER PILLAR SHALL BE VIA BLACK UPVC DUCT.
- PROPOSED ORANGE TWIN WALL 2 x 100mm LONGITUDINAL DUCTING.
- PROPOSED ORANGE TWIN WALL 4 x 100mm TRANSVERSE DUCTING.
- ⊠ PROPOSED 600 x 600 mm DUCT CHAMBER.
- ⊠ PROPOSED LIGHTING FEEDER PILLAR.
- ⊠ PROPOSED ILLUMINATED SIGN.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:	
<b>CONSTRUCTION</b>	
- Identify and locate existing services (HLG03).	
- All buried services to be isolated / protected prior to start of works.(HLG03).	
- Lighting column near the proximity of high voltage overhead line.(HLG02).	
- Lighting column near the proximity of Oil pipeline (HLG04).	
- Passive safe lighting columns to be installed in nearside verge (HLG01).	
<b>MAINTENANCE / CLEANING</b>	
- As above	
<b>DECOMMISSIONING / DEMOLITION</b>	
- As above	
It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement	



**NOTES**

ONLY RECOGNISED LIGHTING CONTRACTORS SHALL BE USED FOR STREET LIGHTING AND ILLUMINATED SIGNS AND BOLLARDS INSTALLATION WORKS. THEY SHALL BE APPROVED BY THE OVERSEEING ENGINEER. THEY MUST ALSO BE MEMBERS OF ASLEC AND HERS. CURRENT MEMBERSHIP NUMBERS FOR THESE BODIES MUST BE PROVIDED TO THE SUPERVISING AUTHORITY PRIOR TO APPROVAL OF THE PROPOSED LIGHTING CONTRACTOR. THE APPROVED LIGHTING CONTRACTOR SHALL NOT SUB-CONTRACT ANY PART OF THE WORKS.

THE DESIGN IS BASED ON INSTALLATION BEING CONDUCTED BY THE FRAMEWORK CONTRACTOR UNDER WORCESTERSHIRE COUNTY COUNCIL (W.C.C.) STREET LIGHTING AND ILLUMINATED ROAD TRAFFIC SIGNS MAINTENANCE CONTRACT AND NEC X12 CLAUSE. IF THE CONTRACTOR WISHES TO USE ALTERNATIVE ARRANGEMENTS, THEY MUST CONTACT W.C.C FOR ADDITIONAL SPECIFICATION.

ALL MATERIALS SHALL BE TO THE RELEVANT BRITISH STANDARD. SITE WORKS SHALL COMPLY IN GENERAL WITH DEPARTMENT OF TRANSPORT SPECIFICATION FOR HIGHWAY WORKS, AND SHALL ALSO CONFORM TO:

- THE ELECTRICITY AT WORK REGULATIONS (1989)
- THE HEALTH AND SAFETY AT WORK ETC. ACT 1974
- CHAPTER 8 OF THE TRAFFIC SIGNS MANUAL
- THE CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH REGULATIONS 2002
- THE CONSTRUCTION (DESIGN AND MANAGEMENT) (CDM) REGULATIONS 2015

ERECTION AND INSTALLATION WORKS SHALL COMPLY WITH THE CURRENT ISSUE AND AMENDMENTS OF BS7671: 18TH EDITION IET WIRING REGULATIONS 2018 REQUIREMENTS FOR ELECTRICAL INSTALLATIONS. THE CURRENT EDITIONS OF THE I.P. CODE OF PRACTICE FOR ELECTRICAL SAFETY IN PUBLIC LIGHTING OPERATIONS AND THE CODE OF PRACTICE FOR THE ASSOCIATION OF STREET LIGHTING ELECTRICAL CONTRACTORS.

EXACT LOCATION OF LIGHTING COLUMNS TO BE AGREED WITH W.C.C. REPRESENTATIVE BEFORE ERECTION.

ALL EXISTING LED LUMINAIRES PROPOSED FOR REMOVAL ARE TO BE PUT INTO STORE FOLLOWING WCC ASSESSMENT.

ALL PROPOSED PASSIVELY SAFE LIGHTING COLUMNS SHALL BE INSTALLED IN LINE WITH WCC PASSIVE SAFE POLICY AND SPECIFICATION.

ALL COLUMNS SHALL HAVE CABLING INSTALLED BY CONTRACTOR TO ENABLE THE RE-PROGRAMMING OF BALLASTS TO 33% DIMMING BETWEEN MIDNIGHT AND 5 am.

FOR HAZARD TRIANGLE REFERENCES REFER TO HERR SCHEDULE: B2367219-02-JAC-GHS-00-HS-ZS-0003 HERR

**LEGEND**

QTY	SYM	DESCRIPTION
2	⊠	PROPOSED 6 m HE3 ALUMINIUM PASSIVE SAFE LIGHTING COLUMN (SUPPLIED BY ALC WITH NAL SOCKETS) TO BE ON PRIVATE CABLE NETWORK C/W POST TOP MOUNTED SIGNIFY DIGI STREET MINI LED LUMINAIRE (BGP761_DM50_6400_40LED_5.1S_CLO_L90_NW - 6.40 klm).
9	⊠	PROPOSED 10 m HE3 ALUMINIUM PASSIVE SAFE LIGHTING COLUMN (SUPPLIED BY ALC WITH NAL SOCKETS) TO BE ON PRIVATE CABLE NETWORK C/W POST TOP MOUNTED SIGNIFY DIGI STREET MINI LED LUMINAIRE (BGP761_DM33_10000_40LED_5.1S_CLO_L90_NW - 10.00 klm).
7	⊠	PROPOSED 10 m GALVANISED STEEL LIGHTING COLUMN TO BE DNO FED C/W 1.5 m BRACKET ARM MOUNTED SIGNIFY DIGI STREET MINI LED LUMINAIRE (BGP761_DM33_10000_40LED_5.1S_CLO_L90_NW - 10.00 klm).
	●	LIGHTING COLUMN TO BE REMOVED.

Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Apprv'd
C03	18/12/2020	AMENDED TO RSA AUDIT COMMENTS	LM	DS	DS	JB
P02	11/11/2020	ISSUE FOR REVIEW AND COMMENT	LM	SM	SM	JB
P01	11/10/2020	ISSUE FOR STAGED APPROVAL	LM	SM	SM	JB

**JACOBS**

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Client  
**Project** UPTON A38 ROUNDABOUT

Drawing title  
**PROPOSED LIGHTING LAYOUT AND PROPOSED LIGHT SPILL**

Drawing status  
**A5 - CONSTRUCT AND COMMISSION**

Scale: 1:500@A1 **DO NOT SCALE**

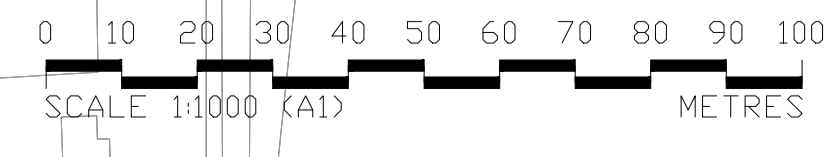
Jacobs No. B2367219 Rev **C03**

Client no. CP01083

Drawing number  
**B2367219-02-JAC-HLG-00-DR-EO-1301**

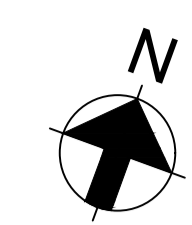
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## Appendix D. Final Development Layout Map



- LEGEND:**
- GCN RECEPTOR SITE
  - WILDLIFE KERBS ADJACENT TO PROPOSED GULLY (ACO WILDLIFE KERB HB2 915mm)
  - OFFSET GULLY - KERB OFFSET FROM GULLY BY 100mm
  - GCN GUIDE FENCING (50m LENGTH EITHER SIDE OF ENTRANCES)
  - GCN CULVERT
  - EXISTING DITCH
  - EXISTING HEDGEROW TO BE RETAINED
  - EXISTING GRASSLAND TO BE RETAINED
  - PROPOSED FENCE LINE
  - PROPOSED HEDGEROW
  - PROPOSED TREES
  - PROPOSED WOODLAND/TREE BELT
  - PROPOSED GRASS (SHORT MOWN VERGES) - SEED MIX A
  - PROPOSED GRASS - SEED MIX A TO BE CREATED AND MANAGED FOR GCN
  - PROPOSED SPECIES RICH GRASS - SEED MIX B TO BE CREATED AND MANAGED FOR GCN
  - PROPOSED SCRUB
  - PROPOSED AQUATIC AND MARSH PLANTING
  - PROPOSED NEW WETLAND AREA - SEED MIX C TO BE CREATED AND MANAGED FOR GCN
  - PROPOSED POND
  - MAINTENANCE ACCESS TRACK
  - PROPOSED LIGHT COLUMNS
  - PROPOSED ROAD SIGNS
  - PROPOSED DITCH
  - DROPPED KERB - MIN 915mm LENGTH, 3-6mm HEIGHT

C:\pwworking\jacobs\_uk\_highways\_ssf4\legintl\_bauresj\1825553B2367219-02-JAC-EGN-00-DR-C-0008.dwg - 08/07/2021 12:23:15 - 0001 - BAURESJ

GCN POND B TO BE MANAGED AND MAINTAINED

ATTENUATION POND

GCN POND A TO BE MANAGED AND MAINTAINED

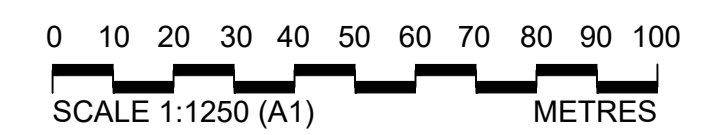
Bluebell Farm

Ryall Court Lane

Holly Green Farm

A4104

A38



P03	08/07/21	UPDATE FOLLOWING NE REVIEW	JB	KL	KL	SLB
P02	02/07/21	UPDATE FOLLOWING NE REVIEW	JB	SB	SB	SLB
P01	19/02/21	FOR INFORMATION	RG/JB	MD	SB	JF
Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd

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Client **worcestershire county council**

Project **UPTON A38 ROUNDABOUT**

Drawing title **FIGURE F1: FINAL DEVELOPMENT LAYOUT MAP**

Drawing status **S0 - Initial Status**

Scale **1:1250@A1** **DO NOT SCALE**

Jacobs No. **B2367219** Rev **P03**

Client no. **CP01083**

Drawing number **B2367219-02-JAC-EGN-00-DR-C-0008**

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