



**Structure ESB10m4ch, Ridge Road Bridge,
Shepton Mallet**

Highways England Historic Railways Estate

Ecological Survey Report in Support of Planning Application for Infill

December 2017

CONTAINS SENSITIVE PROTECTED SPECIES RECORDS – Not for public release



Structure ESB 10m 4ch, Shepton Mallet

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Executive Summary

Structure ESB10m4ch (grid reference ST 60165 42870) carries Ridge Road over the former track bed of the East Somerset railway. The structure requires repair work and complete infilling to provide continuous structural support to the structure arches. Jacobs UK Ltd (Jacobs) has been commissioned by Highways England Historical Railways Estate (HRE) to undertake a suite of ecological surveys at the structure to support planning permission for repair and infill works.

The principal ecological findings were as follows:

- Mells Valley Special Area of Conservation (SAC) is within 6km of the structure that has [REDACTED] listed as a primary qualifying feature. A separate Stage 1 HRA screening report has been prepared (Jacobs, 2017).
- Surveys confirmed that the structure was used as a winter hibernation site by small numbers (possibly single animals) of [REDACTED]. The structure was also used as a summer day roost and a night roost by small numbers [REDACTED] was also recorded using the structure as a summer day roost.
- Two ponds were recorded within 250m of the structure. Environmental DNA (eDNA) surveys produced negative results for the presence of great crested newt (*Triturus cristatus*).
- An active blackbird (*Turdus merula*) nest was found in a hole in the masonry soffit of the northern arch 'Arch 1'. A wren (*Troglodytes troglodytes*) was found in a cavity in the pier masonry between the central arch 'Arch 2' and the southern arch 'Arch 3'. Vegetation surrounding the structure has potential to support nesting birds.
- No signs of badger (*Meles meles*) or their setts were found within 100m of the structure but signs of their presence was found in the wider area.
- The vegetation surrounding the structure has potential to support reptiles. Full reptile surveys were not undertaken due to the small works footprint expected. Reptile presence is assumed.
- A dormouse survey was undertaken. No evidence of dormouse was recorded.

Key mitigation comprises:

- Bats would be excluded from the structure prior to commencement of works (subject to European Protected Species Derogation licence being granted by Natural England). This would be undertaken in late summer.
- Alternative roosting habitat would be provided: two x 2m diameter buried pipes with horizontal access on the western side of the structure and one x 1.5 metre diameter buried concrete pipe with vertical access on the eastern side of the structure. This would be completed before the next hibernation period after the commencement of works (i.e. by the end of October).
- Two thirds of the new embankments would be planted with taller shrub species of local provenance: hawthorn (*Crataegus monogyna*), field maple (*Acer campestre*) and blackthorn (*Prunus spinosa*).
- The structure and vegetation for clearance would be checked by an experienced ecologist for active bird nests prior to commencement of the bat exclusion and vegetation clearance; birds would be excluded from the structure using the same method as the bat exclusion. If active bird nests are encountered works would stop and an appropriate buffer would be put in place.
- Arisings from cleared vegetation would be used to create wildlife hibernacula near the structure, in retained habitat.
- Any excavations would be covered or fenced to deter badgers from entering, and/or fitted with a mammal ladder (scaffold plank) to provide an exit route for any animals that may become trapped.
- A vegetation clearance method statement for reptiles would be produced detailing mitigation measures including hand removal of potential refugia and checking of vegetation for reptiles prior to its removal. Reptiles found would be relocated to safe areas outside the works area.

1. Introduction

1.1 The structure

Jacobs UK Ltd (Jacobs) has been commissioned to Highways England Historical Railways Estate (HRE) to undertake a suite of ecological surveys at structure ESB10m4ch, Ridge Road Bridge (grid reference ST 60165 42870, Figure 1) to inform a design and planning permission for works to structurally stabilise the structure.

Structure ESB10m4ch carries Ridge Road over the former track bed of the East Somerset railway. The track bed is infilled for 1km to the north east and south west of the structure with approximately 10 metres of track bed under the central arch of ESB10m4ch remaining. The structure requires repair work and complete infilling to provide continuous structural support to the structure arches.

The structure is a stone and brick structure consisting of three arches (Figure 2):

- the northern arch Arch 1' (Plate 1) was open on the south western side but infilled on the north eastern side with large slabs of concrete and masonry forming a slope which meets the soffit of the arch on the north eastern facing site and the southern arch;
- the middle arch 'Arch 2' (Plate 2) was open on both sides; and
- 'Arch 3' (Plate 3) was infilled on both sides, though a significant internal cavity was present with a small accessible gap allowing animals (but not humans) to enter.

A Preliminary Ecological Appraisal (PEA) was carried out in October 2015 which identified the potential for protected species to be present, including a roosting [REDACTED]. Further detailed ecological surveys were conducted in 2016 and winter 2016/2017 to inform the planning application for the proposed infilling works to the structure.



Plate 1 Arch 1 infilled on northern eastern facing side only



Plate 2 Arch 2 open on both sides



Plate 3 Arch 3 infilled on both sides but with a narrow bat accessible gap on the north west facing side leading into a large internal void (Not visible in photo)

1.2 Site description

Structure ESB10m4ch is located within an agricultural landscape dominated by fields used for crop production and for pasture for sheep and cattle. These are bordered by hedgerows, which are well connected to small parcels of woodland in the distant landscape. Land immediately north and south of the structure supports species-poor improved and semi-improved grassland with patches of scrub and ruderal vegetation adjacent to the structure itself.

1.3 Proposed works

The repair work will involve the complete infill of the structure with foamed concrete and granular fill material to provide continuous structural support to the bridge arches. The ends of the parapet will be dismantled and reconstructed and areas of open joint and loose coping stones will be re-mortared. New embankments will be formed on either side of the structure which will be covered with topsoil and seeded. Vegetation clearance within the footprint of the works (up to 20m) will be undertaken ahead of the works (Figure 2). Works are expected to take approximately eight weeks.

1.4 Purpose of report

This report is intended to inform the planning application for infill by presenting the findings of the ecological surveys undertaken at the structure between April 2016 and March 2017, an assessment of the potential impacts on protected species and identified ecological features present and provide mitigation measures to avoid or limit any potential adverse effects.

2. Methodology

2.1 Desk study

A data request was made to the Somerset Environmental Records Centre (SERC) for all protected and notable species, habitats and designated sites within 2km of the structure and for all bat species records within 5km of the structure.

A data search within a 30km radius of the structure was carried out to identify any Special Areas of Conservation (SAC) with bats as qualifying features. The search was carried out using the following resources:

- NBN Gateway <http://data.nbn.org.uk/imt/> accessed November 2017; and
- MAGIC <http://www.magic.gov.uk/> accessed November 2017.

2.2 Field surveys

An experienced Jacobs Ecologist undertook a Preliminary Ecological Appraisal of the structure on 15 October 2015 using the Guidelines for Preliminary Ecological Appraisal (CIEEM, 2013). The structure and surrounding land were methodically searched for evidence of protected and notable species and an assessment of the bat roost potential of the structure was made.

Based on this Preliminary Ecological Appraisal a suite of protected species surveys was undertaken; the methodologies of these species-specific surveys are given below.

2.2.1 Habitats

A Phase 1 Habitat survey of the site and accessible land surrounding the structure was carried out on 15 October 2015 during the PEA in accordance with the Handbook for Phase 1 habitat survey - a technique for environmental audit (JNCC, 2010).

2.2.2 Bats

A range of bat surveys, in accordance with Bat Conservation Trust (BCT) Bat Surveys for Professional Ecologists; Good Practice Guidelines (Collins, 2016), were undertaken. These are discussed below and summarised in Table 1.

2.2.2.1 Trees

Trees within 50m of the structure were surveyed to identify potential features for roosting bats on 15 October 2015.

Potential bat roost features can include:

- Tree and branch splits;
- old woodpecker holes;
- rot holes (through the removal of branches);
- hollow trunks, branches or root;
- loose bark;
- tree cavities (in root buttresses and coppice stools);
- dense epicormic growth; and
- bat and bird boxes.

The assessment of the trees was undertaken from the ground using 10x40 close focusing binoculars and a powerful torch.

2.2.2.2 Visual Inspection

A detailed visual inspection of the structure for bats was undertaken as part of the Preliminary Ecological Appraisal on 15 October 2015. An endoscope inspection of the structure was undertaken from ground level on 18 April 2016. An extending 5m pole with an endoscope extension was used to gain access to areas of the structure at height.

Further detailed inspections of potential bat roosting features in the structure from the ground using a GoPro Camera fixed to an extending pole (to inspect at height) and an endoscope were carried out on 12 October 2016, 16 January 2017 and 14 February 2017.

Visual inspections of accessible areas of the structure were also undertaken in daytime ahead of emergence-re-entry surveys in May, June, July, August and September 2016.

2.2.2.3 Emergence/re-entry survey

Dusk emergence and dawn re-entry surveys were undertaken in accordance with BCT guidelines (Collins, 2016) as set out in Table 1. This standard bat survey methodology was augmented by the guidance for [REDACTED]

Surveyors were positioned on either side of the structure and equipped with Batbox Duet bat detectors or Elekon Batscanner bat detector and Anabat Express recorders. Surveys commenced 30 minutes before sunset until 3 hours after sunset (dusk) and at 1.5 hours before sunrise until just after sunrise (dawn). These timings [REDACTED]

[REDACTED] Night vision cameras were used during the surveys to observe bat activity in low light levels.

2.2.2.4 Static detectors

At the time of survey two of the three arches at ESB/10m4ch were partially infilled and were below the level of the surrounding land (Figure 2). This heavily constrained access but static detectors (Anabat Express) were able to be deployed. Microphones with extension leads, where necessary, were optimally positioned to detect the directional calls of [REDACTED] species. All equipment used was serviced by the manufacturer before deployment ensuring microphone sensitivities were calibrated and assured.

Three static bat detectors were deployed (one per arch), recording for at least 10 days per month between April and October 2016, inclusive. The static detectors were placed: in Arch 1 at the top of a slope of infill material; attached to a tree immediately adjacent to Arch 2; and inside the void in Arch 3 on top of infill material (Figure 3).

During each emergence/re-entry survey the batteries in the static detectors were changed, the data was downloaded and the bat detectors left to record again until the batteries expired. All recordings were analysed using AnaloookW software to identify the bat species present.

The dates of the static recordings are listed below in Table 2.

2.2.2.5 Survey methodology and consultation

From the PEA and initial roost assessment the presence of [REDACTED] species roosting in the structure was known. As such appropriate survey methodology for these bat species was reviewed. The survey methodology undertaken differs from that set out in the Bat Mitigation Guidelines (Mitchell-Jones 2004) where it recommends two emergence/re-entry surveys in each month between May and September for [REDACTED] species. This reduction was considered appropriate for the following reasons.

Based on previous experience by Jacobs ecologists of lesser and greater horseshoe roosts at similar structures, emergence and re-entry surveys proved less effective than acoustic analysis from static detectors at identifying the presence of roosts and their pattern of use in these type of structures. This experience was gained at structure CMZ/4m1ch (Natural England licence 2015-13565-EPS-MIT), FOZ/2m22ch (Natural England licence 2015-13801-EPS-MIT) and the South Bristol Link lime kilns (Natural England licence 2015-12485-EPS-MIT).

As structure ESB10m4ch had the potential to be used throughout the year by bats, a combination of emergence and re-entry survey and targeted static detector surveys was used to provide the most efficient, reliable and productive use of survey effort to determine species and patterns of use at these type of structures.

Natural England (NE) was formally consulted on this approach through their "NE Discretionary Advice Service", and their response was supportive. Natural England's (Alison Howells) formal response is included in Appendix D.

Table 1. Bat survey type, date and equipment used.

Date	No of surveyors	Bat Survey Effort	Equipment used
15 October 2015	1	1 visit: ground based visual inspection of underside of structure including endoscope of accessible features.	Endoscope, torch and binoculars
18 April 2016	2	1 visit: ground based visual inspection of underside of structure including endoscope of accessible features. 3 static detectors deployed (1 beneath each arch). Detectors left out continuously until September 2016.	Endoscope, torch and binoculars Anabat express x 3
26 May 2016	4	1 visit: ground based visual inspection of underside of structure and a long dusk emergence survey (3 hours after sunset) Service, download and redeploy the static detectors	Endoscope, torch and binoculars Bat scanner x 2, Anabat express x 3, Anabat SD2 x 2, and night vision cameras x 2.
21 June 2016	4	1 visit: ground based visual inspection of underside of structure and a long dusk emergence survey (3 hours after sunset) Service, download and redeploy the static detectors	Endoscope, torch and binoculars Bat scanner x 2, Anabat express x 3, Anabat SD2 x 2, and night vision cameras x 2.
18-19 July 2016	4	1 visit: ground based visual inspection of underside of structure, a long dusk emergence survey (3 hours after sunset) and a pre-dawn return to roost survey. Service, download and redeploy the static detectors.	Endoscope, torch and binoculars Bat scanner x 2, Anabat express x 3, Anabat SD2 x 2, and night vision cameras x 2.
8-9 August 2016	4	1 visit: ground based visual inspection of underside of structure a long dusk emergence survey (3 hours after sunset), and a pre-dawn return to roost survey. Service, download and redeploy the static detectors	Endoscope, torch and binoculars Bat scanner x 2, Anabat express x 3, Anabat SD2 x 2, and night vision cameras x 2. Anabat Walkabout
14-15 September 2016	3	1 visit: ground based visual inspection of underside of structure and a long dusk emergence survey (3 hours after sunset), and a pre-dawn return to roost survey 1 visit: collect static detectors	Endoscope, torch and binoculars Bat scanner x 2, Anabat express x 3, Anabat SD2 x 2, and night vision cameras x 2. Anabat Walkabout
12 October 2016	2	1 visit1 visit: ground based visual inspection of underside of structure 1 visit: collect static detectors	Endoscope, torch and binoculars Anabat express x 3

Date	No of surveyors	Bat Survey Effort	Equipment used
8 December 2016	2	1 visit: winter Deploy static detectors. Winter ground based visual inspection and endoscopy of accessible features	Endoscope Anabat express x 3
16 January 2017	2	1 visit: winter ground based visual inspection and endoscopy of accessible features. Service, download and redeploy the static detectors.	Endoscope Anabat express x 3
14 February 2017	2	1 visit: winter ground based visual inspection and endoscopy of accessible features. Service, download and redeploy the static detectors. 1 visit: winter collect in static detectors.	Endoscope Anabat express x 3
6 March 2017	2	1 visit: winter ground based visual inspection. Collect the static detectors End of survey period.	Endoscope Anabat express x 3

Table 2 : Static bat detector recording dates

Recording dates	Number of recording nights		
	Arch 1	Arch 2	Arch 3
18 April – 26 May 2016	11	1 (equipment failure)	11
26 May - 21 June 2016	23	27	27
21 June - 18 July 2016	23	26	23
18 July - 8 Aug 2016	22	20	22
8 Aug - 12 Sep 2016	21	19	21
12 Sept – 12 Oct 2016	18	19	18
8 Dec – 23 Dec 2016	16	16	8
16 Jan – 29 Jan 2017	14	12	12
14 Feb – 3 March 2017	19	19	16

2.2.3 Great crested newt

2.2.3.1 Habitat Suitability Index (HSI)

Habitat Suitability Index (HSI) surveys for great crested newt (*Triturus cristatus*) were carried out on two ponds within 250m of the structure on 8 April 2016. The ponds and their locations (Figure 6) in relation to the structure are listed in Table 3.

Table 3. Waterbodies identified within 250m of the structure

Waterbody ID	HSI survey undertaken?	eDNA survey undertaken?	Traditional GCN survey techniques undertaken?	Approximate distance and direction from ESB10m4ch structure
Pond 1	Yes	Yes	No	140m west
Pond 2	Yes	Yes	No	200m north east

Each waterbody was assessed for its suitability to support GCN, according to the evaluation criteria provided by Oldham et al. (2000), in April 2016. Environmental parameters used in predicting the likely presence/absence of GCNs for the HSI score included:

- geographic location;
- pond area;
- pond permanence;
- water quality;
- pond shading;
- presence and density of wildfowl populations;
- presence of fish and density of populations;
- pond density within 1km;
- suitability and accessibility of adjacent terrestrial habitat; and
- presence and percentage cover of aquatic and emergent macrophytes.

Waterbodies were then allocated a HSI score and associated predicted presence class, as shown in Table 4. The HSI score is a measure of habitat suitability and waterbodies with high scores are more likely to support GCN than those with low scores.

Table 4 : HSI scores and pond suitability from ARG UK (2010).

HSI Score	Predicted Presence Class
0.00 – 0.49	Poor
0.50 – 0.59	Below average
0.60 – 0.69	Average
0.70 – 0.79	Good
0.80 – 1.00	Excellent

2.2.3.2 Environmental DNA (eDNA)

Environmental DNA (eDNA) surveys for great crested newt presence were carried out on two ponds (Pond 1 and 2, Table 3 and Figure 6). These were carried out on 18 April 2016.

eDNA is DNA found within a particular environment (e.g. pond) that has been released from an organism in the form of faeces, saliva, urine, skin cells or carcasses. In aquatic environments, the eDNA is diluted and distributed in the water where it persists for 7-21 days, depending on environmental conditions (Biggs et al., 2014).

eDNA sampling to confirm the presence or absence of great crested newt in ponds is a method that has been accepted by Natural England (NE). The procedure involves taking 20 water samples from a pond then combining these samples in a vessel to allow one composite sample per pond to be taken for laboratory analysis.

Jacobs used 'Nature Metrics DNA based monitoring', an accredited laboratory to provide sampling equipment and carry out laboratory analysis. The survey protocol used is in accordance with Natural England's guidance note, WC1067 Technical Advice Note (Biggs et al., 2014) with additional information taken from the accredited laboratory's survey protocol.

2.2.4 Breeding birds including barn owl

During the bat survey visits, any bird nests or signs of breeding birds, including barn owl (*Tyto alba*), that were observed on or around the structure were noted. Possible signs could include potential roosting areas, nesting material, egg shells, pellets and/or birds entering or leaving the structure.

2.2.5 Hazel dormouse

A hazel dormouse (*Muscardinus avellanarius*) nest tube survey was conducted according to dormouse nest tube survey guidelines as described in the Dormouse Conservation Handbook (Bright et al., 2006). Fifty tubes were placed in hedgerows surrounding the structure (Figure 8). These were checked monthly from May to October 2016, inclusive.

2.2.6 Badger

A badger (*Meles meles*) survey within a 250m radius around the structure was undertaken on 8 March 2016 with reference to the methodology set out in the Design Manual for Roads and Bridges (DMRB, 2001) Volume 10. This involved a search of suitable habitat for setts and other evidence of badger including badger paths, latrines, badger hairs on fences, bushes etc., scratching posts and evidence of digging for food.

2.2.7 Reptiles

An assessment of habitat suitability for reptiles was made. This was based on the following guidelines developed by the Amphibian and Reptile Conservation (ARC) for use in the National Amphibian & Reptile Recording Scheme (ARC, 2007):

- Vegetation structure – ideal reptile habitat has a variable structure with a mixture of vegetation heights, tangled or thorny areas, mosaics, bare patches, lots of edges ('ecotones') and good basking places.
- Extent – must be big enough area to support a population. Small habitat patches can be sufficient for lizards, whereas snakes need larger areas (although grass snakes can cross unsuitable habitat).
- Aspect – sunny, sheltered locations, unshaded, south-facing.
- Topography - undulating topography, banks, hummocks, hollows, south-facing slopes; generally, not north-facing slopes.
- Connectivity – essential to allow colonisation when habitat is created, and recolonization after local extinctions. For example, if an area of good habitat is surrounded by intensive arable farmland, reptiles might not be able to colonise it.

- History – habitat that has been recently created might look deceptively good, but it takes time for reptiles to colonise, and there must be connectivity with neighbouring areas where they are present.

Reptile surveys were not conducted due to the very small quantity of habitat likely to be affected by the works.

2.3 Limitations

It should be borne in mind that the behaviour of animals can be unpredictable and may not conform to standard patterns recorded in scientific literature. Therefore, this report cannot predict with absolute certainty that animal species will occur in apparently suitable locations or habitats, or that they will not occur in locations or habitats that appear unsuitable. In order to minimise the likelihood of adverse effects on protected animal species it is accepted good practice, in accordance with best practice guidelines, for wildlife surveys to be updated should development be deferred for over 12 months from the date of the last survey.

An inspection of the arch barrel and side walls, both visually and by endoscope, could not be undertaken in Arch 3 due to lack of access under the structure.

The original track bed has been infilled completely to within approximately 10 metres of the structure. Therefore, the remaining section of track bed was at the bottom of a deep depression in the surrounding land. Access down the slopes was hazardous and initially dusk and dawn surveys were conducted from the top of the embankments. As the summer season progressed, the view of the structure was obscured by vegetation a hand line was used to allow surveyors to descend the steep embankments for the dusk and dawn surveys from July 2016 onwards.

Fly tipped materials such as broken asbestos cement sheeting, piles of animal manure, domestic waste, broken glass etc. thrown from vehicles parked on the road over the parapets walls into the area under the structure arches created a particularly hazardous and physically challenging environment for surveyors. This required the use of full personal protective equipment, including disposable boiler suits and facemasks (due to the asbestos) while accessing under the arches. This reduced the ease of observation, but this was overcome through the use of night vision (infra-red) camcorders which allowed recorded video footage to be viewed at a later date, as well as in real-time.

3. Results

3.1 Desk study

3.1.1 Statutory designated sites

Four Special Areas of Conservation (SACs) designated for bat species are located within 30km of the structure. Table 5 lists the four sites, their approximate distance from the structure and the bat species present as qualifying features. The locations of the SACs in relation to the structure are shown in Figure 4.

Records supplied by the SERC confirmed the presence of one statutory designated site located within 2km of the structure. This is a 4-hectare grassland SSSI known as 'Friar's Oven' approximately 1km to the west of the ESB10m4ch structure (Table 5).

Table 5 : Statutory designated sites

Site name	Approximate distance and direction from structure	Summary of citation
<u>European sites within 30km wit bat species as qualifying features</u>		
Mells Valley SAC	5.3km east	██████████ – a primary reason for the selection of this site, contains a maternity site associated with a population comprising 12% of the UK population. Also contains a hibernation site.
North Somerset and Mendip Bats SAC	12.2km north west	██████████ – a primary reason for the selection of this site. Range of important hibernation sites in the limestone Mendip caves for lesser and greater horseshoe bats. ██████████ – a primary reason for the selection of this site, contains 3% of the UK population which is spread between two maternity sites in north Somerset and cave and mine hibernation sites in the Mendips.
Mendip Limestone Grasslands SAC	19.3km north west	██████████ – present as a qualifying feature but not a primary reason for site selection.
Bath and Bradford-on-Avon Bats SAC	25km north east	██████████ - this site includes the hibernation sites associated with 15% of the UK population and is selected for importance of this exceptionally large population. ██████████ – small numbers recorded hibernating in abandoned mines. ██████████ - is present as a qualifying feature but not a primary reason for site selection.
<u>Sites of Special Scientific Interest within 2km</u>		
Friar's Oven	1km west	This site consists of two separate fields which support herb-rich calcareous grassland classified as the Upright Brome (<i>Bromus erectus</i>) type. Such grassland has a restricted distribution within Somerset and also in a national context.

No records of other European designated sites, National Nature Reserves or Local Nature Reserves were found within 2km of the structure.

3.1.2 Non-statutory designated sites

SERC provided information on a total of 25 non-statutory designated sites found within 2km of the structure: 19 Local Wildlife Sites (LWS) and six Local Geological Sites (LGS). These are listed in Table 6.

No records of ancient woodland, priority habitats or tree preservation orders were found within 2km of the structure.

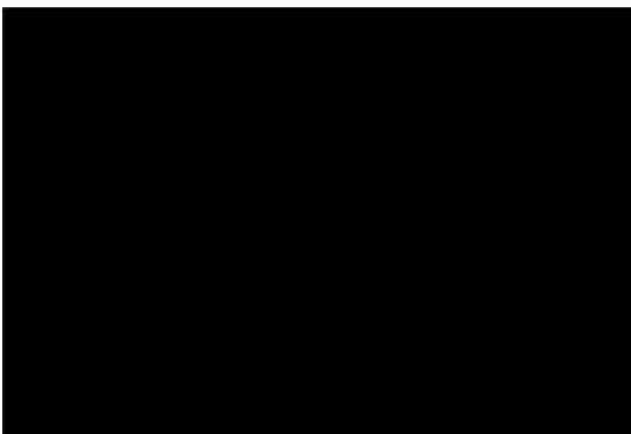
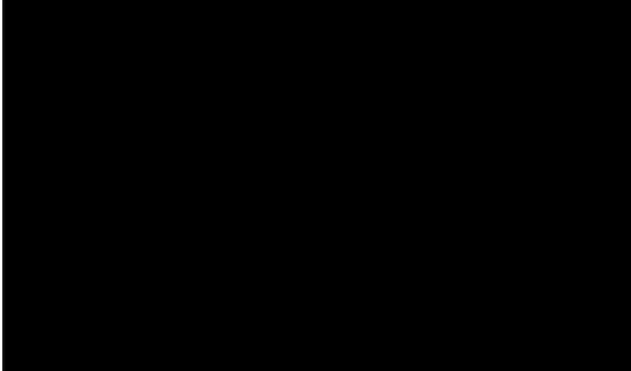
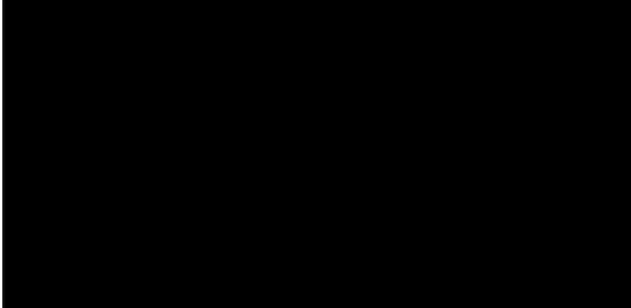
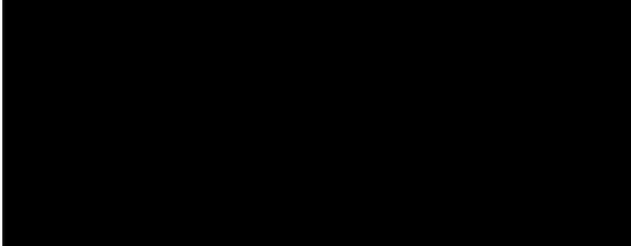
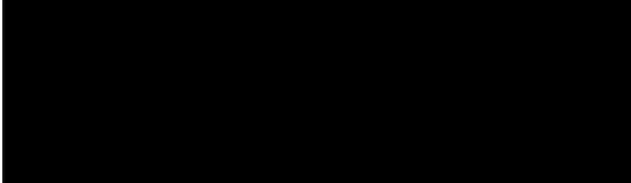
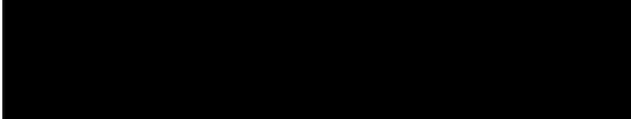
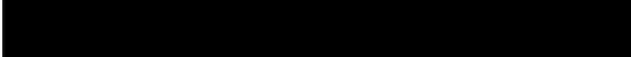
Table 6. Non-statutorily designated site records within 2km of structure ESB10m4ch

Site name	Designation	Approximate distance and direction from structure	Reason for designation
Three Arch Bridge Cutting (now de-designated due to previous infilling)	LGS	0km	Important section through Rhaetian sequence including the Westbury Formation and Langport, Cotham members.
Lambert's Hill Farm Fields	LWS	0.34km south	Species rich unimproved grassland.
Lambert's Hill Farm Fields	LWS	0.34km south	Species rich unimproved grassland.
Stump Cross Railway Cutting	LGS	0.88km west	Exposed carboniferous limestone (Black Rock Group) which have become mineralised and dolomitised, overlain unconformably by breccias and marls of the triassic Mercia Mudstone Group.
Elm Farm	LWS	0.95km south	Unimproved species-rich grassland.
Titwell Wood Narrow	LWS	0.97km north	Narrow semi-natural broadleaved woodland on a steep north-facing slope.
Knowle Wood	LWS	1.14km west	Ancient semi-natural broadleaved woodland, unimproved calcareous grassland and scrub.
Knowle Hill Field	LWS	1.16km west	Unimproved calcareous grassland.
Croscombe Pasture	LWS	1.24km north west	Irregularly shaped north-facing fields with steep herb-rich banks.
Ham Fields	LWS	1.27km north east	Unimproved calcareous grassland.
Ham Fields	LWS	1.27km north east	Unimproved calcareous grassland.
Shepton Road Field	LWS	1.28km north	Field with small area of unimproved calcareous grassland and Somerset notable species.
Compton Wood	LWS	1.29km south west	Ancient semi-natural broadleaved woodland.
Ham Woods Field	LWS	1.48km north	Broadleaved woodland, partly secondary, and herb-rich grassland.
Old Burford Field & Wood	LWS	1.51km south west	Unimproved neutral grassland and wet woodland.
Bowlish Roadside Cutting	LGS	1.51km north east	Section exposing Lower Jurassic.

Site name	Designation	Approximate distance and direction from structure	Reason for designation
Shepton Mallet Railway Cutting	LGS	1.54km east	Small section exposing Lower Jurassic marine Limestones and clays.
Croscombe Cutting	LGS	1.62km north west	Small roadside cutting in Triassic Dolomitic Conglomerate.
Paradise Hill Quarry	LGS	1.63km north west	Quarry face with massive limestone, much calcite, haematite and chert layers.
Paradise Hill	LWS	1.65km north west	Unimproved calcareous grassland adjacent to disused quarry.
Ham Woods	LWS	1.66km north	Ancient semi-natural broadleaved woodland.
The Roundabout	LWS	1.71km north west	Unimproved grassland on hill slopes with areas of broadleaved woodland.
Pilton Wood	LWS	1.73km south west	Ancient semi-natural broadleaved woodland.
Batch Sidelands	LWS	1.76km west	Unimproved grassland.
Flat Wood and Pasture	LWS	1.84km south west	Ancient semi-natural broadleaved woodland and unimproved neutral grassland.
Church Hill Railway Line	LWS	1.89km north west	Disused railway cutting with species-rich grassland and scrub.
Pond south of Shepton Mallet	LWS	1.92km east	Pond with legally protected species.

3.1.3 Protected Species

Records supplied by SERC confirmed the presence of numerous protected and notable species within 2km of the structure. These records and their distances from the site are listed in Appendix B. Records of the following bat species/genera were found within 2km:

- 
- 
- 
- 
- 
- 
- 
-

Other protected or notable species within 2km:

- badger (*Meles meles*);
- otter (*Lutra lutra*);
- water shrew (*Neomys fodiens*);
- harvest mouse (*Micromys minutus*); and

- barn owl (*Tyto alba*).

3.2 Field survey

3.2.1 Habitats

The Phase 1 Habitat survey results are set out in Figure 5. Habitats around the structure consisted of, scrub, tall ruderal, poor semi improved grassland, and improved grassland bordered by species rich intact hedgerow to the north and species poor intact hedgerow to the south. The fields to the north east were horse grazed, the fields to the south west were cattle grazed. Habitat connectivity was considered good with good bat foraging habitats; the cattle grazed fields with intact hedgerows were assessed as of potential value to [REDACTED] species, depending on animal husbandry (i.e. the use of antiparasitic drugs such as Ivermectin which may have adverse effects on the abundance of the invertebrate prey of bats).

3.2.2 Bats

3.2.2.1 Trees

The only tree within the footprint of works was an immature multi-stemmed ash tree (*Fraxinus excelsior*) on the southern side of Arch 1. This was assessed as having no potential roost features for bats.

3.2.2.2 Visual inspection of the structure

The area immediately around the structure is set in a deep depression formed from what remains of the original railway cutting which has been filled in to within several metres of the structure. This depression is fringed by scrub and ruderal vegetation and so provides sheltered foraging for bats. The area around the structure is also subject to fly tipping of household waste and farmyard/ stable waste which encourages high levels of detritivorous insects which provide excellent forage for bats.

Visual inspections of Arch 1 and Arch 2, using an endoscope and/or a pole mounted 'GoPro' camera, confirmed bat roosting in the structures, the details are set out below.

[REDACTED]
18 April 2016, 12 October 2016) in recesses formed by masonry missing from the soffit of the arch (Plate 5, 14 February 2017) and also hanging in the open from the soffit itself (16 January 2017).



[REDACTED]
material in Arch 1

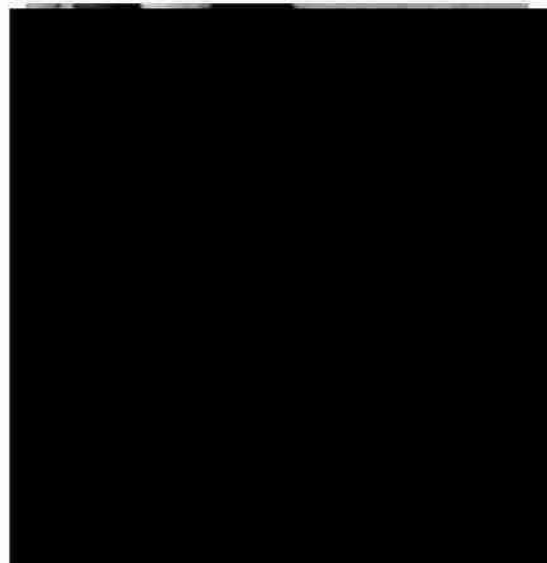
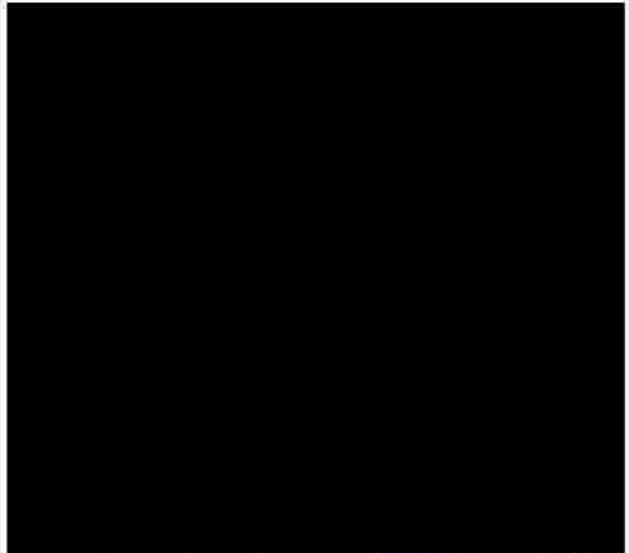


Plate 5 [REDACTED] roosting in a cavity formed by missing masonry in the soffit of Arch 1

[REDACTED]
8 August 2016 and 12 October 2016 and in a recess formed by masonry missing from the soffit of Arch 1 (Plate 7) on 14 February 2017.



[REDACTED] (photograph taken 12th October 2016)



[REDACTED] February 2017)

(photograph taken 14

3.2.2.3 Emergence/re-entry surveys

During the emergence/re-entry surveys low numbers of bats were observed using the structure as a roost and foraging and/or commuting underneath the structure arches. The following was recorded:

- [REDACTED] returning at dawn;
- [REDACTED] dusk emergence survey;
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED] calls could not be identified beyond the genus) foraging activity; and
- [REDACTED] the structure but this activity was not considered to be directly associated with the structure.

Full results of emergence / re-entry survey observations are set out in Appendix C.1.

3.2.2.4 Static detectors

The static bat detectors recorded levels of bat activity consistent with small numbers of bats present throughout the year. These results concurred with observations made during the emergence and re-entry surveys and daytime inspections.

Winter deployment of automated static detectors in the three arches in December 2016 and January to March 2017. The results of static detectors are set out in Tables 7, 8 and 9 below. Full results of static detectors are in Appendix E.

Table 7: Static Detector Results - Numbers of bat passes per night (- = no bats recorded)

Date	Average number of bat registrations per Anabat per night														
	Total number of bat passes (all species)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
18 April - 28 April 2016	10.5	-	-	-	-	-	6.4	3.4	-	-	-	-	-	-	0.8
26 May - 21 June 2016	471.4	1.3	0.8	-	-	-	67.7	400.6	0.2	-	-	-	-	-	0.8
21 June - 18 July 2016	169.5	0.9	0.5	-	-	0.5	28.1	138.5	0.6	-	0.1	-	-	-	0.3
18 July - 8 Aug 2016	166.2	1.3	0.6	-	-	0.1	37.7	125.5	0.3	-	-	-	-	-	0.5
8 Aug - 12 Sep 2016	212.0	0.4	0.5	-	-	0.2	38.8	168.3	-	-	0.1	-	-	-	3.6
13 Sept - 12 Oct 2016	524.5	12.1	2.5	-	-	0.1	94.7	412.7	1.5	-	-	-	-	0.2	0.5
8 Dec - 23 Dec 2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16 Jan - 29 Jan 2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14 Feb - 3 March 2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

; '-' = no bats recorded)

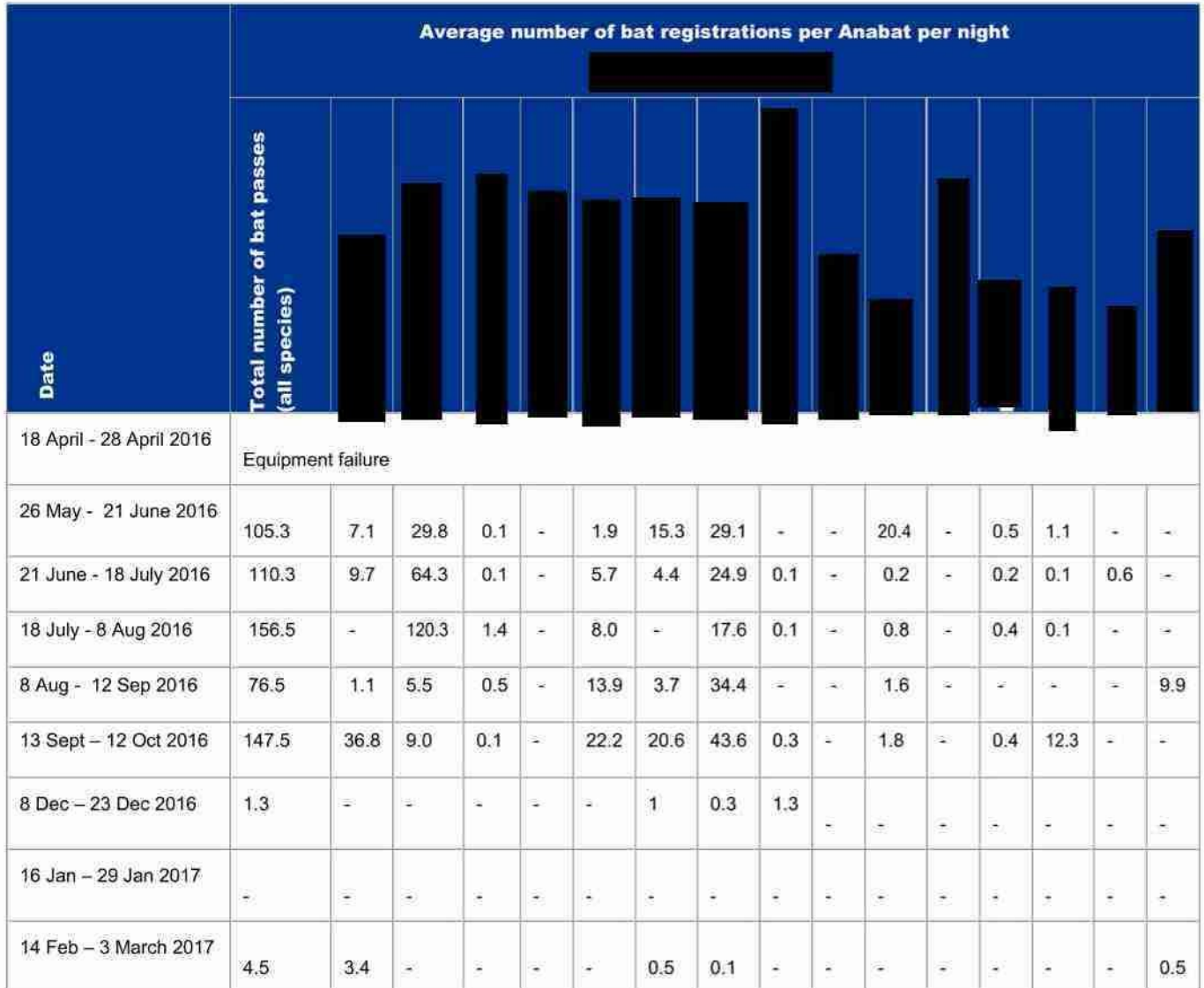


Table 9

'-' = no bats recorded)

Date	Average number of bat registrations per Anabat night															
	Total number of bat passes (all species)															
18 April - 28 April 2016	8.4	-	0.4	-	-	-	6.9	0.1	-	-	1.0	-	-	-	-	-
26 May - 21 June 2016	134.2	0.1	43.8	0.3	-	0.5	55.7	18.9	-	-	0.4	0.2	11.4	1.2	-	-
21 June - 18 July 2016	80.5	0.04	14.4	-	-	-	51.1	13.1	0.3	-	0.5	-	0.04	-	-	-
18 July - 8 Aug 2016	100.1	-	22.8	-	-	-	27.2	49.0	0.2	-	0.6	-	0.4	-	-	100.1
8 Aug - 12 Sep 2016	9.0	-	-	-	-	-	9.0	-	-	-	-	-	-	-	-	-
13 Sept - 12 Oct 2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 Dec - 23 Dec 2016	19.0	-	-	-	-	-	19.0	-	-	-	-	-	-	-	-	-
16 Jan - 29 Jan 2017	3.4	-	0.1	-	-	-	3.3	-	-	-	-	-	-	-	-	-
14 Feb - 3 March 2017	9.9	-	0.1	-	-	-	9.5	0.1	-	-	0.2	-	-	-	-	-

3.2.3 Great crested newt

The results of the HSI assessments and eDNA for great crested newt are summarised in Table and set out in full in Appendix C.2. The HSI scores predicted that the likelihood of GCN being present was 'Good' for Pond 1 and 'Poor' for Pond 2 (Figure 6). The eDNA surveys proved negative for both Pond 1 and Pond 2. As a consequence, no further surveys were undertaken.

Table 10 : Summary of HSI and eDNA great crested newt survey results

Waterbody name /number	Date of HSI survey	Date of eDNA survey	Location	Approx. distance and direction from structure	HSI Score	Prediction (Likelihood of GCN)	eDNA result
1	8 March 2016	18 April 2016	ST 60016 42840	140m west	0.71	Good	Negative
2	8 March 2016	18 April 2016	ST 60340 42985	200m north east	0.44	Poor	Negative

3.2.4 Breeding birds including barn owl

Two bird nests were recorded underneath the structure. A blackbird (*Turdus merula*) nest was recorded in Arch 1 and a wren (*Troglodytes troglodytes*) nest in Arch 2. The wren's nest was not active during any of the visits but the blackbird nest was active with eggs present in the June 2016 visit.

Barn owl pellets were found in the northern arch (Arch 1). The structure was not considered to be suitable for barn owl nesting and the pellets were considered most likely associated with short term roosting and hunting activity.

3.2.5 Hazel dormouse

The field surveys revealed no evidence of hazel dormouse in the nest tubes shown in Figure 8.

3.2.6 Badger

The results of the badger survey carried out on 8 March 2016 are set out in Figure 7.

No badger setts were found within the survey area. Dung pits and feeding signs were found but these were outside the planned footprint of works. The existing infill of the track bed up to the structure was found to consist of rubble and concrete slabs making it unsuitable for badgers to burrow into. There was also regular human disturbance caused by fly-tipping which is considered likely to discourage badger activity close to the structure.

3.2.7 Reptiles

No reptile survey was carried out, but a reptile habitat assessment was made.

The rough grassland, tall ruderal and scrub margin habitats within the proposed footprint of works were found to have some suitability to support small populations of common reptile species such as slow worm (*Anguilla fragilis*), grass snake (*Natrix natrix*) and common lizard (*Zootoca vivipara*). These are therefore assumed to be present.

4. Potential Impacts

4.1 Designated sites

direct impacts within any of the SACs is proposed. A Habitats Regulations Assessment: Stage 1 Screening (Jacobs, 2017) details the potential impact of the proposed infill works on the mobile bat species of these designated sites. As mobile species that are able to commute up to 30km there is a feasible link to the individual bats recorded at the structure, either directly or in breeding, to those populations of the designated sites. These potential impacts are also discussed in the bats section below.

It is considered that the bat roosts associated with the structure are not a critical resource for the local populations, due to the small number of bats recorded roosting. It is also likely that similar roosting and foraging opportunities for these species are available in the wider landscape.

The proposed works are unlikely to have any effect on connectivity that might impact populations of using the European sites; the works will not affect the bats' ability to move through the landscape. The former track bed is not continuous in its current state and has already been fully infilled to within a few metres of the structure. There are sufficient surrounding hedgerow and scrub habitats to enable bats to continue commuting through the wider landscape. It is considered unlikely that are reliant on flying beneath the structure as movement through the central arch was associated with foraging activity rather than commuting. The HRA concludes that there is no likely significant effect on the SACs.

There are no pathways to effect for potential impacts on the SSSI and non-statutory sites.

4.2 Habitats

Section 41 (S41) of The Natural Environment and Rural Communities (NERC) Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The list has been drawn up in consultation with Natural England.

No habitats as listed in S41 would be impacted by the proposed infill and repair works.

Vegetation in the immediate vicinity (up to 20m) of the structure would need to be cleared to allow access of plant, infilling of the structure and creation of embankments. Therefore, there would be a loss of scrub and ruderal vegetation within 20 metres of the structure. There are no aquatic habitats in the footprint of works.

4.3 Bats

Bats and their roosts receive full protection under the Conservation of Habitats and Species Regulations 2017 and full protection under the Wildlife and Countryside Act 1981 (as amended). It is an offence to deliberately:

- Kill, injure, capture or handle a bat;
- Damage, destroy or obstruct their breeding or resting places whether bats are present or not; and/or
- Disturb a bat when it is using such a place.

4.3.1 Trees

The tree and scrub species within 50m of the structure were found to be unsuitable for roosting bats. The trees and scrub were of limited value to bats as foraging and/or commuting habitat. Clearance of the trees and scrub within 20m of the structure would result in a minor, localised loss of this habitat and is considered highly unlikely to have any significant impact on bat populations.

4.3.2 ESB10m4ch structure

The bat survey data suggests that the structure is used intermittently throughout the year by individuals or very small numbers of [REDACTED] for hibernation, day roosting, night roosting and foraging.

[REDACTED] were visually observed in daytime inspections in Arch 1 in spring, autumn and winter months. Static bat detector results and emergence/re-entry survey results confirmed that small numbers of [REDACTED] day roost in Arch 1 throughout the year. Static bat detector results were consistent with this species hibernating in winter and day roosting in spring and autumn in small numbers in Arch 3. Emergence/re-entry surveys confirmed that Arch 3 was used for day roosting by at least one [REDACTED] in summer. There was no evidence of breeding activity associated with the structure in any of the three arches.

[REDACTED] Emergence/re-entry surveys and static data suggest that the structure was used by small numbers (possibly even a single animal) of [REDACTED], mainly as a night roost, but also as an occasional day roost. A single call was recorded in the central Arch 2 at 16:07 on 9 December 2016 and two calls were recorded at 19:10 on 22 February 2017 which suggests that there was a low level of [REDACTED] activity associated with the structure in the winter. This may indicate that Arch 1 and Arch 3 have been used as a hibernation roost by the low numbers of the species for short periods or possibly as a night perch during winter foraging when conditions are mild enough to support this.

[REDACTED] were observed day roosting in summer in weep holes in Arch 2 and hibernating in winter in cavities in masonry in Arch 1. Whilst emergence/re-entry surveys did not observe emergence by this species both emergence/re-entry surveys and automated corroborated daytime inspections that both Arch 1 and Arch 2 were used by small numbers of non-breeding [REDACTED] for day roosting throughout the year. Neither emergence/re-entry nor automated surveys found any [REDACTED] activity in Arch 3.

[REDACTED] A [REDACTED] was observed to emerge from the soffit of Arch 2 during a dusk emergence survey in September 2016. Although the exact location of the roosting position was not observed there were a large number of potential roost features in the soffit of Arch 2 and it is likely that small numbers of this species use some of these features as occasional roosts.

Other bat species

The structure environs are used as a foraging area by small numbers of other vespertilionid bat species, of which [REDACTED] and [REDACTED] were the most frequently recorded.

Potential impacts

Works to completely infill the structure arches would result in the following impacts on bats species:

- disturbance to bats through noise and an increase in human presence at the structure during access works/vegetation clearance;
- loss of bat roosts;
- mortality risk of bats roosting in the structure during infilling works; and

- as this site may be used as a 'stopping off' point by bats on route to other roosts (main breeding or hibernation sites) in the wider area, or for dispersing juveniles; its loss has the potential to fragment bat dispersal routes.

Arches 1 and 3 are partially infilled with no through passage underneath for possible commuting bats. Whilst Arch 2 is open it is below ground level and surrounded by dense scrub on the south side. Bat species were regularly observed flying underneath Arch 2 but this was associated with foraging behaviour rather than commuting behaviour. It is unlikely that it is currently used as a significant commuting route as bat species (including [REDACTED]) were regularly observed to commute by crossing the road above the structure.

In summary, it is considered that the structure is not a critical resource for the local bat populations due to the small number of bats recorded and that similar roosting and foraging opportunities are likely to be available in the wider landscape. Loss of the roost site is unlikely to have a significant effect on the conservation status of [REDACTED]

4.4 Great crested newt

GCN receive legal protection under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017. It is an offence to capture, kill, disturb or injure a GCN deliberately. It is also an offence to damage or destroy a breeding or resting place or to obstruct access to their resting or sheltering places (deliberately or by not taking enough care).

Results of the eDNA surveys confirmed that GCN were absent from Ponds 1 and 2. It is highly unlikely that GCN are present in terrestrial habitat around the structure.

4.5 Breeding birds including barn owl

All breeding birds and their nests are protected by the Wildlife and Countryside Act 1981 (as amended). Under the Act it is an offence to intentionally kill, injure or take any wild bird. It is also an offence to intentionally take, damage or destroy the eggs or nest of a bird while it is in use or being built.

Vegetation adjacent to the structure has the potential to support breeding birds and two nests (blackbird and wren) were found underneath the structure. Signs of barn owl roosting underneath the structure (pellets) were identified but there was no evidence of or suitability for nesting. It is considered likely that the structure provides barn owl with a sheltered hunting site in adverse weather conditions. Evidence of a substantial brown rat (*Rattus norvegicus*) colony present in the fly tipped material under the structure was recorded which may have attracted barn owl to hunt at the structure.

There is potential for breeding birds to be injured or killed through disturbance and destruction of nests during the vegetation clearance and infilling works at the structure.

4.6 Hazel dormouse

Hazel dormouse are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017. It is an offence to kill or injure a dormouse, damage, destroy or obstruct access to any structure or place used for shelter or protection by a dormouse or disturb a dormouse occupying such a structure.

The desk study did not reveal any dormouse records within 2km of the structure. The dormouse field survey did not reveal any evidence of dormouse presence. It is highly unlikely that dormouse are present in terrestrial habitat around the structure.

4.7 Badger

Badger and their setts are protected under the Protection of Badgers Act 1992. Under this legislation it is unlawful to:

- wilfully kill, injure, take, possess or cruelly ill-treat a badger;
- attempt to do any of the above; or
- intentionally or recklessly interfere with a sett.

No badger setts were recorded within the proposed footprint of works or within the wider study area. It is unlikely that badgers could establish a sett before construction in the proposed footprint of works due to the unsuitability of the embankments which consisted of hardcore and rubble. The regular human disturbance due to ongoing fly tipping issues was also likely to deter badgers. However, badger were recorded as being present in the wider area and there is a risk that badgers could enter the construction area during works and become entrapped or injured.

4.8 Reptiles

Reptiles receive protection under the Wildlife and Countryside Act (1981, as amended) making it illegal to intentionally or recklessly injure or kill these animals.

Scrub and tall ruderal habitats adjacent to the structure have the potential to be used by reptiles. There is potential for any reptiles present in within the footprint, or adjacent to it, to be directly harmed by vegetation clearance/access works and earthworks to create new embankments.

5. Mitigation

5.1 Designated sites

5.2 Habitats

Following the infill of the structure, two thirds of the new embankments would be planted up with taller shrub species of local provenance such as hawthorn (*Craetegus monogyna*), field maple (*Acer campestre*) and blackthorn (*Prunus spinosa*). The newly formed embankments would be seeded with a wildflower grassland seed mix.

Vegetation cuttings (arisings) would be used to create wildlife hibernaculum and refugia in appropriate locations, within the retained habitats, as specified by the supervising ecologist at the time of clearance. This is a habitat enhancement and a sustainable use for cleared vegetation.

5.3 Bats

The infilling of the structure and repair works would cause disturbance to bats during vegetation clearance, potential direct harm (mortality) of bats and the permanent loss of the bat roosts present in the structure. This would constitute offences under the Conservation of Habitats and Species Regulations 2017. As such, it would be necessary to apply to Natural England (NE) for an European Protected Species (EPS) derogation licence. NE would need to grant the licence before any works could legally proceed. The licence would cover the mitigation detailed below. Its purpose is to avoid disturbance, minimise the risk of killing or injuring bats and to compensate for the loss of the roosts, which are feasibly linked to a number of SACs.

5.3.1 Timing

Although bats were recorded year round at the structure it is considered that the hibernation period is the most sensitive. Infill and repair works would take place outside of the bat hibernation season (late October-March). The proposed work schedule would consist of late summer bat exclusion (early August) with works taking place during the late summer to early autumn and completed before the next hibernation season (end October).

The infill and repair works would take place during daylight hours only and the construction site would remain unlit overnight.

5.3.2 Pre infill and repair works survey

A licensed ecologist would carry out a pre-works inspection of all potential roosting features within the structure and trees within the footprint of the works to be cleared. This is to ensure that roosting bats are not present.

Following inspection, all unoccupied suitable features would be blocked to prevent bats from roosting within them. Given the large number of potential roosting areas in the structure this would be best carried out by the use of netting 'curtains' which completely cover the open arches. These would be raised at dusk to allow bats to exit, and later lowered and secured at ground level to prevent bat re-entry. This method has been used very effectively by Jacobs ecologists in the past for the same species at several similar structures, such as structure CMZ/4m1ch (NE licence 2015-13565-EPS-MIT), FOZ/2m22ch (NE licence 2015-13801-EPS-MIT) and the South Bristol Link lime kilns (NE licence 2015-12485-EPS-MIT). This procedure would be carried out during the bat active season (April – October), subject to an EPS derogation licence being granted by NE.

5.3.3 Provision of alternate roosting habitat

Three bat pipes will be installed to replace each of the three arches. They are intended to provide a 'like for like' (Mitchell Jones, 2004) replacement for the loss of the roosting habitat in each arch. The bat habitat pipes would

be installed and available for use before the beginning of the bat hibernation period (i.e. before the end of October). This assumes infilling works take place August-October.

Two x 2m diameter pipes with horizontal access would be buried on the western side of the structure (one plastic pipe and one concrete pipe) and one x 1.5 metre diameter concrete pipe with vertical access (i.e. 'pill box' style) would be buried on the eastern side of the structure. The diameter of these pipes have been

[REDACTED] (Ransome, 1990), in accordance with best practice stated in Mitchell-Jones (2004) and Schofield (2008). Bat

[REDACTED] used only concrete pipes. As the two pipes proposed for the western side of the structure would be identical in dimensions, this is an excellent opportunity to compare the use of a concrete pipe with the use of a plastic pipe by roosting bat species, specifically horseshoe bats. If the proposed bat monitoring programme finds that the plastic pipe is as successful or better in terms of bat colonisation than the concrete pipe there are considerable cost efficiencies that can be made in future similar projects. The costs and ease of installation of the plastic pipe is much lower than the concrete counterpart. This proposal was discussed with Natural England during the consultations using their Discretionary Advice Service.

The proposed height of the entrances has been maximised, in accordance with best practice stated in Schofield (2008), to avoid possible entry by predators (e.g. foxes and cats) and limit potential for vandalism or anti-social behaviour. The 'pill box' type structure would also be constructed from a capped 1.5m diameter pipe with side access grille. The layout and detail of all the alternative bat roosting features are set out in Figure 9.

The pipes would be rough rendered internally to allow horseshoe bat species to have numerous opportunities to roost. The pipes would also have additional features suitable for roosting for [REDACTED] species and [REDACTED]

- 4 x Schwegler 1GS bat bricks attached to the inside of the pipes;
- a cold tower constructed of breeze blocks;
- timber boards to create crawl spaces; and
- inverted plastic bins screwed into the internal ceiling of the pipe to create thermally stable roosting 'alcoves' for horseshoe bats. The inside of the plastic bins will be rough rendered to facilitate [REDACTED] perching.

Provision of alternative roosting features would also maintain any dispersal or transitory functions of those bat roosts, particularly for [REDACTED].

It should also be noted that the structure is subject to persistent fly tipping of domestic and farm waste which has almost completely obstructed bat access to Arch 3. A discarded bed mattress was burned under Arch 2 sometime between October 2015 and March 2016 causing soot staining of the Arch Soffit. There is a risk that bats may be disturbed, entombed by further fly-tipping or otherwise harmed by these ongoing unauthorized activities. Therefore, the proposed infilling of the structure presents a positive opportunity to provide safe, secure and resilient compensatory roosting habitat for the bat species, which are currently at risk from the unauthorised activities on site.

5.4 Great crested newt

No mitigation for GCN is required.

In the unlikely event that GCN are found then works will stop and advice from an ecologist sought and where necessary, NE.

5.5 Breeding birds

The vegetation clearance and infill works would preferably take place outside of breeding bird season (March to August, inclusive). However, due to the need to exclude bats in August a pre-construction inspection of the structure and the vegetation to be removed would be made by an experienced ecologist. It must be noted that

the majority of birds breeding has completed by August. However, if any nests are found, works would stop and an appropriate buffer would be put in place around the nest until all juveniles had fledged. The bat exclusion method using net "curtains" would also be effective for excluding bird species.

5.6 Hazel dormouse

No mitigation for dormice is required.

In the unlikely event that a dormouse or dormouse nest is found then works would stop and advice sought from an ecologist and, where necessary, NE.

5.7 Badger

During construction, any excavations would be covered or fenced to deter badgers from entering, and/or fitted with a mammal ladder (scaffold plank) to provide an exit route for any animals that may become trapped. No heavy objects would be left propped against trees or the structure overnight.

5.8 Reptiles

A method statement would be produced to avoid the potential risk of injury or mortality to reptiles during vegetation clearance.

Vegetation clearance of scrub and tall ruderal habitats would be carried out during the active season for reptiles (March – October, inclusive and weather dependent) and would be undertaken under ecological supervision. The supervising ecologist would check the vegetation for the presence of reptiles prior to its removal.

All potential refuge habitats, e.g. log or brick piles and non-hazardous fly tipped materials, would be removed by hand to check for reptiles. This would be done immediately in advance of construction work but only during the active season for reptiles. If any reptiles were found, they would be relocated to safe areas outside of the works area and into the area where hibernacula had been created.

5.9 Summary of mitigation measures

Table 11 provides a summary of the impacts on ecological features of the proposed development and the mitigation measures to avoid or reduce any impacts.

Table 11 : Summary of mitigation measures

Feature / habitat / species	Impact	Mitigation measure	Reason	Timing
Habitats	Minor loss of habitat	Plant up of approx. two thirds of the new embankments with shrub species of local provenance	Replace lost habitat	On completion of works
Bats	Injury or mortality	Exclusion of bats from the structure prior to commencement of works (subject to European Protected Species Derogation licence being granted by Natural England)	Prevent entombment or other direct harm to bats due to infilling works	Outside hibernation period; late summer (August).
Bats	Loss of roosts and possible additional dispersal/transitory functions of those roosts	Provision of alternate roosting habitat: two x 2m diameter pipes with horizontal access on the western side; and one x 1.5m diameter concrete pipe with vertical access on the eastern side	To provide compensatory bat roosting provision	To be completed before the end of October (in the same year that works commence) in order that they are available for bats to use for hibernation
Bats	Disturbance	Timing – most sensitive hibernation period avoided.	To avoid most sensitive time for roosting bats at the structure	Outside hibernation period; late summer (August).
Breeding Birds	Risk of harm to active nests, eggs and chicks.	The structure and vegetation on site would be checked by an experienced ecologist for active bird nests prior to commencement of the bat exclusion and vegetation clearance Birds would be excluded from the structure using the same method as the bat exclusion	To reduce the risk that breeding birds would be encountered during works	August – to avoid main breeding season
Badger	Risk of entrapment in excavations or harm from	During construction, any excavations would be covered or fenced to deter badgers from entering, and/or fitted with a mammal ladder (scaffold plank) to provide an exit route for any	Prevent entrapment/harm	During construction

Feature / habitat / species	Impact	Mitigation measure	Reason	Timing
	stored materials	animals that may become trapped. No heavy objects would be left propped against trees or the structure overnight.		
Reptiles	Risk of harm to reptiles from vegetation clearance	A method statement would be produced detailing measures to prevent harm to reptiles including hand checking of vegetation for reptiles prior to its removal and relocation of reptiles found to safe areas outside the works area.	Prevent harm to any reptiles present	In advance of construction work but only during the active season for reptiles; March – October (weather dependent).

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Appendix A. Figures

Figure 1	Location plan
Figure 2	Existing general arrangement
Figure 3	Arches and Location of static bat detectors
Figure 4	Statutory designated sites
Figure 5	Phase 1 habitat survey results
Figure 6	Location of ponds that were assessed and eDNA sampled
Figure 7	Badger survey results
Figure 8	Location of dormouse tubes
Figure 9	Proposed general arrangement



FIGURE 1

- Legend**
- ESB/10m4ch location
 - Footprint of proposed works



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Apprd
0	29/11/2017	Initial Issue	FL	LW	CK	CK



Client

highways england

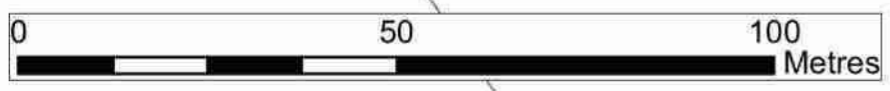
Project

ESB/10m4ch Canards Grave Road Bridge

Drawing Title

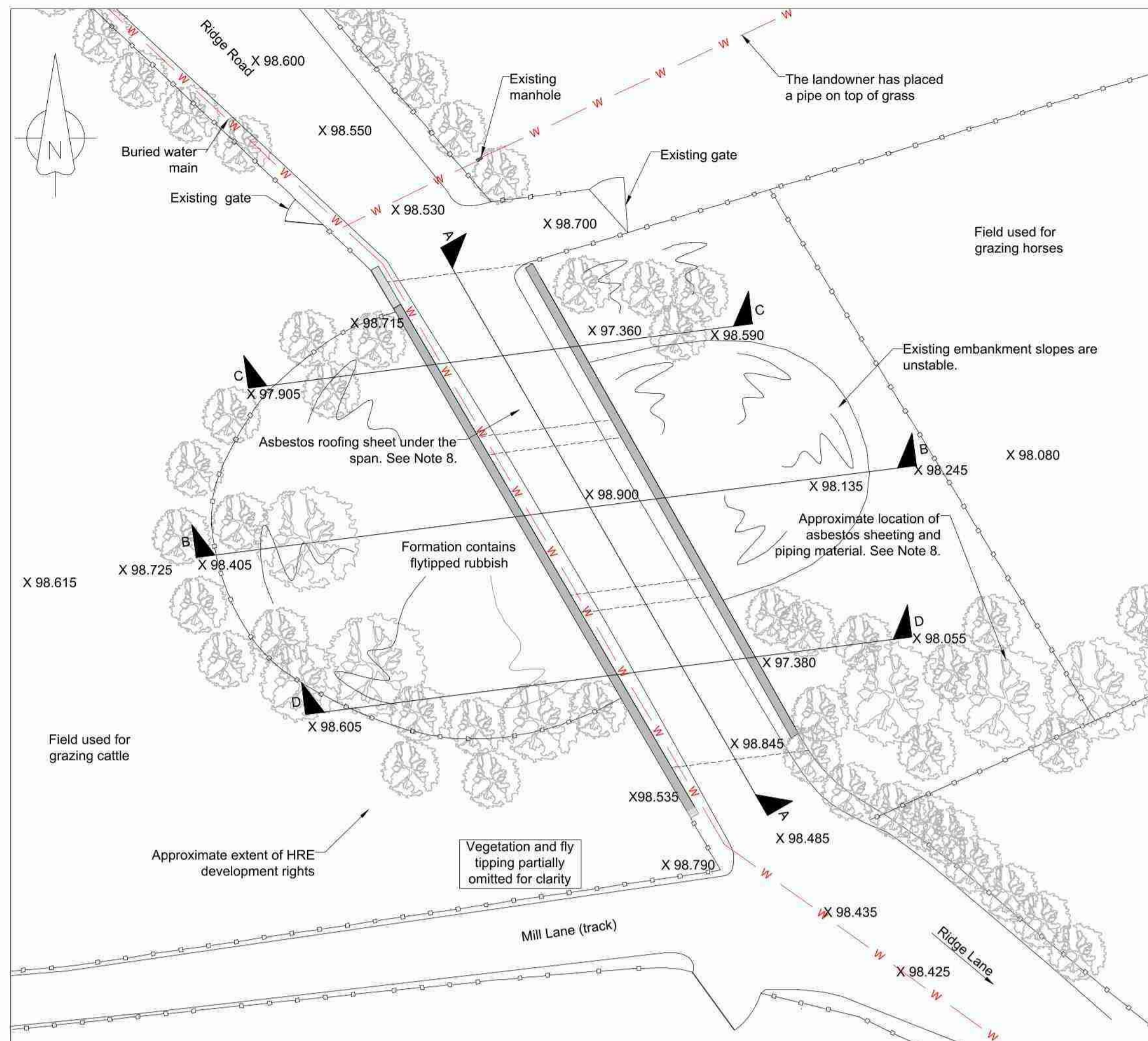
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Jacobs No.	B18280DW/01	

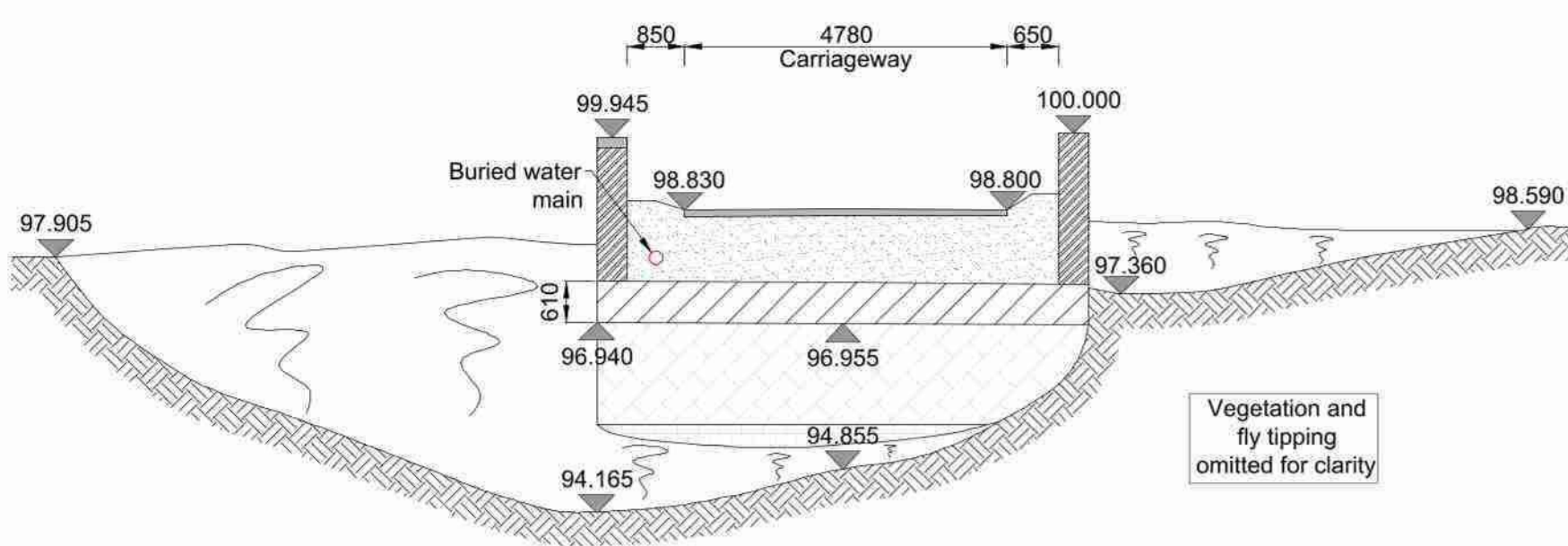


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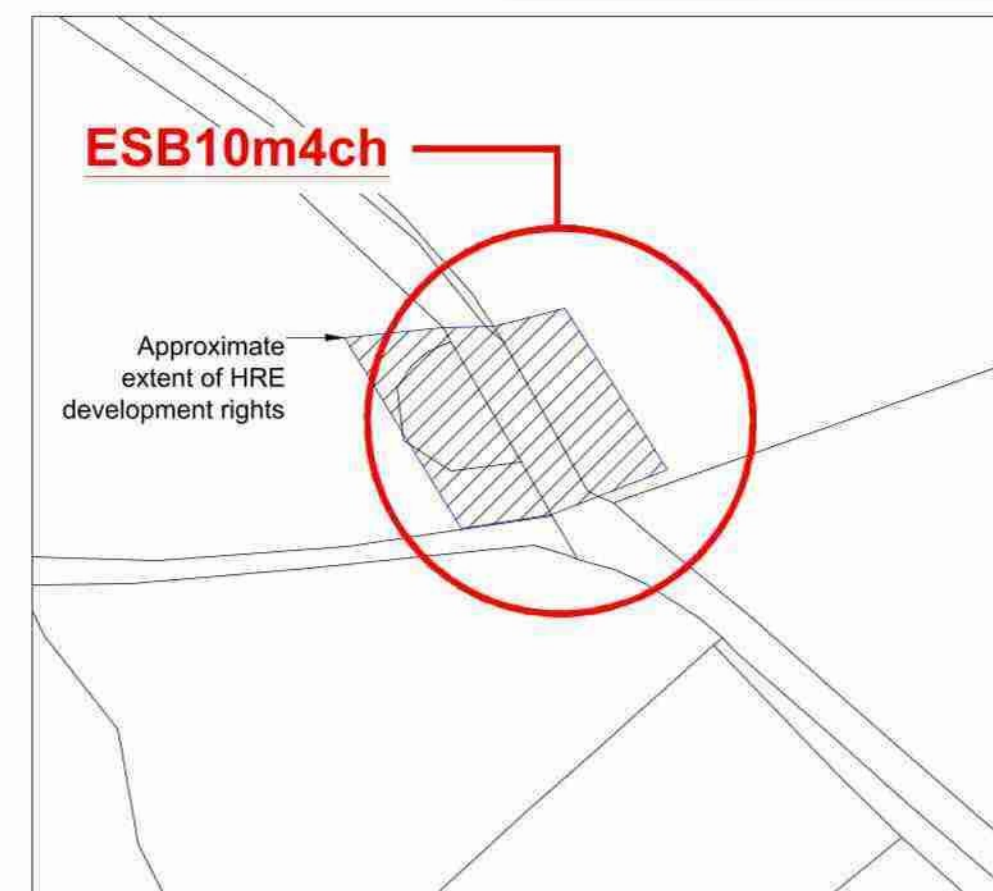
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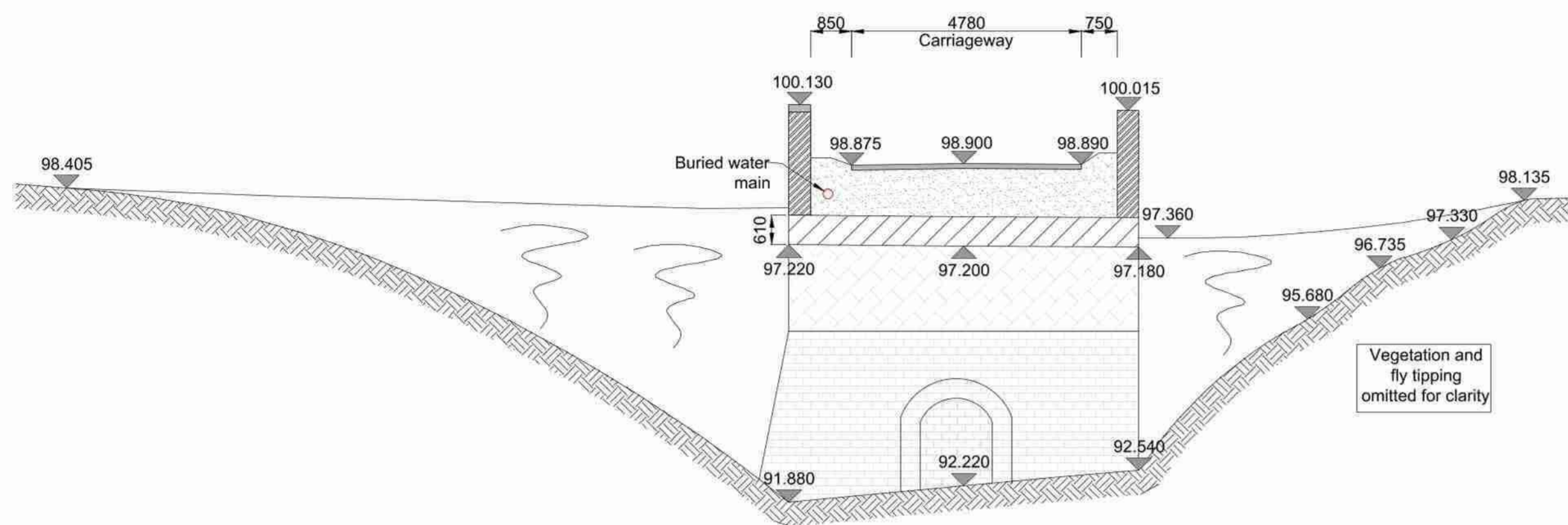
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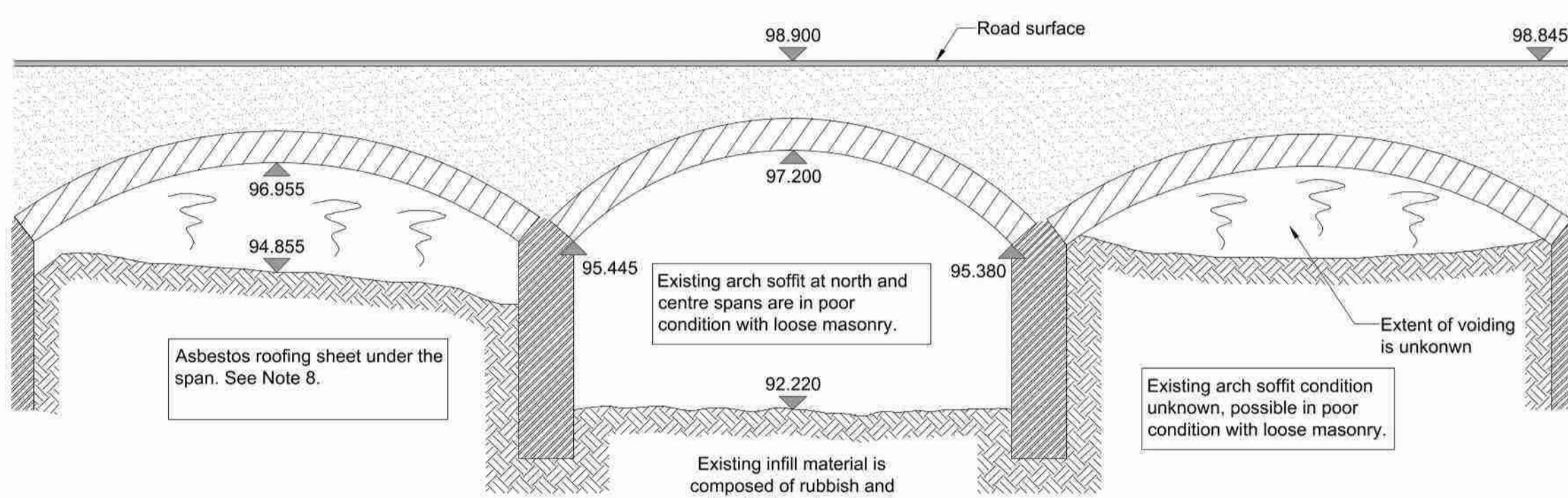
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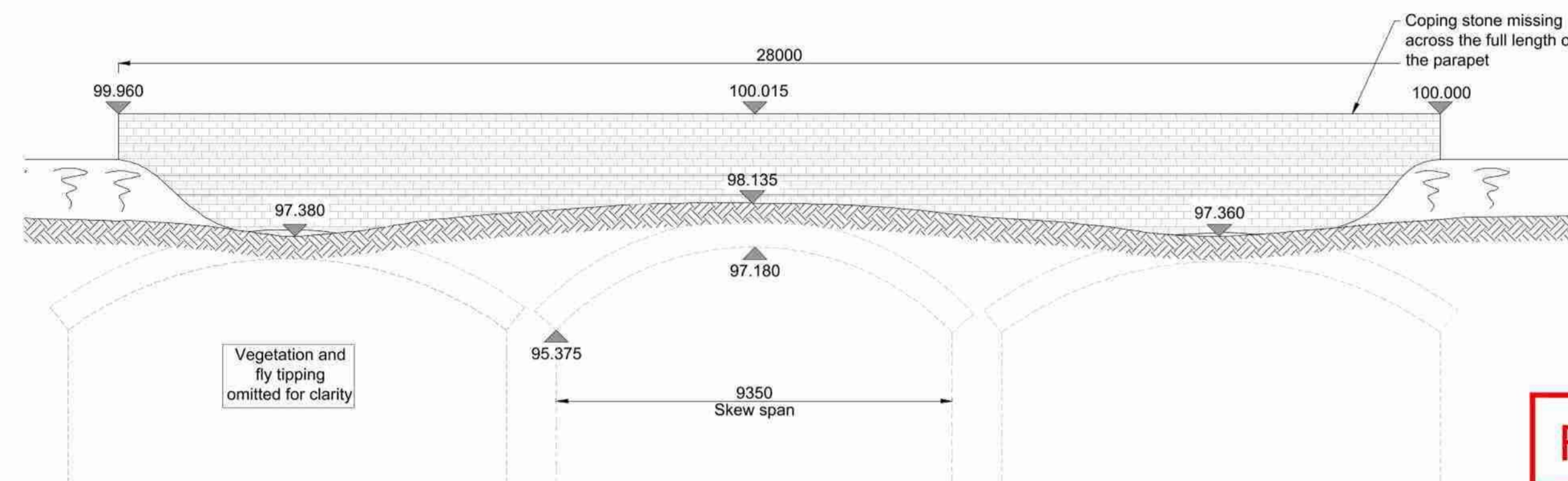
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SECTION B-B
SCALE 1:100



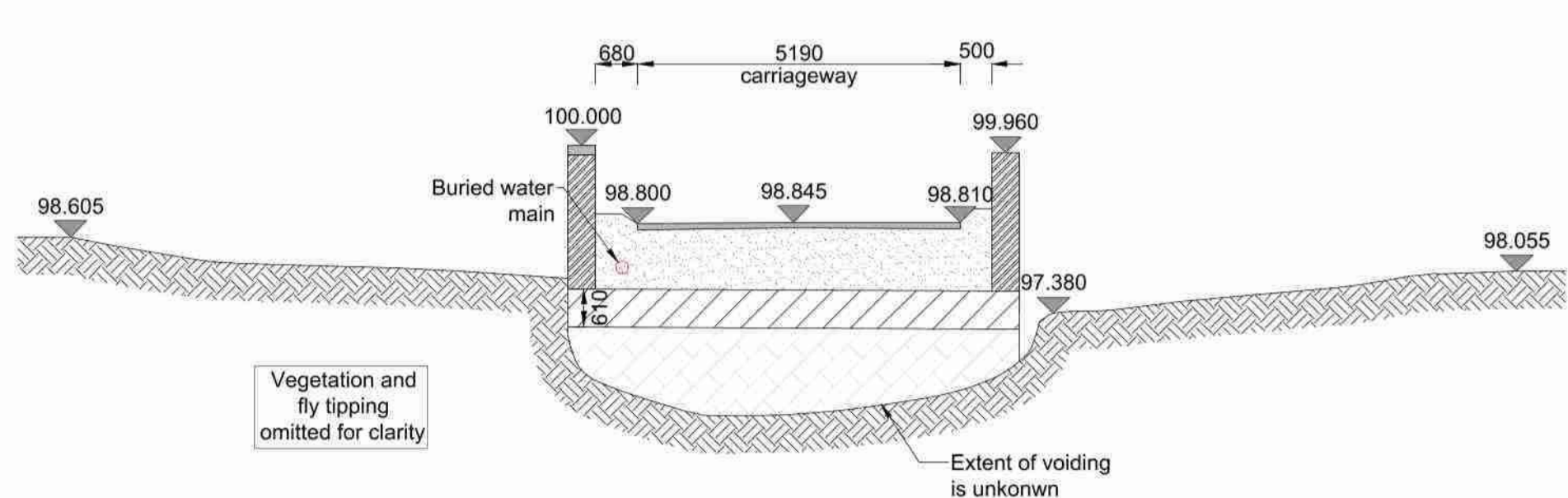
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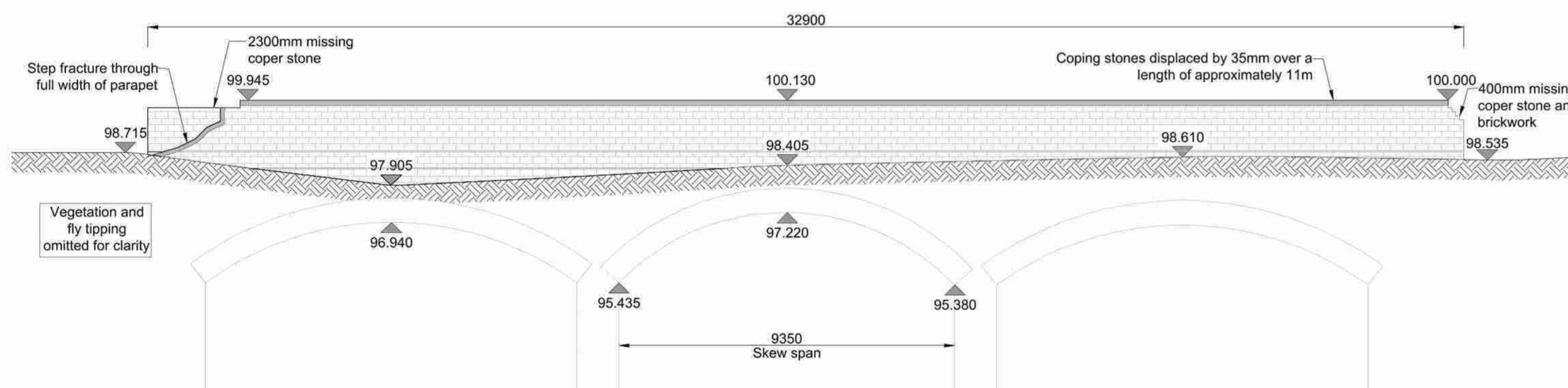
EAST ELEVATION
SCALE 1:100

SAFETY NOTES:
FLY TIPPED ASBESTOS SHEETING AND ROOFING PRESENT ON SITE

FOR INFORMATION



SECTION D-D
SCALE 1:100



WEST ELEVATION
SCALE 1:100

Notes

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2. All dimensions are in millimetres and levels in metres unless stated otherwise. TBM value of 100.000 situated on north end of the east parapet.
3. Locations and extent of services are indicative only and not exhaustive. Contractor to confirm exact location, nature and owner of any services within the area affected by the permanent or temporary works.
4. Reproduction from the Ordnance Survey map with the permission of the controller of Her Majesty's Stationery Office crown copyright reserved licence no. al 100.017326.
5. Date of Site survey :- 15/10/2015.
6. BD21 Bridge Assessment (August 1999) - Assessed capacity 17t GVW
7. The original rock cutting which the bridge crosses, has been infilled in the past by third parties with fly tipped materials and construction rubbles, this has formed unstable slopes.
8. Fly tipped asbestos sheeting and piping material has been identified underneath and adjacent to the structure.

REV	DATE	PURPOSE OF REVISION	DRAWN	CHECKED	APPROVED
02		FORM B			
01	28/10/2015	FORM A	HR	JCW	NR

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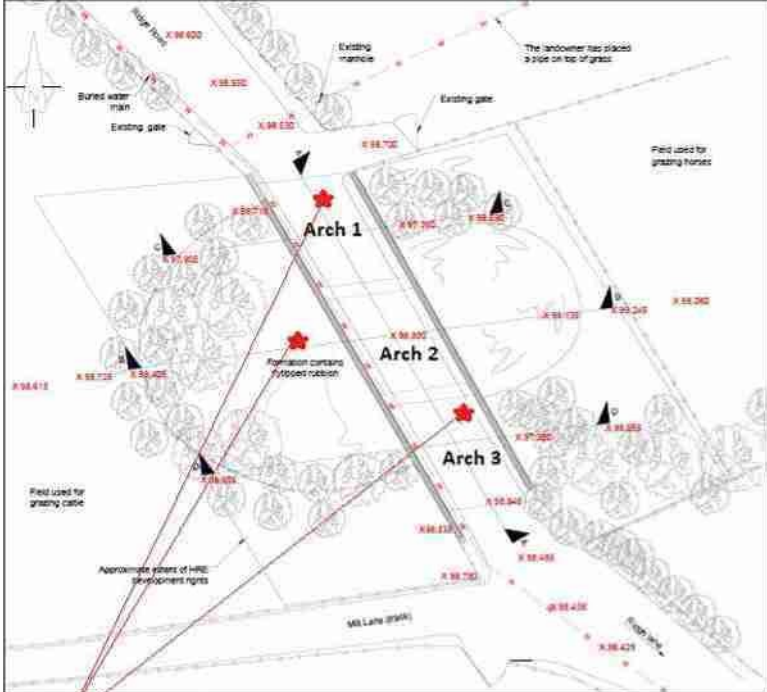
PROJECT
HRE WORKS FRAMEWORK

DRAWING TITLE
STRUCTURE ESB 10m 4ch
CANARDS GRAVE ROAD BRIDGE
EXISTING GENERAL ARRANGEMENT

DRAWING STATUS
FORM B

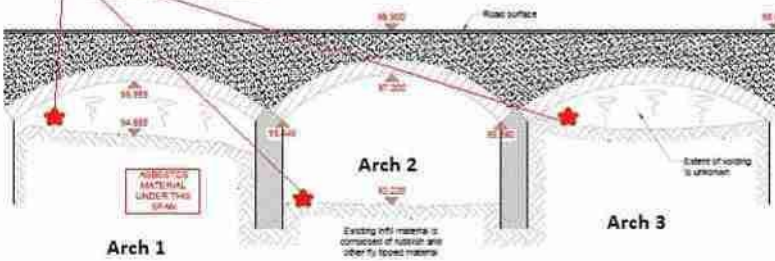
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JACOBS No. B18280DW
CLIENT No. ESB 10m4ch
DRAWING NUMBER B18280-DW-0001

REV 02



Position of Static bat detectors

PLAN (for illustration only)



Arch 1






Arch 2

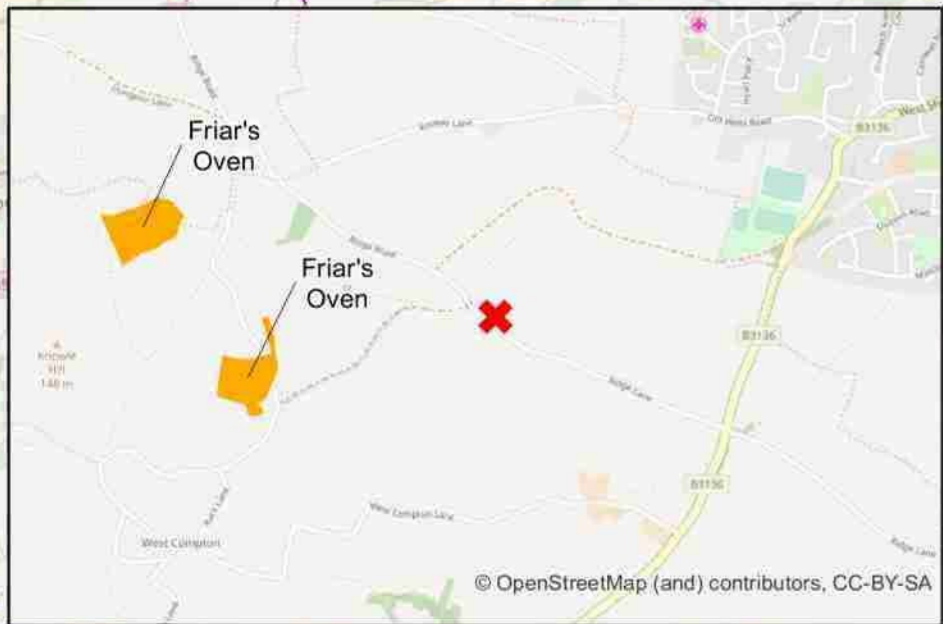
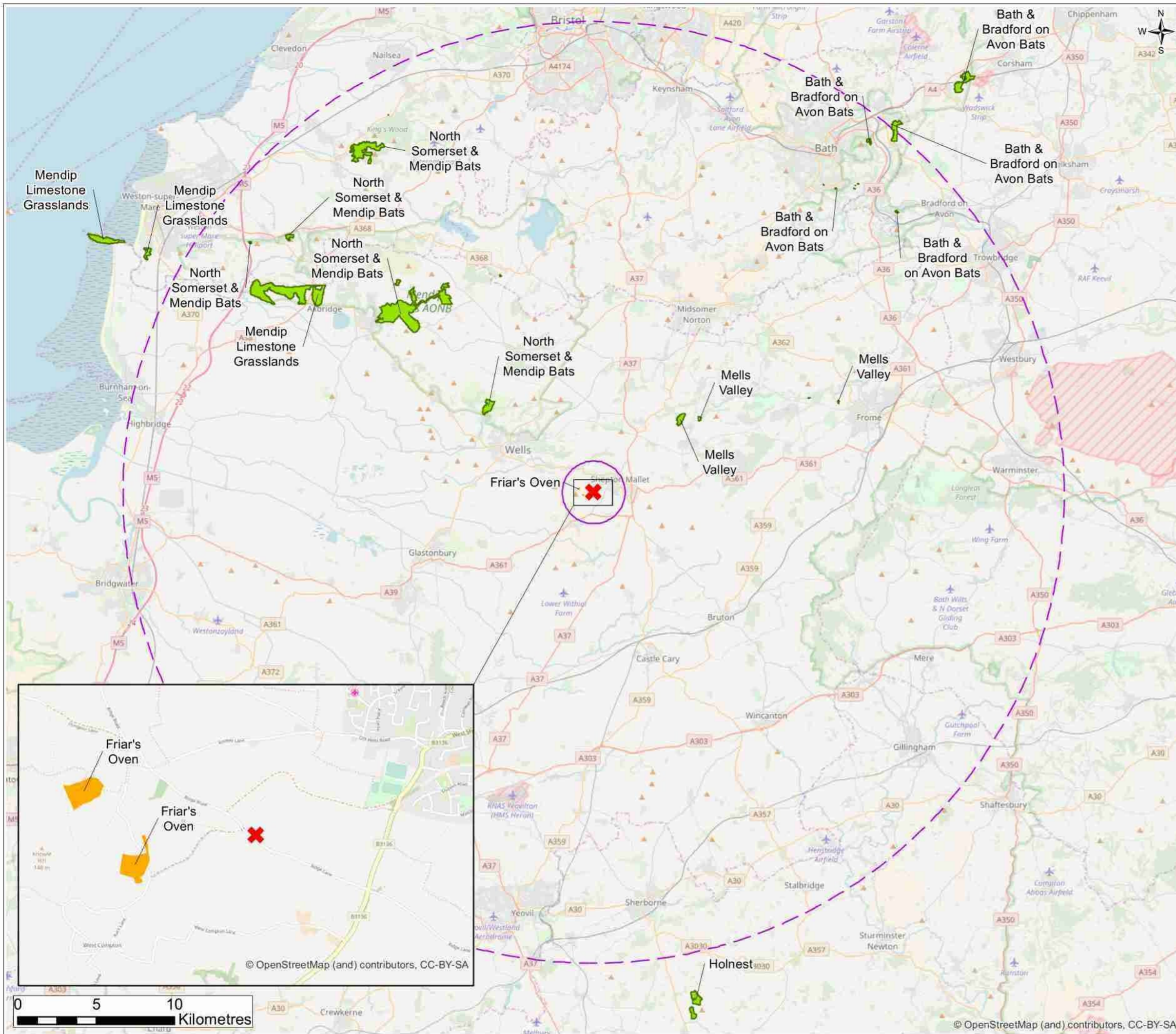
Arch 3

SECTION (for illustration only)

FIGURE 4

Legend

-  ESB/10m4ch location
-  2km study area
-  30km study area
-  Special Area of Conservation (SAC)
-  Site of Special Scientific Interest (SSSI)



Rev.	Date	Initial Issue	FL	LW	CK	CK
0	29/11/2017	Initial Issue				
		Purpose of revision	Drawn	Check'd	Rev'd	Apprd

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Client: highways england

Project: ESB/10m4ch Canards Grave Road Bridge

Drawing Title: Figure 4: Statutory designated sites

Scale @ A3	1:235,000	DO NOT SCALE
Jacobs No.	B18280DW/04	

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FIGURE 5

- Legend**
- ESB/10m4ch location
 - Footprint of proposed works
 - A2.1 Dense/continuous scrub
 - B4 Improved grassland
 - B6 Poor semi-improved grassland
 - C3.1 Other tall herb and fern - ruderal
 - G1 Standing water
 - J2.1.1 Species rich hedgerow
 - J2.1.2 Species poor hedgerow
 - J2.3.2 Hedge and trees - species poor



0	29/11/2017	Initial Issue	FL	LW	CK	CK
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Apprd

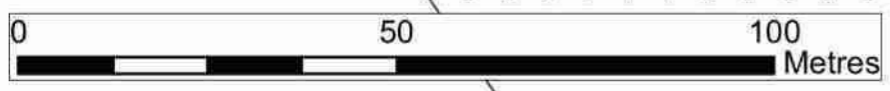


Client:

Project: ESB/10m4ch Canards Grave Road Bridge

Drawing Title: Figure 5: Phase 1 habitat survey results

Scale @ A3	1:1,000	DO NOT SCALE
Jacobs No.	B18280DW/05	






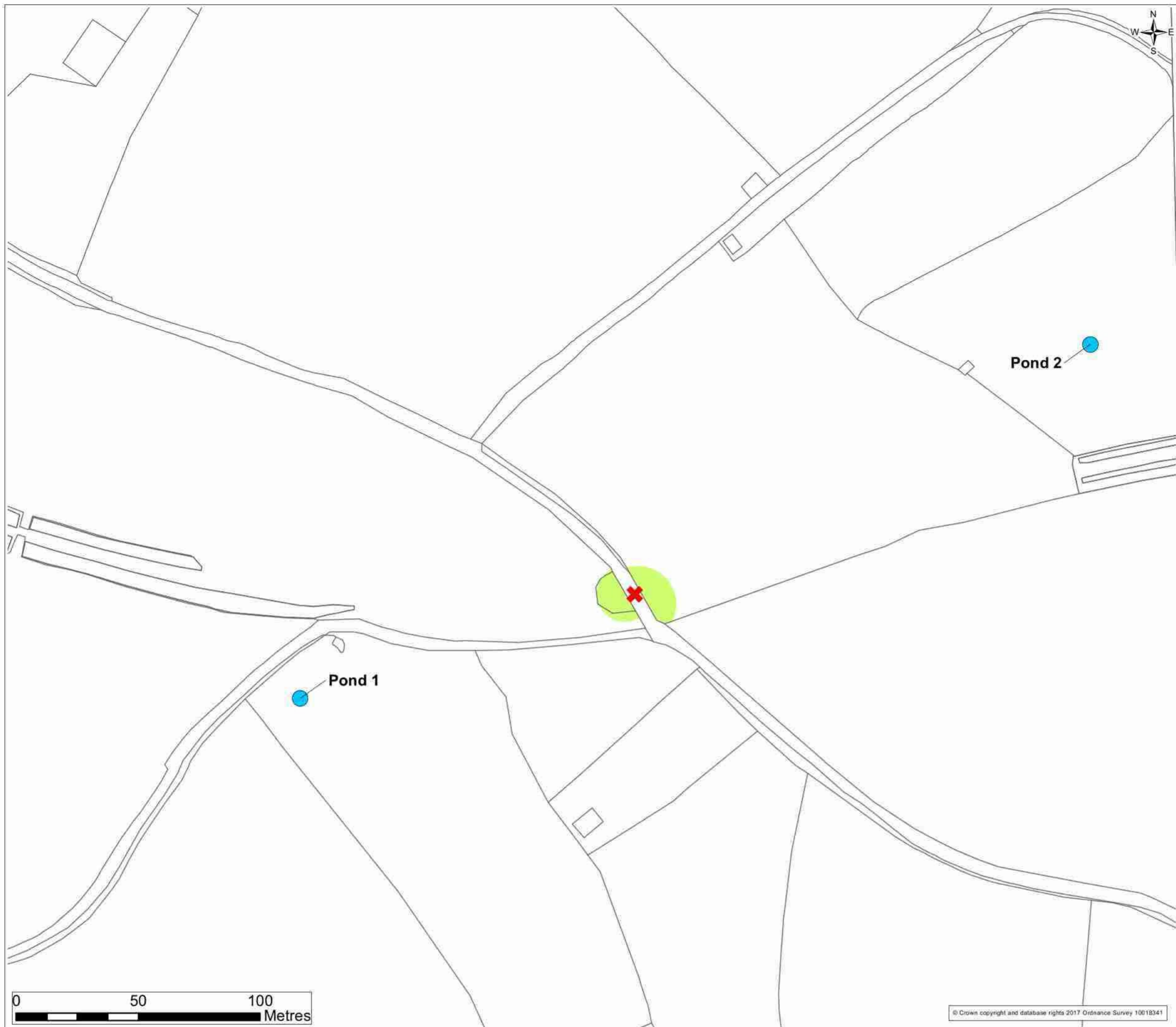
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FIGURE 6

Legend

-  ESB/10m4ch location
-  Footprint of proposed works
-  Great crested newt positive ponds (eDNA sampled)



0	29/11/2017	Initial Issue	FL	LW	CK	CK
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Apprd



Client
highways england

Project
ESB/10m4ch Canards Grave Road Bridge

Drawing Title
Figure 6: Locations of ponds that were assessed and eDNA sampled






Scale @ A3	1:1,500	DO NOT SCALE
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FIGURE 7

Legend

-  ESB/10m4ch location
 -  Footprint of proposed works
- Badger survey results**
-  Digging
 -  Latrine
 -  Pathway



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0	29/11/2017	Initial Issue				
		Purpose of revision	Drawn	Check'd	Rev'd	Apprd



Client: highways england

Project: ESB/10m4ch Canards Grave Road Bridge

Drawing Title: Figure 7: Badger survey results

Scale @ A3	1:750	DO NOT SCALE
Jacobs No.	B18280DW/07	




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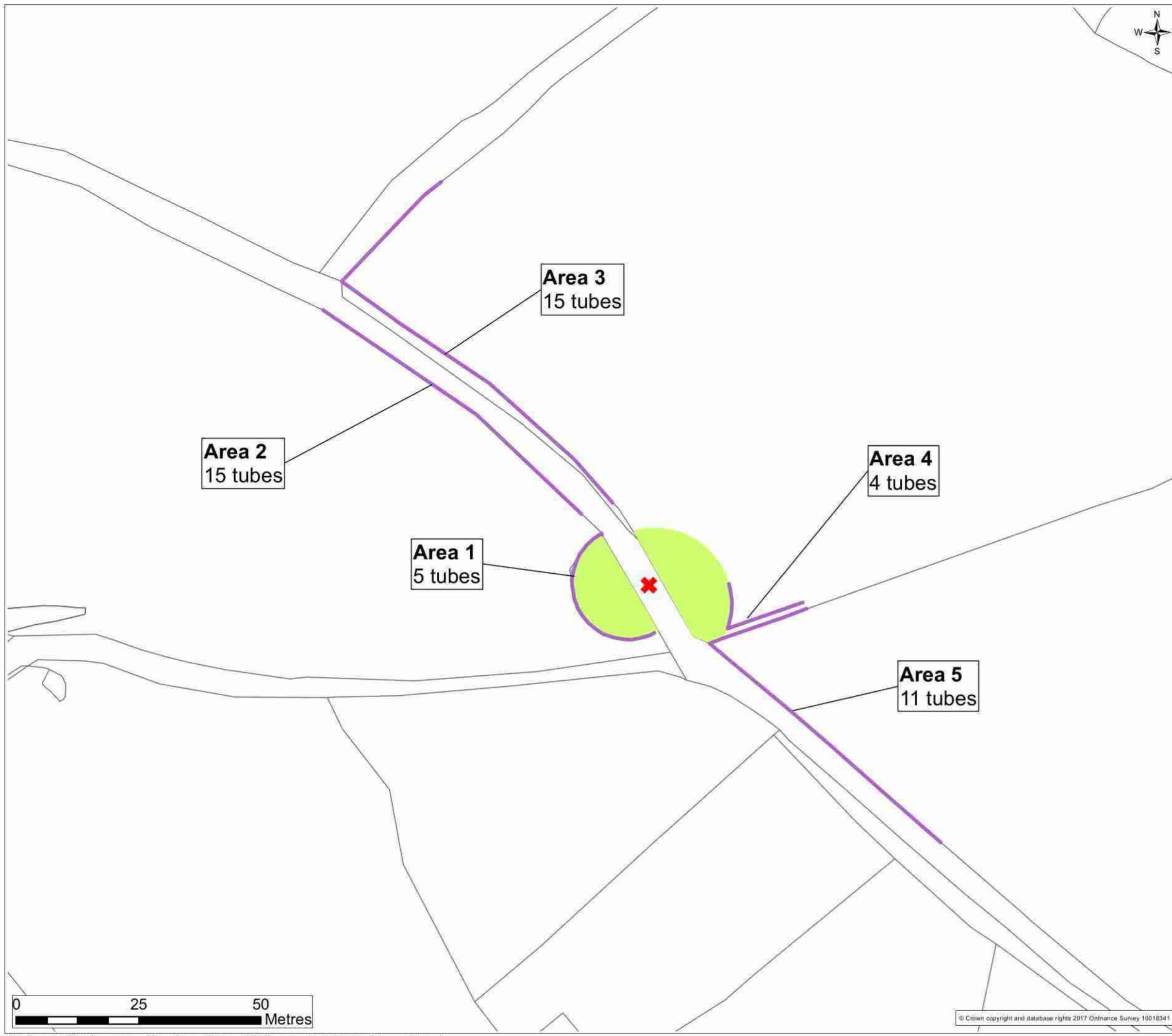


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FIGURE 8

Legend

-  ESB/10m4ch location
-  Footprint of proposed works
-  Locations of dormouse tubes



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Apprd
0	29/11/2017	Initial Issue	FL	LW	CK	CK



Client: highways england

Project: ESB/10m4ch Canards Grave Road Bridge

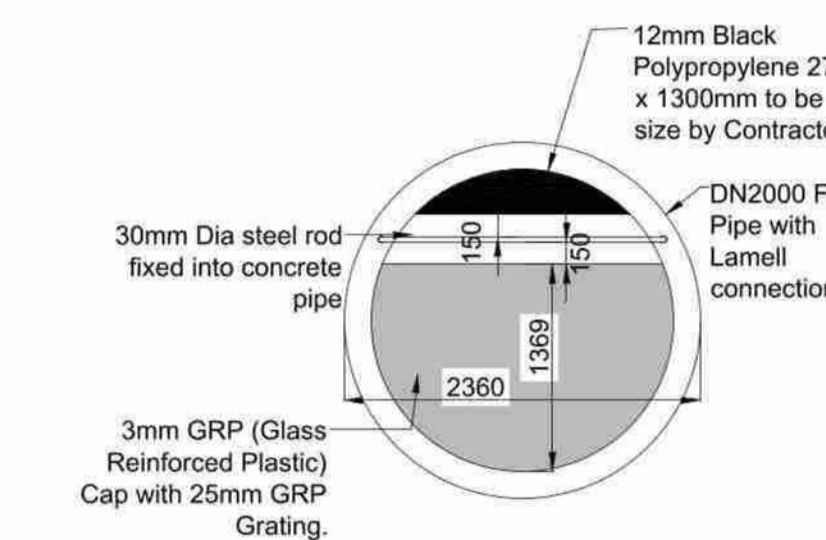
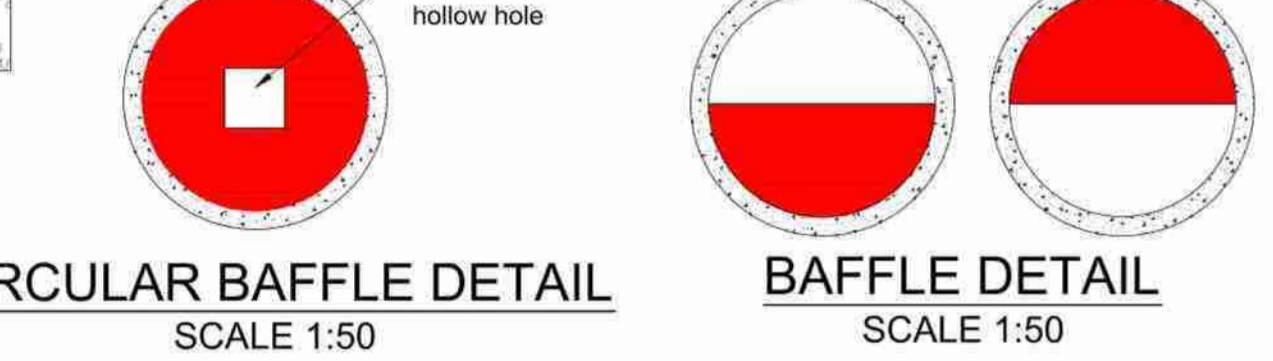
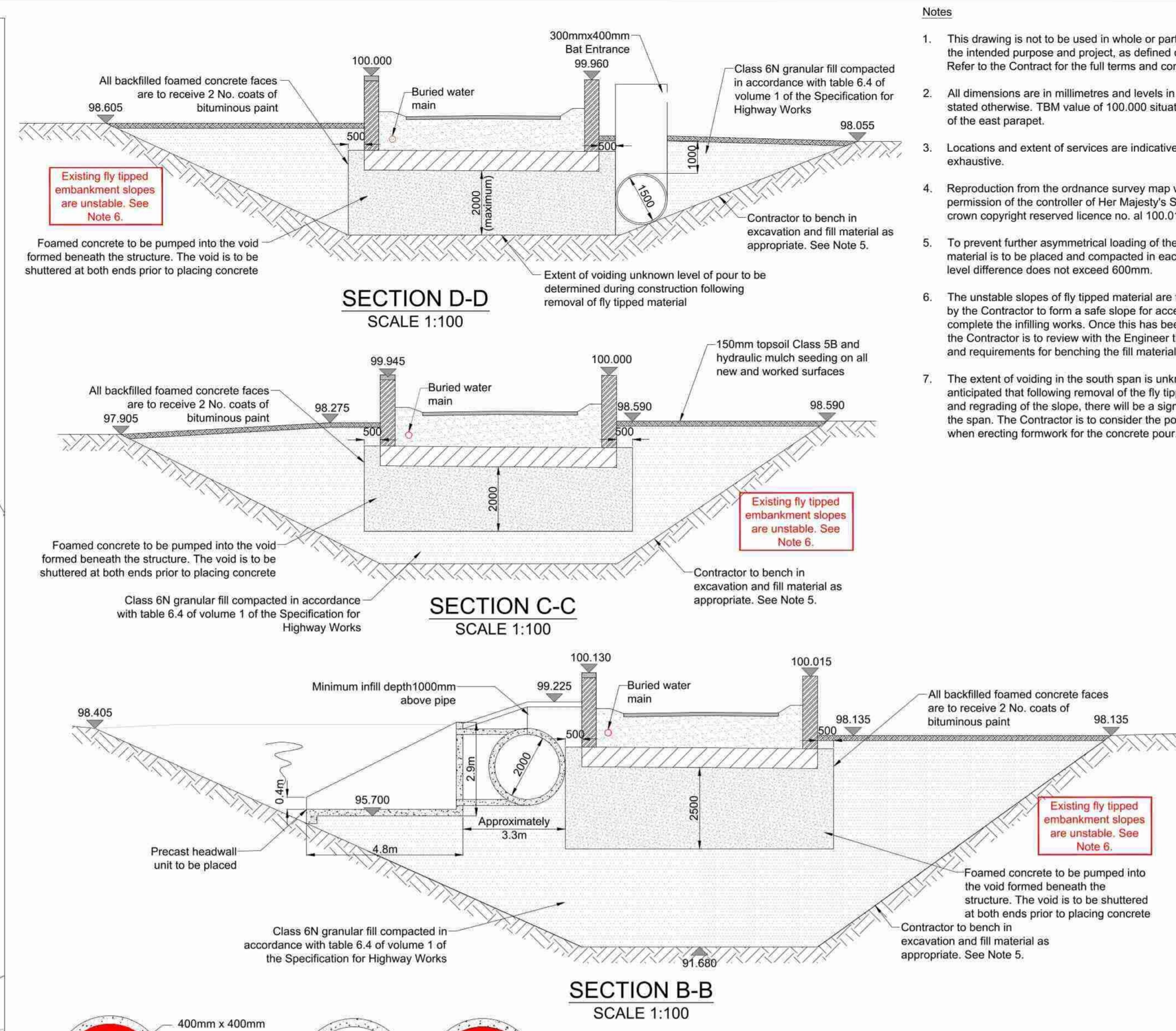
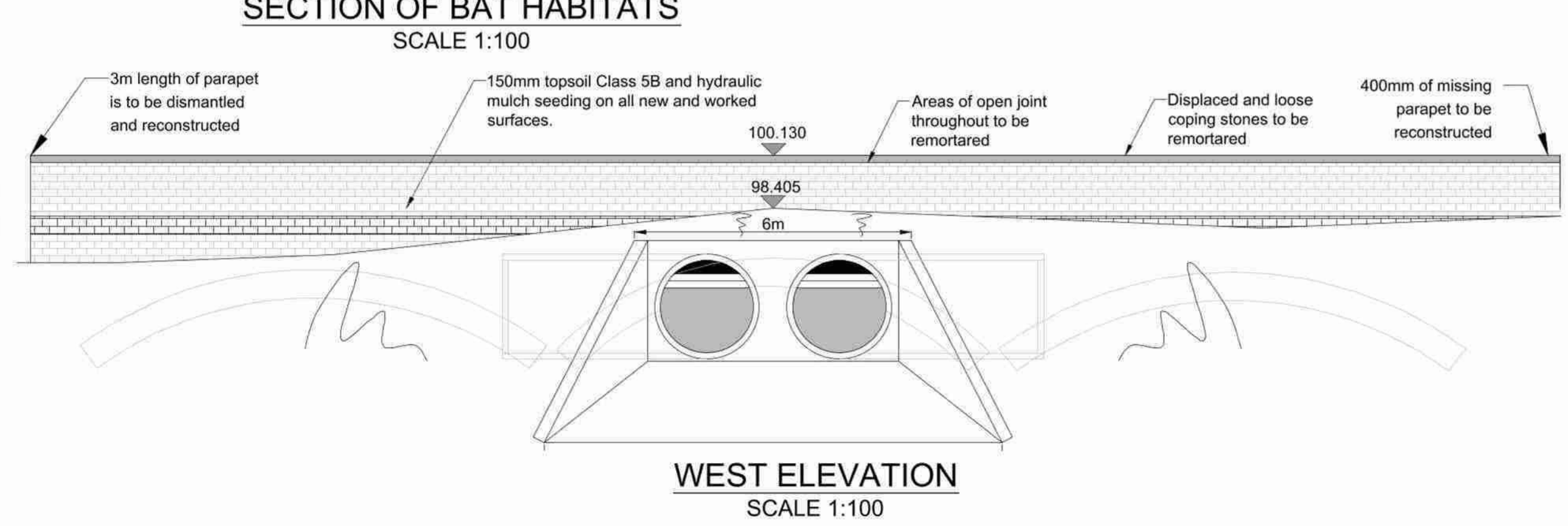
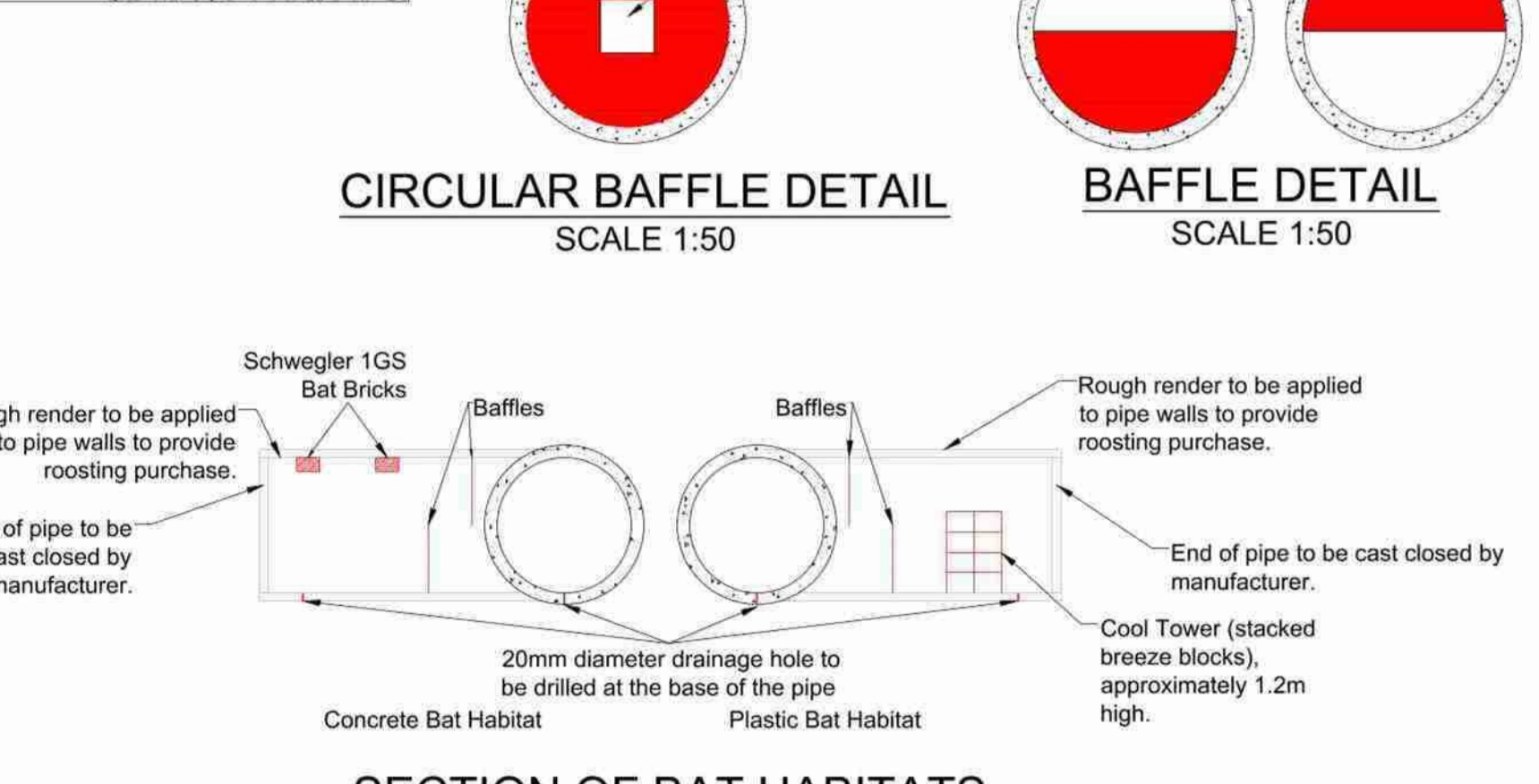
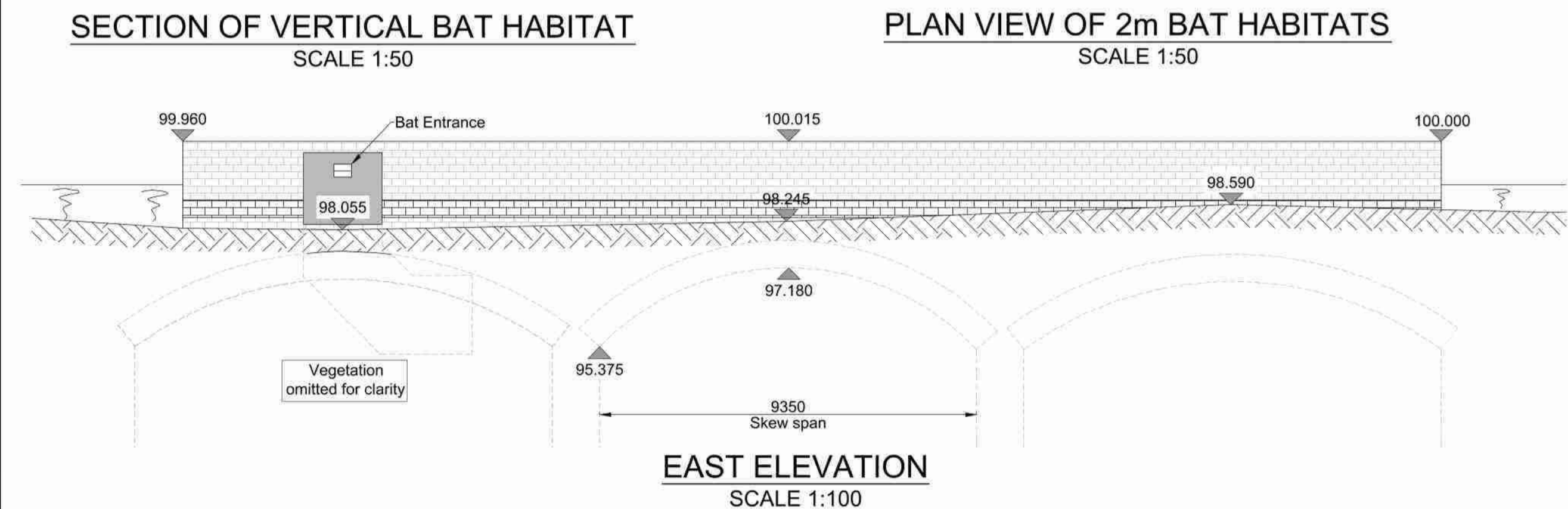
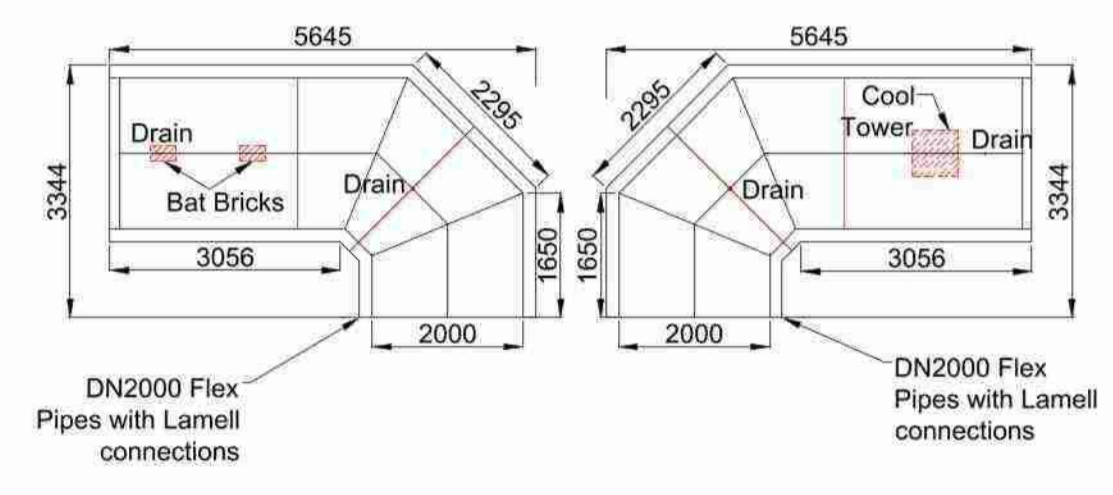
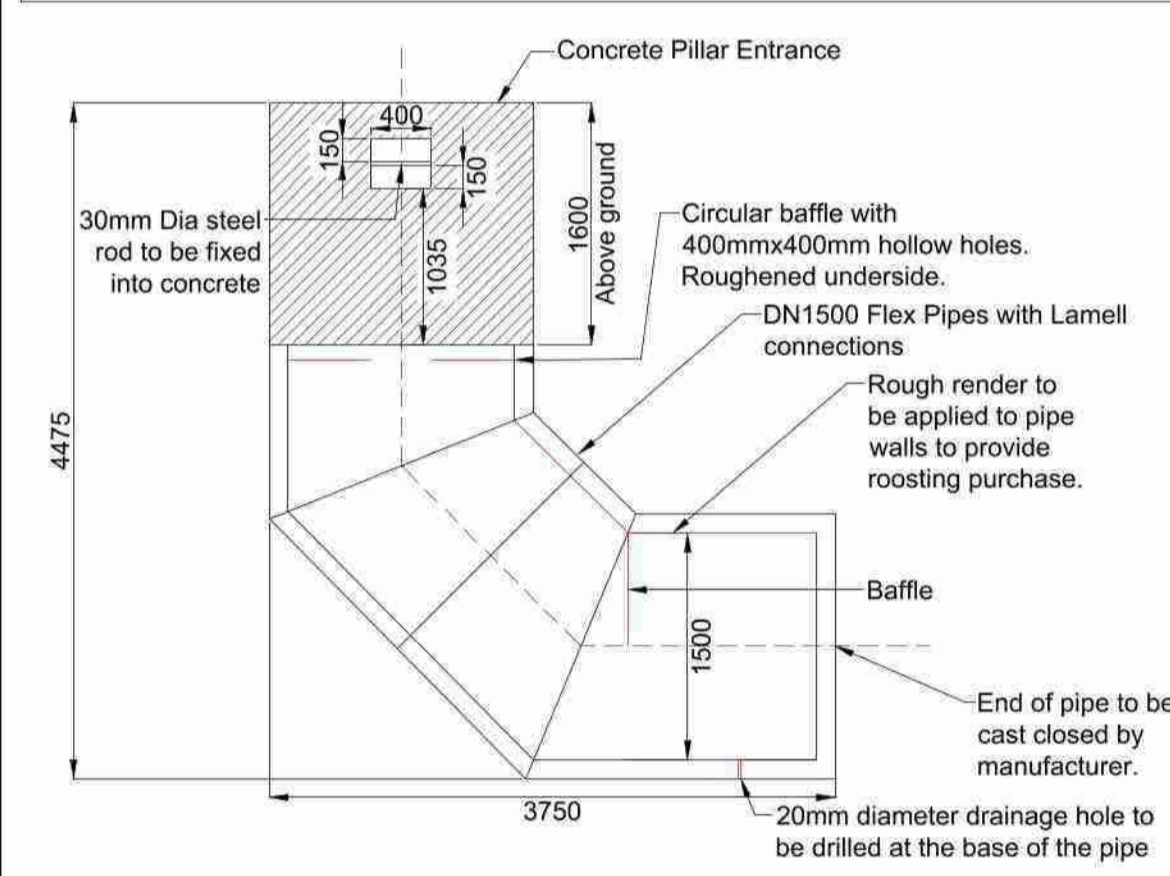
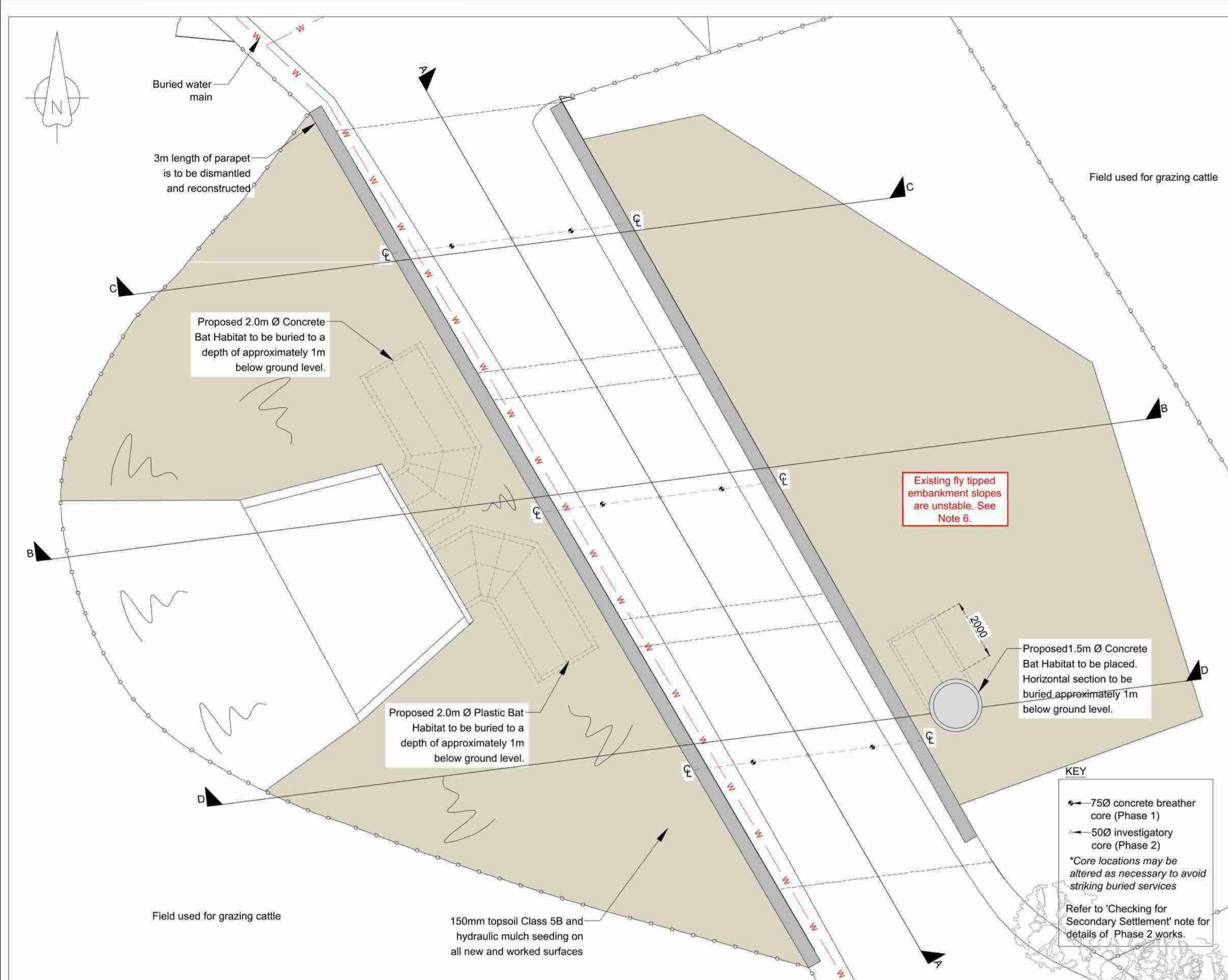
Drawing Title: Figure 8: Locations of dormouse tubes

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 - Locations and extent of services are indicative only and not exhaustive.
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 - To prevent further asymmetrical loading of the pier, fill material is to be placed and compacted in each span so the level difference does not exceed 600mm.
 - The unstable slopes of fly tipped material are to be regraded by the Contractor to form a safe slope for access and to complete the infilling works. Once this has been completed the Contractor is to review with the Engineer the slope angle and requirements for benching the fill material into the slope.
 - The extent of voiding in the south span is unknown. It is anticipated that following removal of the fly tipped material and regrading of the slope, there will be a significant void in the span. The Contractor is to consider the possible slope when erecting formwork for the concrete pour.

FOR INFORMATION

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01					

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WEBSITE: WWW.JACOBS.COM

CLIENT: Historical Railways Estate on behalf of the DfT

PROJECT: MAJOR WORKS PROGRAMME 2012-15

DRAWING TITLE: STRUCTURE ESB/10m4ch
CANARDS GRAVE ROAD BRIDGE
PROPOSED GENERAL ARRANGEMENT

DRAWING STATUS: FORM B

SCALE: AS NOTED @ A1 DO NOT SCALE

JACOBS No. B18280DW
CLIENT No. ESB/10m4ch
DRAWING NUMBER: B18280-DW-0002

REV 01

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Appendix B. Biological data records

Somerset Environmental Records Centre bat species records within 5km of structure ESB10m4ch

Scientific name	Common Name	Approximate Distance from Structure (km)	Date of Record	Number of records
		1.14	01/04/2004	1 Count of Adult Female
		2.17	31/08/2000	1 Count of juvenile female
		2.95	15/04/2001	Present, Count
		3.27	20/09/1988	2 Count
		1.72	06/10/2003	20 Count
		2.64	06/02/2003	6 Count of adult
		2.57	06/02/2003	3 Count of adult
		2.91	01/01/1900	1 Count of present
		1.3	06/03/2002	1 Count of droppings; 2 Count of adult
		3.27	20/09/1988	2 Count of present
		2.93	27/05/1987	20 Count of present
		2.76	20/02/2013	1 Count of roost
		2.21	11/11/1992	1 Count of present
		2.21	11/11/1992	1 Count of droppings
		1.37	20/09/1990	1 Count of droppings
		2.03	29/05/2013	1 Count of roost
		3.81	20/03/1987	1 Count of present
		4.01	31/03/2008	
		4.01	31/03/2008	
		4.01	31/03/2008	
		4.01	31/03/2008	
		4.01	31/03/2008	
		2.19	12/11/1996	Present, Count
		3.81	20/03/1987	Present, Count
		2.69	12/09/2005	1 Count
		2.64	21/08/1995	1 Count
		3.97	04/02/1996	Present, Count
		3.75	01/12/1999	Present, Count
		1.16	14/06/2002	Present, Count
		2.11	01/01/1985	Present, Count
		3.19	02/07/1999	4 Count
		1.3	06/02/2003	2 Count of Adult
		1.3	27/12/2009	5 Count of Adult
		3.09	12/02/1999	Present, Count
		1.72	07/12/2009	2 Count of Adult
		2.93	27/05/1987	20 Count
		2.35	13/09/1999	1 Count
		2.57	06/02/2003	3 Count of Adult
		1.3	06/02/2003	
		2.66	06/03/2003	6 Count of Adult
		2.21	11/11/1992	1 Count
		1.37	20/09/1990	Present, Count
		2.21	11/11/1992	Present, Count

	2.82	15/08/2001	50 Count of Adult
	2.21	01/12/2001	Present, Count
	2.28	07/10/1999	Present, Count
	3.81	20/03/1987	Present, Count

Somerset Environmental Records Centre other protected and notable species records within 2km of structure ESB10m4ch

Scientific name	Common Name	Approximate Distance from Structure (km)	Date of Record	Number of records
<i>Meles meles</i>	Eurasian Badger	1.13	15/10/2002	
<i>Lutra lutra</i>	European Otter	1.04	25/04/2009	2 Count of present
<i>Meles meles</i>	Eurasian Badger	1.96	14/05/1990	1 Count of nest
<i>Meles meles</i>	Eurasian Badger	1.96	14/05/1990	
<i>Meles meles</i>	Eurasian Badger	1.19	26/06/1990	1 Count of nest
<i>Meles meles</i>	Eurasian Badger	1.24	31/03/1991	
<i>Meles meles</i>	Eurasian Badger	1.48	15/09/1990	1 Count of badger sett
<i>Meles meles</i>	Eurasian Badger	1.48	15/09/1990	1 Count of nest
<i>Lutra lutra</i>	European Otter	1.03	28/02/2009	2 Count of Droppings
<i>Lutra lutra</i>	European Otter	1.03	31/01/2009	2 Count of Droppings
<i>Lutra lutra</i>	European Otter	1.03	31/03/2009	2 Count of Droppings
<i>Lutra lutra</i>	European Otter	1.72	31/05/2008	3 Count of present
<i>Lutra lutra</i>	European Otter	2.03	02/04/1984	1 Count of droppings
<i>Lutra lutra</i>	European Otter	1.04	28/02/2005	1 Count of droppings
<i>Neomys fodiens</i>	Eurasian Water Shrew	1.16	27/04/2005	1 Count of present
<i>Lutra lutra</i>	European Otter	1.21	19/12/2006	
<i>Lutra lutra</i>	European Otter	1.21	31/05/2006	1 Count of present
<i>Lutra lutra</i>	European Otter	1.04	31/01/2013	1 Count of Individual
<i>Meles meles</i>	Eurasian Badger	1.03	31/12/1995	
<i>Meles meles</i>	Eurasian Badger	0.87	17/01/1993	4 Count of active holes
<i>Meles meles</i>	Eurasian Badger	1.96	31/12/1995	
<i>Meles meles</i>	Eurasian Badger	1.51	31/12/1995	
<i>Meles meles</i>	Eurasian Badger	1.27	31/12/1991	6 Count of active holes
<i>Meles meles</i>	Eurasian Badger	1.41	31/07/1992	
<i>Meles meles</i>	Eurasian Badger	1.35	31/12/1991	
<i>Meles meles</i>	Eurasian Badger	1.25	31/12/1991	
<i>Meles meles</i>	Eurasian Badger	1.04	31/12/1991	12 Count of active holes
<i>Meles meles</i>	Eurasian Badger	1.06	31/12/1995	3 Count of active holes
<i>Micromys minutus</i>	Harvest Mouse	1.54	04/11/1973	1 Count of Individual
<i>Meles meles</i>	Eurasian Badger	1.13	24/03/2002	1 Count of present
<i>Tyto alba</i>	Barn owl	1.45	03/08/2003	

Appendix C. Raw survey data

C.1 Bats – Emergence/Re-entry Survey Data

Date	Survey	Time Sunrise/ Sunset/	Start Time	Finish Time	Weather conditions	Roost Observations	General Observation
26 May 2016	Dusk Emergence	21:09 BST	20:30	00:00	17 C Fine, 90% Cloud cover, wind Beaufort 1	<p>██████████ Arch 1 at 21:54.</p> <p>██████████ light sampling behaviour noted under Arch 1.</p> <p>██████████ foraging under Arch 1 and Arch 2 continued until 23:46.</p> <p>██████████ bat recorded on IR camcorder (only) emerging from Arch 3 at 21:43.</p>	<p>██████████ (21:30). Not clear if it flew in or emerged from structure.</p> <p>██████████ calls heard briefly at 22:14 and 22:17 but not seen.</p> <p>Automated detectors recorded ██████████ activity in Arch 1 at 21:23, ie before sunset and before emergence noted</p> <p>Automated detectors recorded ██████████ in Arch 3 at 21:50 suggesting the bat may have emerged from Arch 3.</p>
21 June 2016	Dusk Emergence	21:28 BST	20:52	23:55	12 C Fine, 100% Cloud cover, No wind	<p>██████████ bat Emerged from Arch 1 at 22:17.</p> <p>██████████ foraging under Arch 1 and Arch 2 continued throughout survey. Number of animals estimated at 2.</p>	<p>██████████ was observed flying over deck and then under structure at 21:40.</p> <p>██████████ was noted foraging but not associated with the structure.</p> <p>Automated detectors confirmed sporadic activity by ██████████ throughout the survey.</p>

Date	Survey	Time Sunrise/ Sunset/	Start Time	Finish Time	Weather conditions	Roost Observations	General Observation
18-19 July 2016	Dusk emergence and dawn re-entry	21:14 BST - 05:18 BST	21:16 BST (dusk) 03:45 BST (dawn)	00:16 BST (dusk) 05:16 BST (dawn)	23 C (Dusk) 17 C (Dawn) 0% cloud cover Fine, light breeze	No emergence or re-entry noted. Observation was constrained by dense vegetation.	<p>██████████ bat activity noted from 21:50 but levels were low compared to previous months.</p> <p>██████████ bat activity was recorded by automated detectors at 21:32 and 21:23 in Arch 1 and Arch 3 respectively suggesting that this species was day roosting in the structure.</p> <p>██████████ foraging activity noted throughout survey.</p> <p>██████████ species foraging noted.</p>
8-9 August 2016	Dusk emergence and dawn re-entry	20:43 BST 05:49 BST	04:15 (dawn) 20:30 (dusk)	05:50 (dawn) 23:20 (dusk)	15 C (Dusk) 9 C (Dawn) Fine 5% cloud cover, wind Beaufort 4	<p>██████████ was observed emerging from Arch 3 at 21:36 and re- entering at 21:37.</p>	<p>Observation was improved from July manual survey by positioning a surveyor under the structure.</p> <p>At the start of the survey a ██████████ was noted roosting in a weep hole in the soffit of the central arch.</p> <p>██████████ bat heard but not seen during dusk at 21:44.</p> <p>██████████ bat seen foraging under Arch 1 and Arch 2, possibly present in Arch 1 at start of dawn survey</p>

Date	Survey	Time Sunrise/ Sunset/	Start Time	Finish Time	Weather conditions	Roost Observations	General Observation
13-14 September 2016	Dusk emergence and dawn re-entry	19:27 BST - 06:43 BST	19:00 (dusk) 05:15 (dawn)	22:15 (dusk) 06:50 (dawn)	19 C (dusk) 18 C (Dawn) Fine 50% cloud cover, wind Beaufort 3 (dusk) Beaufort 4 (dawn)	<p>A [redacted] emerged at 19:40 from within Arch 2 and then foraged under the structure until 19:54.</p> <p>A [redacted] bat emerged from Arch 1 at 19:55. Light sampling and foraging behaviour was noted in Arch 1 and Arch 2.</p> <p>At 20:14 [redacted] bats commuted in from the north side of the structure and entered Arch 3.</p> <p>A [redacted] bat was recorded flying in Arch 1 at 05:25. It was not seen so it was not established for certain if it was present in the arch at the start of the survey or if it flew in from elsewhere. greater horseshoe bat calls were recorded in the arch until 05:35.</p>	<p>A [redacted] bat was noted commuting from south to north above the structure at 20:05 then descended into the northern arch where it appeared to remain flying but may have perched briefly.</p> <p>A [redacted] was detected but not seen at 20:35.</p> <p>A [redacted] was recorded at 20:27 some distance from the structure.</p> <p>[redacted] bat foraging activity under the structure (estimated 2 or 3 individuals) continued until 21:40</p> <p>A [redacted] bat was recorded at 06:04 but not seen.</p>

C.2 Great crested newt - Survey Data

Full HSI Results

Water Body Number	Location	Area (sq m)	Pond Permanence	Water Quality	Shade (%)	Waterfowl	Fish	Pond Density	Terrestrial Habitat Quality	Macrophyte Cover (%)	HSI Sum	Final HSI Score
1	1	0.10	0.50	1.00	1.00	1.00	1.00	0.80	0.80	1.00	0.03	0.71
2	1	0.10	0.10	0.33	0.30	1.00	1.00	1.00	1.00	0.30	0.00	0.44

eDNA survey results

Waterbody name /number	Date of eDNA survey	Location	Approx. distance from structure	Surrounding habitat	eDNA result	Limitations
1	18 th April 2016	In field south west of structure	140m	In edge of grazed field	Negative	None
2	18 th April 2016	In field north east of structure	200m	In edge of grazed field	Negative	None

Great Crested Newt eDNA Results

Company:	Jacobs UK
Address:	2 Glentworth Court, Lime Kiln Close, Stoke Gifford, Bristol, BS34 8SR
Contact:	Leyton Williams
Project No:	B18280DW
Date of Report:	13 th May 2016
Number of samples:	2

Thank you for sending your samples for analysis by NatureMetrics. Your samples have been processed in accordance with the protocol set out in Appendix 5 of Biggs *et al.* (2014).

DNA was precipitated via centrifugation at 14,000g and then extracted using Qiagen Blood and Tissue extraction kits.

qPCR amplification was carried out in 12 replicates per sample using the primers and probe described by Biggs *et al.* (2014) in the presence of both positive and negative controls.

Results indicate GCN absence in both samples. No DNA degradation or PCR inhibition was detected in any sample, and all controls performed as expected.

Sample	Pond ID	Date arrived	GCN Status	eDNA Score	Inhibition	Degradation
GCN000752	Pond 2	20/04/2016	Negative	0/12	No	No
GCN000753	Pond 1 – ESB/10m4ch	20/04/2016	Negative	0/12	No	No

Note that a negative result does not preclude the presence of Great Crested Newts at a level below the limits of detection.

Appendix D. Natural England Discretionary Advice Service – Response regarding ESB10m4ch

Date: 08 September 2016
Our ref: DAS2169/183946
Your ref: ESB/10m4ch



Customer Services
Hornbeam House
Crewe Business Park
Electra Way
Crewe
Cheshire
CW1 6GJ

0300 060 3900

BY EMAIL ONLY: Leyton.williams@jacobs.com

Dear Leyton

Discretionary Advice Service (Charged Advice)

Development proposal and location: ESB/10m4ch Works to infill Canards grave road bridge, (nearest postcode BA4 4PF)

Thank you for your DAS request dated 21 April 2015.

This advice is being provided as part of Natural England's Discretionary Advice Service. Jacobs UK Ltd has asked Natural England to provide advice upon:

- Potential impacts on designated sites
- Biological survey methodology
- Ecological mitigation plan

This advice is provided in accordance with the Quotation and Agreement dated 12 May 2016.

The following advice is based upon the information within the Proposed Survey Methodology (21 April 2016) and your updating emails dated 23 May and 7 June, and our telephone conversation on 6 September 2016.

The bridge is located on Ridge Road to the south west of Shepton Mallet. The bridge carries the road over a now dismantled railway line. Friars Oven Site of Special Scientific Interest (SSSI) lies 600m to the west of the structure. The area under and around the bridge is considered excellent for foraging bats as insect activity is high due to the large amounts of cattle and horse manure present in the fields and also tipped next to and under the bridge. The dismantled railway line is likely to provide a commuting route through the landscape for bats and Horseshoe bats in particular.

The bridge has 3 arches, all of which are partially infilled by rubble and fly tipping. It is now necessary to completely infill the arches in order to support the road securely in the long term.

It has been confirmed that there is access for bats to the north eastern arch and the central arch. There is also a substantial void under the south eastern arch.

Surveys have confirmed:

- A Lesser Horseshoe bat *hibernating* in the north eastern arch;
- Small numbers of Lesser and Greater Horseshoe bats forage around the bridge and use it to night roost;
- Small numbers of Lesser Horseshoes also day roost in the bridge;
- Common Pipistrelles and at least one Natterer's bat roost under the bridge.

Horseshoe bats are likely to be connected to the North Somerset & Mendip Bats Special Area of Conservation (SAC) and the Mells Valley Bats SAC. The site is well connected through the landscape to important maternity and hibernation sites.

Surveying the bridge for bats presents several problems because of risks to the health and safety of personnel. The access to the bridge is very steep and dangerous, particularly in the dark. There is fly-tipped asbestos sheeting under the arches, meaning that face masks and suits are necessary when accessing the arches. At least one fire has been lit under the arches since surveying began (possibly disturbing or even injuring roosting bats).

As the access to the voids under the arches is very constrained, static detectors can be deployed with a high degree of confidence of detecting the very directional calls of horseshoe bats and of identifying any roosting bats present.

We note that the survey methodology proposed does not follow the guidance set out for Horseshoe bat surveys set out in English Nature's Bat Mitigation Guidelines. However, static detectors will be deployed continuously from April to September 2016 and one long dusk emergence survey will be undertaken every month between May and September 2016. Mitigation is likely to involve the construction of replacement roost features within the infill material, using concrete pipes

Advice

We note that the site presents particular difficulties for surveying. With these difficulties in mind, we consider that the surveys proposed will provide adequate data on which to make professional judgments about impacts on different bat species and the potential for Likely Significant Effects on the North Somerset & Mendip and Mells Valley Bats SACs.

It would be helpful if a summary of the data obtained could be provided when the final manual dusk survey is undertaken in September 2016 and when the static surveys are completed in February 2017. When we receive the full data findings, we will provide written confirmation of our advice on the mitigation proposed.

Regionally Important Geographical Site (RIGS)

The three arch bridge is a RIGS due to the exposure of a section of Rhaetian sediments which is the best in the Mendip area. We understand that Jacobs' engineering team is investigating this issue and whether there is a solution which makes the bridge safe whilst leaving the geological interest exposed.

The advice on this proposal, and the guidance contained within Natural England's standing advice relates to this case only and does not represent confirmation that a species licence (should one be sought) will be issued. Please see **Annex 1** for information regarding licensing for bats.

For clarification of any points in this letter, please contact Alison Howell on 07867 900 281.

The advice provided in this letter has been through Natural England's Quality Assurance process

The advice provided within the Discretionary Advice Service is the professional advice of the Natural England adviser named below. It is the best advice that can be given based on the information provided so far. Its quality and detail is dependent upon the quality and depth of the information which has been provided. It does not constitute a statutory response or decision, which will be made by Natural England acting corporately in its role as statutory consultee to the competent authority after an application has been submitted. The advice given is therefore not binding in any way and is provided without prejudice to the consideration of any statutory consultation response or decision which may be made by Natural England in due course. The final judgement on any proposals by Natural England is reserved until an application is made and will be made on the information then available, including any modifications to the proposal made after receipt of discretionary advice. All pre-application advice is subject to review and revision in the light of changes in relevant

considerations, including changes in relation to the facts, scientific knowledge/evidence, policy, guidance or law. Natural England will not accept any liability for the accuracy, adequacy or completeness of, nor will any express or implied warranty be given for, the advice. This exclusion does not extend to any fraudulent misrepresentation made by or on behalf of Natural England.

Yours sincerely

Alison Howell
Somerset, Avon, Wiltshire Team

cc commercialservices@naturalengland.org.uk

Annex 1 **European Protected Species**

A licence is required in order to carry out any works that involve certain activities such as capturing the animals, disturbance, or damaging or destroying their resting or breeding places. Note that damage or destruction of a breeding site or resting place is an absolute offence and unless the offences can be avoided (e.g. by timing the works appropriately), it should be licensed. In the first instance it is for the developer to decide whether a species licence will be needed. The developer may need to engage specialist advice in making this decision. A licence may be needed to carry out mitigation work as well as for impacts directly connected with a development. Further information can be found in Natural England's [How to get a licence](#) publication.

If the application requires planning permission, it is for the local planning authority to consider whether the permission would offend against Article 12(1) of the Habitats Directive, and if so, whether the application would be likely to receive a licence. This should be based on the advice Natural England provides at formal consultation on the likely impacts on favourable conservation status and Natural England's [guidance](#) on how the three tests (no alternative solutions, imperative reasons of overriding public interest and maintenance of favourable conservation status) are applied when considering licence applications.

Natural England's pre-submission Screening Service can screen application drafts prior to formal submission, whether or not the relevant planning permission is already in place. Screening will help applicants by making an assessment of whether the draft application is likely to meet licensing requirements, and, if necessary, provide specific guidance on how to address any shortfalls. The advice should help developers and ecological consultants to better manage the risks or costs they may face in having to wait until the formal submission stage after planning permission is secured, or in responding to requests for further information following an initial formal application.

The service will be available for new applications, resubmissions or modifications – depending on customer requirements. More information can be found on [Natural England's website](#).



Structure ESB 10m 4ch, Ridge Road Bridge, Shepton Mallet

Highways England Historic Railways Estate

Habitats Regulations Assessment Stage 1: Screening

Rev 0

December 2017



Document history and status

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Appendix A: Natural England Consultation Response

Appendix B: Survey Data

1. Introduction

1.1 Terms of reference

Jacobs UK Ltd. has been commissioned by Highways England, Historical Railways Estate (HE HRE) to carry out ecological surveys and a Habitats Regulations Assessment (HRA) Stage 1: Screening report on proposed repair and infill works on structure ESB10m4ch, Ridge Road Bridge (grid reference ST 60165 42870).

Structure ESB10m4ch carries Ridge Road over the former track bed of the East Somerset railway. The track bed is infilled for approximately 1km to the north east and south west of the structure with approximately 10 metres of track bed under the central arch of ESB10m4ch remaining. The structure requires repair work and complete infilling to provide continuous structural support to the bridge arches.

1.2 Habitats Regulations Assessment

The European Directive (92/43/EEC) on the Conservation of Natural Habitats and Wild Flora and Fauna (the Habitats Directive) protects habitats and species of European nature conservation importance. This is transposed into UK law through the Conservation of Habitats and Species Regulations 2017. The Habitats Directive establishes a network of internationally important sites designated for their ecological status (hereafter referred to as the Habitats Regulations). These are referred to as Natura 2000 sites or European sites, and comprise Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites.

Regulation 63 of the Habitats Regulations requires the competent authority (in this case the local planning authority) to carry out an appropriate assessment (AA) on proposed plans or projects which are not necessary for the management of the site but which are likely to have a significant effect on one or more European site(s) either individually, or in combination with other plans and projects. This information normally takes the form of a Habitats Regulations Assessment (HRA) Report.

1.3 Guidance

In the absence of guidance relating specifically to structures, this HRA report has been undertaken with reference to *Assessment of plans and projects significantly affecting Natura 2000 sites Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (EC, 2001) and guidance provided in *Design Manual for Roads and Bridges (DMRB) Volume 11, Section 4, Part 1 (HD44/09): Assessment of Implications (of Highways and / or Roads Projects) on European sites (Including Appropriate Assessment)*.

DMRB HD44/09 sets out a five stage process for assessing the implications of a project on European sites which will allow the competent authority to complete the Habitats Regulation Assessment as required by the Conservation of Habitats and Species Regulations 2017. The stages are shown in Table 1. If no likely significant effects are identified, stages 2-5 will not be required. This report comprises the Stage 1: Screening, only.

Table 1: Habitat Regulations Assessment – Key stages

Stage	Description
1 - Screening	<ul style="list-style-type: none"> • Identify international sites in and around the proposal area; • Examine conservation objectives (if available); • Analyse the proposal and its key components; • Identify potential effects on European Sites; and • Examine other plans and programmes that could contribute to 'in combination' effects.

Stage	Description
	<ul style="list-style-type: none"> If <i>no effects likely</i> – report that no likely significant effect. If <i>effects are judged likely or uncertainty exists</i> – the precautionary principle applies proceed to stage 2.
2 - Appropriate Assessment	<ul style="list-style-type: none"> Collate information on sites and evaluate impact in light of conservation objectives; Consider how plan 'in combination' with other plans and programmes will interact when implemented (the Appropriate Assessment); Consider how effect on integrity of site could be avoided by changes to plan and the consideration of alternatives; and Develop mitigation measures (including timescale and mechanisms).
3 - Assessment of alternative solutions	<ul style="list-style-type: none"> Report outcomes of AA and develop monitoring alternative strategies solutions; If effects remain following the consideration of alternatives and development of mitigations proceed to stage 4.
4 - Imperative reasons of Overriding Public Importance	<ul style="list-style-type: none"> Identify "imperative reasons of overriding public interest" (IROPI).
5 - Compensatory Measures	<ul style="list-style-type: none"> Identify/ develop potential compensatory measures.

1.4 In-combination effects

In-combination effects have been determined based on a review of the relevant district and borough council websites for details on policies and current planning applications in the Mendip district within the last year. The following types of plans and projects were reviewed:

- the incomplete parts of projects that have been started but which are not yet completed;
- projects given consent but not yet started;
- projects that are subject to applications for consent;
- projects that are subject to outstanding appeal procedures;
- any known projects that are not subject to any consent;
- ongoing projects subject to regulatory reviews, such as discharge consents or waste management licences;
- policies and proposals that are not yet fully implemented in plans that are still in force; and
- draft plans that are being brought forward by other public bodies.

In order for an in-combination effect to be possible, the proposal would have to have some level of adverse impact. Where developments were found not to contribute to an adverse effect or cause an adverse effect, the development was scoped out for the purposes of the in-combination effect assessment in this HRA since there would not be any cumulative effects to European sites.

1.5 Consultation

Natural England (NE) were formally consulted on the bat survey effort used (over summer 2016) through the NE Discretionary Advice Service (their full response is shown in Appendix A). Bat Mitigation Guidelines (Mitchell-Jones 2004) recommend that two surveys in each month between May and September are undertaken for horseshoe bat species. A reduction in survey effort using a combination of dusk emergence and dawn re-entry roost surveys and targeted static detectors was proposed since this was found to be most efficient and reliable

based on surveys of [REDACTED] at similar structures CMZ/4m1ch (licence 2015-13565-EPS-MIT) and FOZ/zm22ch (licence 2015-13801-EPS-MIT) in south west England where similar proposed works have been given planning permission or have already been undertaken. Full survey information is given in the ESB10m4ch Ecological Survey Report (Jacobs, 2017).

1.6 Data sources used in this assessment

1.6.1 Desk study

The Multi-Agency Geographic Information for the Countryside (MAGIC) website was used to search for any European sites as detailed in Section 2.2. A data request was made to Somerset Environmental Records Centre (SERC) for records of protected and notable species within 2km of the structure which was extended to 4km for bat species. Annex II species (those that are qualifying feature species for designation of European sites) listed in the SERC returned data is provided in Table 2 and shown in Figure 1.

Table 2: Annex II species records recorded within 2km of the structure

Species	Number of records	Nearest Record	Date range
Great crested newt (<i>Triturus cristatus</i>)	1	1.9km south-east	1996
Otter (<i>Lutra lutra</i>)	10	1km north-east	1984-2013
[REDACTED]	6	1.2km north-east	2002-2009

1.6.2 Field survey

Phase 1 habitat survey

A detailed visual inspection of the structure was undertaken as part of the Preliminary Ecological Appraisal (Appendix D; Jacobs, 2017) on 15 October 2015. The structure and surrounding land were methodically searched for evidence of protected and notable species, habitats. The area immediately around the structure was set in a deep depression formed from what remains of the original railway cutting which has been filled in to within several metres of the structure. This depression is fringed by scrub and ruderal vegetation offering sheltered foraging for bats. Habitats around the structure consisted of species rich intact hedgerow, species poor intact hedgerow, scrub, tall ruderal, poor semi improved grassland, and improved grassland. The fields to the north east were horse grazed, the fields to the south west were cattle grazed. Habitat connectivity was considered good with good bat foraging habitats; the cattle grazed fields with intact hedgerows were assessed as of potential value to horseshoe bat species, depending on animal husbandry (i.e. the use of antiparasitic drugs such as Ivermectin which may have adverse effects on the abundance of the invertebrate prey of bats). A Phase 1 Habitat map is given in Figure 2.

Several potential roost features were noted within the structure itself, including the internal cavities beneath the partially infilled arches, cavities formed by the infill material itself, missing masonry and weep holes. An inspection of the structure during the Preliminary Ecological Appraisal recorded a [REDACTED] roosting in a cavity in the infill material. An endoscope inspection of the bridge was undertaken from ground level on 18 April 2016. An extending five metre pole with an endoscope extension was used to gain access to areas of the structure at height. During this survey, a [REDACTED] was recorded again in a cavity in the infill material. Further detailed inspections of the bridge from the ground using a GoPro Camera fixed to an extending pole (to inspect at height) and an endoscope were carried out on 12 October 2016, 16 January 2017 and 14 February 2017. During these subsequent visits, [REDACTED] was recorded roosting in a cavity formed by missing masonry in the soffit and also hanging in the open from the soffit itself.

Dusk emergence / dawn re-entry roost surveys

Low numbers of bats were observed foraging and/or commuting underneath the structure arches during the dusk emergence/dawn re-entry surveys. A summary of roosting activity is given in Appendix B and summarised in Table 3.

Table 3 : Bat emergence from structure ESB 10m 4ch

Species	Description
[REDACTED]	Up to 3 individuals observed emerging from Arches 1 and 3 at dusk and returning at dawn.
[REDACTED]	One individual observed flying into Arch 1 and remaining in there for a period during a dusk emergence survey. An individual also entered Arch 1 during a dawn survey.

Static detector surveys

Static detectors were deployed in positions with a high degree of confidence that they would record any roosting bats present. Microphones, with extension leads where necessary, were optimally positioned to detect the directional calls of [REDACTED] species and were deployed continuously from April to October 2016 to record activity in each of the three arches. The static detectors recorded levels of bat activity consistent with small numbers of bats present throughout the year. These results concurred with observations made during the dusk emergence/dawn re-entry surveys and daytime inspections.

Static detectors were also deployed in each of the three arches in December 2016 and January to March 2017.

The bat survey data suggests that the bridge is used intermittently throughout the year by individuals or very small numbers of [REDACTED] for day roosting, night roosting hibernating, and foraging. Full survey results are provided in the ESB 10m 4ch Ecological Survey Report (Appendix F; Jacobs, 2017).

Conclusions

[REDACTED] were visually observed in daytime inspections in Arch 1 in spring, autumn and winter months. Static bat detector results and emergence/re-entry survey results confirmed that small numbers of [REDACTED] day roost in Arch 1 throughout the year. Static bat detector results were consistent with this species hibernating in winter and day roosting in spring and autumn in small numbers in Arch 3. Emergence/re-entry surveys confirmed that Arch 3 was used for day roosting by at least one [REDACTED] bat in summer. There was no evidence of breeding activity associated with the structure in any of the three arches.

Emergence/re-entry surveys and static data suggest that the structure was used by small numbers (possibly even a single animal) of [REDACTED] bat, mainly as a night roost, but also as an occasional day roost. A single call was recorded in the central Arch 2 at 16:07 on 9 December 2016 and two calls were recorded at 19:10 on 22 February 2017 which suggests that there was a low level of [REDACTED] activity associated with the structure in the winter. This may indicate that Arch 1 and Arch 3 have been used as a hibernation roost by low numbers of the species for short periods or possibly as a night perch during winter foraging when conditions are mild enough to support this.

2. Scoping

2.1 Description of the proposed project

The structure consists of three arches; the middle arch is open on both sides, the northern arch is open on the south western side but infilled on the north eastern side, and the southern arch is infilled on both sides. The repair work will involve the complete infill of the structure with foamed concrete and granular fill material to provide continuous structural support to the bridge arches. The ends of the parapet would be dismantled and reconstructed and areas of open joint and loose coping stones will be remortared. New embankments will be formed on either side of the structure which will be covered with topsoil and seeded with grassland seed mix.

The proposed works would take up to seven weeks to complete and are anticipated to commence in spring/summer 2020. Land take would be limited to the depression in the ground beneath the structure. All vegetation inside the depression would require removal and would take place between October and February to avoid the breeding bird season. Excavation would be required to form safe access and to bench in the fill material although this would be minimal. Plant would be required to complete the proposed works on site, including tracked excavators and dumpers and rollers to compact the fill material.

2.2 Identifying relevant European sites

The European sites detailed in Table 4 have been identified as they are within the following extents of sensitivity in accordance with guidance set out in the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 4, Part 1 (HD44/09): Assessment of Implications (of Highways and / or Roads Projects) on European sites (Including Appropriate Assessment) and that of professional experience:

- Any European sites within 2km of the proposed works;
- Any European sites designated for any bat species within 30km of the proposed works;
- All European sites for which mobile species are qualifying features and which could potentially use areas or habitats within the extent of the proposed works. Mobile species that are qualifying species of SACs or SPAs that have been considered in this assessment include great crested newt and otter; and / or
- Any additional European sites with hydrological links with the proposed works.

No European Sites are present within 2km of the proposed works. No European Sites were identified with a hydrological connection to the proposed works.

The European sites (and qualifying features) that potentially overlap with the proposed project's zone of influence are detailed in Table 4. Figure 1 illustrates the locations of the European sites in Table 4 in relation to structure ESB 10m 4ch.

Table 4 : European sites

European Site	Approximate Distance and direction from proposed works	Qualifying Features	Scoped in/out and justification
<u>European sites within 2km</u>			
None			
<u>European sites within 30km with bats as qualifying features</u>			
The Mells Valley SAC UK0012658	7km north-east	H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>FestucoBrometalia</i>); Dry grasslands and scrublands on chalk or limestone	Scoped out – no pathway to effect on habitat feature.
		H8310. Caves not open to the public	Scoped out – no pathway to effect on habitat feature.
		[REDACTED]	Scoped in – mobile species recorded within footprint of proposed works
North Somerset and [REDACTED] SAC UK0030052	8.4km north-west	H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>FestucoBrometalia</i>); Dry grasslands and scrublands on chalk or limestone	Scoped out – no pathway to effect on habitat feature.
		H8310. Caves not open to the public	Scoped out – no pathway to effect on habitat feature.
		H9180. <i>Tilio-Acerion</i> forests of slopes, screes and ravines; Mixed woodland on base-rich soils	Scoped out – no pathway to effect on habitat feature.
		S1303. [REDACTED]	Scoped in – mobile species recorded within footprint of proposed works
		S1304. [REDACTED]	Scoped in – mobile species recorded within footprint of proposed works
Mendip Limestone Grasslands SAC UK0030203	21.1km north-west	H4030. European dry heaths	Scoped out – no pathway to effect on habitat feature.
		H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>FestucoBrometalia</i>); Dry grasslands and scrublands on chalk or limestone	Scoped out – no pathway to effect on habitat feature.
		H8310. Caves not open to the public	Scoped out – no pathway to

European Site	Approximate Distance and direction from proposed works	Qualifying Features	Scoped in/out and justification
			effect on habitat feature.
		H9180. <i>Tilio-Acerion</i> forests of slopes, screes and ravines; Mixed woodland on base-rich soils associated with rocky slopes	Scoped out – no pathway to effect on habitat feature.
		S1304. [REDACTED]	Scoped in – mobile species recorded within footprint of proposed works
Bath and Bradford on [REDACTED] SAC UK0012584	28.3km north-east	S1303 [REDACTED]	Scoped in – mobile species recorded within footprint of proposed works
		S1304. [REDACTED]	Scoped in – mobile species recorded within footprint of proposed works
		S1323. [REDACTED]	Scoped out – mobile species not recorded within the footprint of the proposed works or within 4km of the proposed works.
Mobile species – Qualifying feature (Annex II) species records within 2km of structure			
Holnest SAC UK0030350	33km south	S1166 <i>Triturus cristatus</i> ; Great crested newt	Scoped out – no pathway to effect. No breeding ponds within 250m of the structure. Meta-population links at over 30km highly unlikely.
River Usk/ Afon Wysg SAC UK0013007	49km north-west	1095 <i>Petromyzon marinus</i> Sea lamprey	Scoped out – no hydrological connectivity
		1096 <i>Lampetra planeri</i> Brook lamprey	Scoped out – no hydrological connectivity
		1099 <i>Lampetra fluviatilis</i> River Lamprey	Scoped out – no hydrological connectivity
		1103 Twaite shad <i>Alosa fallax</i>	Scoped out – no hydrological connectivity
		1106 <i>Salmo salar</i> Atlantic salmon	Scoped out – no hydrological connectivity
		1163 <i>Cottus gobio</i> Bullhead	Scoped out – no hydrological connectivity

European Site	Approximate Distance and direction from proposed works	Qualifying Features	Scoped in/out and justification
		1355 <i>Lutra lutra</i> European otter	Scoped out – mobile species but no suitable habitat on site and no hydrological connectivity
		3260 Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	Scoped out – no pathway to effect on habitat feature.
		1102 <i>Alosa alosa</i> Allis shad	Scoped out – no hydrological connectivity
Hydrological links with European sites			
None			

2.2.1 Summary

The following European sites which will be taken forward for screening are:

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

The Conservation Objectives for the qualifying features of each European site are presented in the screening matrix in Table 6 in the following Section.

3. Screening Assessment

3.1 Potential effects on European sites

3.1.1 Direct impacts on European Sites

There are no direct impacts within any of the European sites.

3.1.2 Impacts on Qualifying Features of European Sites

Section 2.2.1 and their presence has been identified within the footprint of the proposed infill works. The proposed infill works would result in short-term and long-term negative impacts on the small number of bats using the structure. These are discussed in more detail below and summarised in Table 5.

Short-term impacts

The proposed infill works would likely cause disturbance to bats through construction noise, vegetation clearance and an increase in human presence at the structure.

Vegetation within the proposed works footprint would be cleared ahead of the proposed infill works resulting in a small loss of commuting and foraging habitat, although the proposed infill works are highly localised and similar foraging opportunities are likely to be available in the wider landscape. As the proposed infill works to the bridge are highly localised, there would be no impact on possible 'sustenance zones' for bats of the SAC's (meta-) population. The infilled area around the bridge would be landscaped post-construction with suitable scrub species of local provenance, increasing the amount of foraging habitat available to bats at the site.

Long-term impact

In the longer term, the proposed infill works would result in the permanent loss of [REDACTED] bat and [REDACTED] bat, forcing displaced bats to find other suitable roosting sites. The loss of this roost as a 'stopping off' point on route to other roosts (main breeding or hibernation sites) in the wider area, or for dispersing juveniles, has the potential to fragment bat dispersal routes. The infill process could also cause direct mortality of injury of individual bats if present.

However, it is considered that the roost site at the structure is not a critical resource for the local bat populations due to the small number of bats recorded and that similar roosting opportunities are likely to be available in the wider landscape. Furthermore, the area beneath the structure is subject to illegal fly-tipping and it is likely that the access gaps in two arches which have been partially infilled would eventually be completely blocked off by the continued build-up of waste. A European Protected Species licence relating to a specific method of exclusion would also avoid any potential risk of bat mortality or injury.

The proposed works would have no impact on the populations of [REDACTED] using these European sites because the works will not affect the bats' ability to move through the landscape. The former trackbed is not continuous in its current state and has already been fully infilled to within a few metres of the bridge. There is sufficient surrounding hedgerow and scrub habitats to enable bats to continue commuting through the landscape. It is considered unlikely that [REDACTED] are reliant on flying beneath the structure as movement through the central arch was associated with foraging activity rather than as a commuting route.

Table 5 : Summary of potential impacts during proposed works

Potential Impact	Description	Zone of Influence
Land-take resulting in habitat loss	The permanent loss of a bat roost within the footprint of the proposed works. Short-term loss of commuting and foraging habitat including scrub and trees during the proposed works.	Land within the footprint of the works.
Land-take resulting in severance and fragmentation.	The loss of this transitional roost as a "stopping off" point on route to other roosts (main breeding or hibernation sites) in the wider area, or for dispersing juveniles, has the potential to fragment bat dispersal routes.	Land within the footprint of the works.
Direct mortality during construction.	Death or injury of individuals of feature species as a direct result of the infilling works.	Land within the footprint of the works.
Noise from construction, vegetation clearance and human presence resulting in disturbance.	Direct impact on feature species reducing their ability to forage during construction and /or operation.	Land within the footprint of the works.

3.2 Avoidance and/or embedded mitigation measures

The proposed infill would will cause disturbance to bats during vegetation clearance, potential direct harm (mortality) of bats and the permanent loss of the bat roosts present in the structure. This would constitute offences under the Conservation of Habitats and Species Regulations, 2017. As such a Natural England (NE) European Protected Species (EPS) derogation licence will be obtained ahead of the proposed infill works to allow them to proceed legally. The licence would cover the mitigation detailed below. Its purpose is to avoid or minimise disturbance, minimise the risk of killing or injuring bats and to compensate for the loss of the roosts, which are feasibly linked to the European sites identified in Section 2.2.1.

3.2.1 Timing

The structure supports small numbers of hibernating lesser horseshoe bats and possibly also greater horseshoe bats. Infill and repair works will take place outside of the bat hibernation season (late October-March). The proposed work schedule would consist of a late summer bat exclusion with works taking place during the late summer early autumn season and completed before the next hibernation season in the same year. Therefore, an early August exclusion is proposed with works completed and compensatory roosting provision in place by the end of October.

3.2.2 Pre infill and repair works survey

A licensed ecologist would carry out a pre-construction inspection of all potential roosting features within the structure and trees within the footprint of the works to ensure that roosting bats are not present.

Following inspection all empty suitable features would be blocked to prevent bats from roosting within them. Given the large number of potential roosting areas in the structure this would be best carried out by the use of netting "curtains" which completely cover the open arches. These would be raised at dusk to allow bats to exit, and later lowered and secured at ground level to prevent bat re-entry. This method has been used very effectively by Jacobs ecologists in the past at several similar structures. This procedure would be carried out

during the bat active season (April – October), subject to an EPS derogation licence being granted by Natural England.

3.2.3 Provision of alternative roosting habitat

Bat habitat pipes would be installed and available for use before the beginning of the bat hibernation period (i.e. before the end of October). This assumes infilling works take place August-October.

Two x 2m diameter pipes with horizontal access would be buried on the western side of the structure (one plastic pipe and one concrete pipe) and one x 1.5 metre diameter concrete pipe with vertical access would be buried on the eastern side of the structure. A "pill box" type structure would be constructed from a capped 1.5m diameter pipe with side access grille for this pipe. The layout and detail of these structures is set out in Figure 3.

3.2.4 Commuting and foraging routes

Following the infill of the structure, two thirds of the new embankments would be planted up with taller shrub species of local provenance (hawthorn and field maple) in such a way as to provide a continuation of the linear feature provided by hedgerows and scrub.

3.3 In-combination effects

No projects involving the potential loss of [REDACTED] or [REDACTED] were identified on the Mendip District Council and Somerset County Council planning pages. No in-combination effects with other plans or projects are anticipated in either the construction or operational phases.

3.4 Screening matrix

A screening matrix for likely significant effects on Mells Valley SAC, North Somerset and Mendip Bats SAC, Mendip Limestone Grasslands SAC and Bath and Bradford on Avon Bats SAC is shown in Table 6. This screening matrix only considers the Qualifying Features scoped into this assessment, i.e. [REDACTED] bat and [REDACTED] bat species.

Table 6 : Screening matrix for likely significant effects

Project Name	Structure ESB10m4ch	
Natura 2000 Site under Consideration	<ul style="list-style-type: none"> • Mells Valley SAC • North Somerset and Mendip Bats SAC • Mendip Limestone Grasslands SAC • Bath and Bradford on Avon Bats SAC 	
Date:	Author (Name/Organisation):	Verified (Name/Organisation):
November 2017	 Ecologist, Jacobs	 Principal Ecologist, Jacobs
Description of Project/ Plan		
<i>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:</i>		
• Size and scale	Approximately 0.1ha	
• Land take	The area underneath the structure and immediate surroundings up to approximately 20m.	
• Distance from the European Site or key features of the site (from edge of the project assessment corridor)	Mells Valley SAC is located approximately 7km north-east of the proposed works. North Somerset and Mendip Bats SAC is located approximately 8.4km north-west of the proposed works. Mendip Limestone Grasslands SAC is located approximately 21.1km north-west of the proposed works. Bath and Bradford on Avon Bats SAC is located approximately 28.3km north-east of the proposed works.	
• Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)	The proposed works would require no resources from any European site or land adjacent to any European site.	
• Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	There would be no increase in emissions resulting from the proposed works. There are no watercourses nearby and therefore no pathway to effect.	

Project Name	Structure ESB10m4ch
Natura 2000 Site under Consideration	<ul style="list-style-type: none"> • Mells Valley SAC • North Somerset and Mendip Bats SAC • Mendip Limestone Grasslands SAC • Bath and Bradford on Avon Bats SAC
<ul style="list-style-type: none"> • Excavation requirements (e.g. impacts of local hydrogeology) 	No excavation would be required within or adjacent to any European site. Minimal excavation would be required to form safe access and to bench in the fill material. As the closest European site to the proposed works footprint is 7km away, effects as a result of excavations would not arise.
<ul style="list-style-type: none"> • Transportation requirements 	None of the European sites are located within 200m of the proposed works footprint. Therefore, impacts associated with air quality change arising from transportation requirements would not arise. Tracked excavators and dumpers would be required, as well as rollers to compact the fill material.
<ul style="list-style-type: none"> • Duration of construction, operation etc. 	6-7 weeks starting August 2018.
<ul style="list-style-type: none"> • Other 	N/A
Description of avoidance and/or mitigation measures	
<i>Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:</i>	
<ul style="list-style-type: none"> • Nature of proposals 	<p>A Natural England (NE) European Protected Species (EPS) derogation licence will be obtained ahead of the proposed infill works with the purpose of avoiding or minimising disturbance, minimising the risk of killing or injuring bats and compensating for the loss of the roosts, which are feasibly linked to the European Sites identified in this assessment. This would cover the following mitigation measures:</p> <ul style="list-style-type: none"> • The timing of the proposed infill works to take place outside of the bat hibernation season (late October-March) which is considered to be the most sensitive period for bats using this structure. This is to minimise the impact of disturbance to bats from construction noise, human presence and the bat exclusion during the proposed infill works. The proposed infill works will take place during the late summer/ early autumn season and completed before the next hibernation season (end of October). An early August exclusion is proposed with works completed and compensatory roosting provision in place by the end of October. • A pre-works survey will be undertaken ahead of the proposed infill works by a licensed ecologist who will inspect all potential roosting features within the structure and trees within the footprint of the works. This is to ensure that roosting bats are not present and to avoid the impact of direct mortality or injuring of bats during the proposed infill

Project Name	Structure ESB10m4ch
Natura 2000 Site under Consideration	<ul style="list-style-type: none"> • Mells Valley SAC • North Somerset and Mendip Bats SAC • Mendip Limestone Grasslands SAC • Bath and Bradford on Avon Bats SAC
	<p>works. Following inspection all suitable features will be blocked to prevent bats from roosting within them. This procedure will be carried out during the bat active season (April – October) and is subject to an EPS derogation licence being granted by Natural England.</p> <ul style="list-style-type: none"> • Alternate roosting habitat would be provided in the form of bat habitat pipes installed as part of the infill design and available for use before the beginning of the bat hibernation period (i.e. before the end of October). This is to compensate of the permanent loss of the roost as part of the proposed infill works and any associated severance and fragmentation (transition roost function) resulting from the loss of this roost. This impact would likely occur regardless of whether the proposed infill works take place due to ongoing fly tipping of domestic and farm waste beneath the structure which would eventually completely block off access to the area in which bats were roosting. • Following the infill of the structure, two thirds of the new embankments will be planted up with taller shrub species of local provenance (hawthorn 1.5m transplants and field maple 1.5 transplants) in such a way as to provide a continuation of the linear feature provided by hedgerows and scrub. This will also encourage bats to fly over the structure, thus preventing severance and avoid road casualties. This will compensate for the loss of foraging and commuting habitat due to the land take required for the proposed infill works.
<ul style="list-style-type: none"> • Location 	Within the structure and its immediate surroundings.
<ul style="list-style-type: none"> • Evidence for effectiveness 	The proposed mitigation measures are based on previous experience by Jacobs ecologists of lesser and greater horseshoe roosts at similar structures, including CMZ/4m1ch (Natural England licence 2015-13565-EPS-MIT), FOZ/2m22ch (Natural England licence 2015-13801-EPS-MIT) and the South Bristol Link lime kilns (Natural England licence 2015-12485-EPS-MIT).
<ul style="list-style-type: none"> • Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations) 	The mitigation strategy would be approved under licence by Natural England. Planning would be secured through appropriate planning conditions.

Project Name	Structure ESB10m4ch
Natura 2000 Site under Consideration	<ul style="list-style-type: none"> • Mells Valley SAC • North Somerset and Mendip Bats SAC • Mendip Limestone Grasslands SAC • Bath and Bradford on Avon Bats SAC
Characteristics of European Site(s)	
<i>A brief description of the European Site should be produced, including information on:</i>	
<ul style="list-style-type: none"> • Name of European Site and its EU code 	<p>The information in the following sections (aside from Conservation Objectives) is collated from the relevant citation and Natura 2000 – Standard Data Form (for SACs and SPAs) for each respective designated site.</p> <ul style="list-style-type: none"> • Mells Valley SAC • North Somerset and Mendip Bats SAC • Mendip Limestone Grasslands SAC • Bath and Bradford on Avon Bats SAC
<ul style="list-style-type: none"> • Location and distance of the European Site from the proposed works 	<p>Mells Valley SAC is located approximately 7km north-east of the proposed works. North Somerset and Mendip Bats SAC is located approximately 8.4km north-west of the proposed works. Mendip Limestone Grasslands SAC is located approximately 21.1km north-west of the proposed works. Bath and Bradford on Avon Bats SAC is located approximately 28.3km north-east of the proposed works.</p>
<ul style="list-style-type: none"> • European Site size 	<p>Mells Valley SAC: 28.22ha North Somerset and Mendip Bats SAC: 561.19ha Mendip Limestone Grasslands SAC: 417.47ha Bath and Bradford on Avon Bats SAC: 107.16ha</p>
<ul style="list-style-type: none"> • Key features of the European Site including the primary reasons for selection and any other qualifying interests 	<p>Mells Valley SAC Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) for which the area is considered to support a significant presence. Caves not open to the public for which the area is considered to support a significant presence. [REDACTED] for which this is considered to be one of the best areas in the United Kingdom.</p>

Project Name	Structure ESB10m4ch
Natura 2000 Site under Consideration	<ul style="list-style-type: none"> • Mells Valley SAC • North Somerset and Mendip Bats SAC • Mendip Limestone Grasslands SAC • Bath and Bradford on Avon Bats SAC
	<p>North Somerset and Mendip Bats SAC</p> <p>Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) for which this is considered to be one of the best areas in the United Kingdom.</p> <p>Caves not open to the public for which the area is considered to support a significant presence.</p> <p><i>Tilio-Acerion</i> forests of slopes, screes and ravines for which this is considered to be one of the best areas in the United Kingdom.</p> <p>[REDACTED] for which this is considered to be one of the best areas in the United Kingdom.</p> <p>[REDACTED] for which this is considered to be one of the best areas in the United Kingdom.</p> <p>Mendip Limestone Grasslands SAC</p> <p>European dry heaths for which the area is considered to support a significant presence.</p> <p>Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) for which this is considered to be one of the best areas in the United Kingdom.</p> <p>Caves not open to the public for which the area is considered to support a significant presence.</p> <p><i>Tilio-Acerion</i> forests of slopes, screes and ravines for which the area is considered to support a significant presence.</p> <p>[REDACTED] for which the area is considered to support a significant presence.</p> <p>Bath and Bradford on Avon Bats SAC</p> <p>[REDACTED] for which this is considered to be one of the best areas in the United Kingdom.</p> <p>[REDACTED] for which the area is considered to support a significant presence.</p> <p>[REDACTED] for which this is considered to be one of the best areas in the United Kingdom.</p>
<ul style="list-style-type: none"> • Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways 	<p>Mells Valley SAC</p> <ul style="list-style-type: none"> • Public access/ disturbance (caves not open to the public and greater horseshoe bat) • Wildfire/arson (greater horseshoe bat)

Project Name	Structure ESB10m4ch
Natura 2000 Site under Consideration	<ul style="list-style-type: none"> • Mells Valley SAC • North Somerset and Mendip Bats SAC • Mendip Limestone Grasslands SAC • Bath and Bradford on Avon Bats SAC
	<ul style="list-style-type: none"> • Direct impact from third party (greater horseshoe bat) • Under-grazing (greater horseshoe bat) • Inappropriate designation boundary (greater horseshoe bat) <p>North Somerset and Mendip Bats SAC</p> <ul style="list-style-type: none"> • Planning permission ([redacted] bat; [redacted] bat) • Change to site conditions ([redacted] bat; [redacted] bat) • Disease (mixed woodland on base-rich soils associated with rocky slopes; [redacted] bat) • Air pollution ([redacted] bat) <p>Mendip Limestone Grasslands SAC</p> <ul style="list-style-type: none"> • None relating directly to greater horseshoe bats <p>Bath and Bradford on Avon Bats SAC</p> <ul style="list-style-type: none"> • Planning permission ([redacted] bat; [redacted] bat) • Change in land management ([redacted] bat; [redacted] bat) • Direct impact from third party ([redacted] bat; [redacted] bat) • Offsite habitat availability/management ([redacted] bat; [redacted] bat) • Public access/ disturbance ([redacted] bat; [redacted] bat) • Change to site conditions ([redacted] bat; [redacted] bat) • Inappropriate designation boundary ([redacted] bat; [redacted] bat)

Project Name	Structure ESB10m4ch
Natura 2000 Site under Consideration	<ul style="list-style-type: none"> • Mells Valley SAC • North Somerset and Mendip Bats SAC • Mendip Limestone Grasslands SAC • Bath and Bradford on Avon Bats SAC
<ul style="list-style-type: none"> • European Site conservation objectives – where these are readily available 	<p>Mells Valley SAC, North Somerset and Mendip Bats SAC, Mendip Limestone Grasslands SAC and Bath and Bradford on Avon Bats SAC</p> <p>With regard to the natural habitats and/or species for which the site has been designated, and subject to natural change:</p> <ul style="list-style-type: none"> • Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; <ul style="list-style-type: none"> • The extent and distribution of qualifying natural habitats and habitats of qualifying species; • The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species; • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely; • The populations of qualifying species; • The distribution of qualifying species within the site.
Assessment Criteria	
<p><i>Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.</i></p>	
<p>The screening assessment has concentrated on those issues upon which the integrity of habitats within the European sites or on which their designated qualifying features are dependent may be affected, as detailed below:</p> <ul style="list-style-type: none"> • habitat loss due to land-take (i.e. roost loss); • severance and fragmentation due to the loss of a roosting site (potential transition function of the roost); • direct mortality during construction; and 	

Project Name	Structure ESB10m4ch
Natura 2000 Site under Consideration	<ul style="list-style-type: none"> • Mells Valley SAC • North Somerset and Mendip Bats SAC • Mendip Limestone Grasslands SAC • Bath and Bradford on Avon Bats SAC
<ul style="list-style-type: none"> • noise and human presence resulting in disturbance. 	
Initial Assessment	
<p><i>The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:</i></p>	
<ul style="list-style-type: none"> • Reduction of habitat area 	<p>Due to the distances involved, there would be no habitat loss within the European sites described above. Approximately 0.1ha would be lost as part of the footprint of the proposed infill works which includes the area underneath the structure and immediate surroundings up to approximately 20m. Up to two thirds of this area supports scrub habitat with individual trees which [REDACTED] and [REDACTED] bats use for foraging and commuting. This habitat would be lost in the short-term during vegetation clearance ahead of the proposed infill works but will be replaced as part of the proposed mitigation.</p>
<ul style="list-style-type: none"> • Disturbance to key species 	<p>Without mitigation, there would be short-term disturbance to a small number of individuals of [REDACTED] bats and [REDACTED] bats arising from noise from construction, vegetation clearance and human presence during the proposed infill works. The timings of the proposed infill works avoid the most sensitive period for these species (i.e. the hibernation period late October to March). Bats would be excluded from the structure ahead of the proposed infill works to avoid disturbance to any individuals that would otherwise be roosting in the structure.</p>
<ul style="list-style-type: none"> • Habitat or species fragmentation 	<p>There would be no habitat fragmentation within any European site as a result of the proposed works. Without mitigation, the loss of the structure as a transitional roost or "stopping off" point on route to other roosts (main breeding or hibernation sites) in the wider area, or for dispersing juveniles, has the potential to fragment bat dispersal routes. The proposed mitigation compensates for the loss of this roost through the provision of a replacement roost as part of the infill design. In the long term, this is likely to have a positive effect as the roost is likely to be lost over time due to the continued build-up of flytipping material around the structure. The proposed infilling of the structure presents a positive opportunity to provide safe, secure and resilient compensatory roosting habitat for the bat species.</p>

Project Name	Structure ESB10m4ch
Natura 2000 Site under Consideration	<ul style="list-style-type: none"> • Mells Valley SAC • North Somerset and Mendip Bats SAC • Mendip Limestone Grasslands SAC • Bath and Bradford on Avon Bats SAC
<ul style="list-style-type: none"> • Reduction in species density 	It is unlikely that any of the qualifying species would be affected by the proposed works in a way that could lead to a reduction in species density. A EPS licence would be obtained which would include mitigation measures to avoid the killing or injuring of bats through the exclusion of bats from the structure, to avoid disturbance to roosting bats through the timing of the proposed infill works to avoid the sensitive hibernation period, to compensate for the loss of the roost through the provision of replacement roosts as part of the infill design and the short term minor loss of foraging and commuting habitat through the provision of replacement habitat on the newly formed embankments.
<ul style="list-style-type: none"> • Changes in key indicators of conservation value (water quality etc.) 	It is expected that there would be no adverse changes in key indicators of conservation value due to the distances between the European sites and the proposed works.
<ul style="list-style-type: none"> • Climate change 	It is unlikely that there would be any effects on European sites arising from the proposed works. MONARCH (Modelling Natural Resource Responses to Climate Change) (Berry et al. 2007) was a seven-year phased programme to assess impacts of projected climate change on wildlife in Britain and Ireland and modelled the potential for changes in the ranges of 120 species selected for nature conservation action in the UK Biodiversity Action Plan (BAP), including the ██████████ bat. MONARCH predicted that ██████████ bats would gain substantial potential "climate space", i.e. increase their potential range due to a northward shift of suitable habitat. It can be assumed that responses from ██████████ bats would be similar. Therefore, it is unlikely that any of the SAC (meta-)populations of ██████████ bats would be significantly adversely affected by climate change if any effects were deemed likely.
<i>Describe any likely impacts on the European Site as a whole in terms of:</i>	
<ul style="list-style-type: none"> • Interference with the key relationships that define the structure of the site 	No Likely Significant Effects anticipated
<ul style="list-style-type: none"> • Interference with key relationships that define the function of the site 	No Likely Significant Effects anticipated
<i>Indicate the significance as a result of the identification of impacts set out above in terms of:</i>	

Project Name	Structure ESB10m4ch
Natura 2000 Site under Consideration	<ul style="list-style-type: none"> • Mells Valley SAC • North Somerset and Mendip Bats SAC • Mendip Limestone Grasslands SAC • Bath and Bradford on Avon Bats SAC
• Reduction of habitat area	No Likely Significant Effects anticipated
• Disturbance to key species	No Likely Significant Effects anticipated
• Habitat or species fragmentation	No Likely Significant Effects anticipated
• Loss	No Likely Significant Effects anticipated
• Fragmentation	No Likely Significant Effects anticipated
• Disruption	No Likely Significant Effects anticipated
• Disturbance	No Likely Significant Effects anticipated
• Change to key elements of the site (e.g. water quality, hydrological regime etc.)	No Likely Significant Effects anticipated
<i>Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.</i>	
None of the above impacts are assessed as likely to be significant.	
Outcome of screening stage	No likely significant effects.
Are the appropriate statutory environmental bodies in agreement with this conclusion	This document is provided to consult with Natural England and the Local Planning Authority.

4. Conclusions

4.1 Is the project directly connected with or necessary to the management of the site?

The proposed works are not directly connected with, or necessary to, the management of any European sites.

4.2 Is the proposal likely to have a significant effect on the features of the site of European importance, alone or in combination with other plans and projects?

No likely significant effects on the features of the European sites, alone or in-combination with other plans or projects, are anticipated since no likely significant effects on the features of the European sites were identified during this assessment.

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European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC [http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf]

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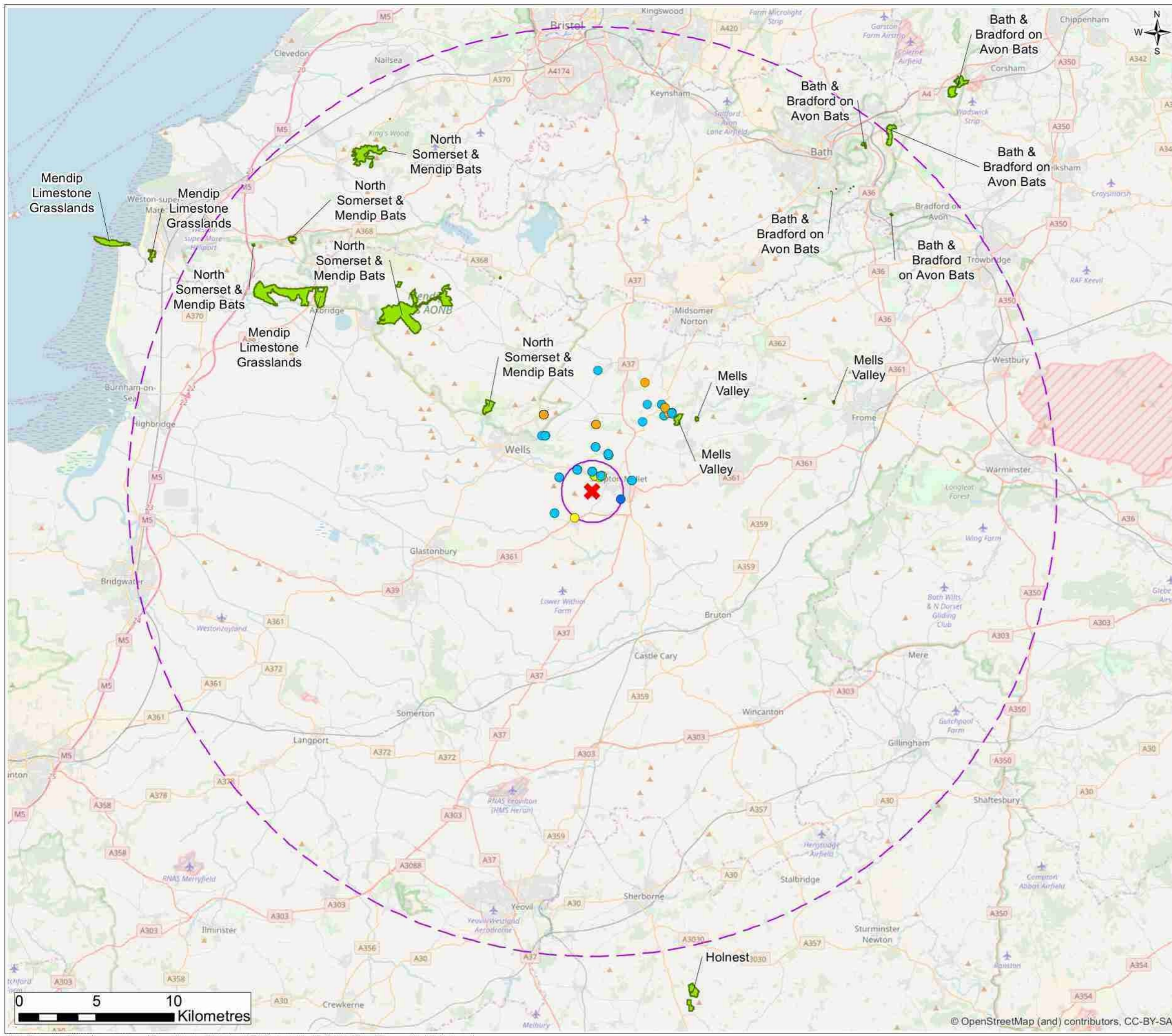
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Multi Agency Geographical Information Centre (MAGIC) [www.magic.gov.uk]

Figures

- Figure 1: European sites and relevant species records
- Figure 2: Phase 1 Habitat map
- Figure 3: Proposed general arrangement

FIGURE 1



Legend

- ✕ ESB/10m4ch location
- 2km study area
- 30km study area
- Special Area of Conservation (SAC)

Annex II species

- European otter
- Great crested newt
- Greater horseshoe bat
- Lesser horseshoe bat



Rev.	Date	Initial Issue	FL	CK	WB	NR
0	27/10/2017	Initial Issue				
		Purpose of revision	Drawn	Checked	Revised	Approved

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Client: highways england

Project: ESB/10m4ch Canards Grave Road Bridge

Drawing Title: Figure 1: European sites scoped in for initial review and species records

Scale @ A3	1:237,114	DO NOT SCALE
Jacobs No.	B18280DW/01	

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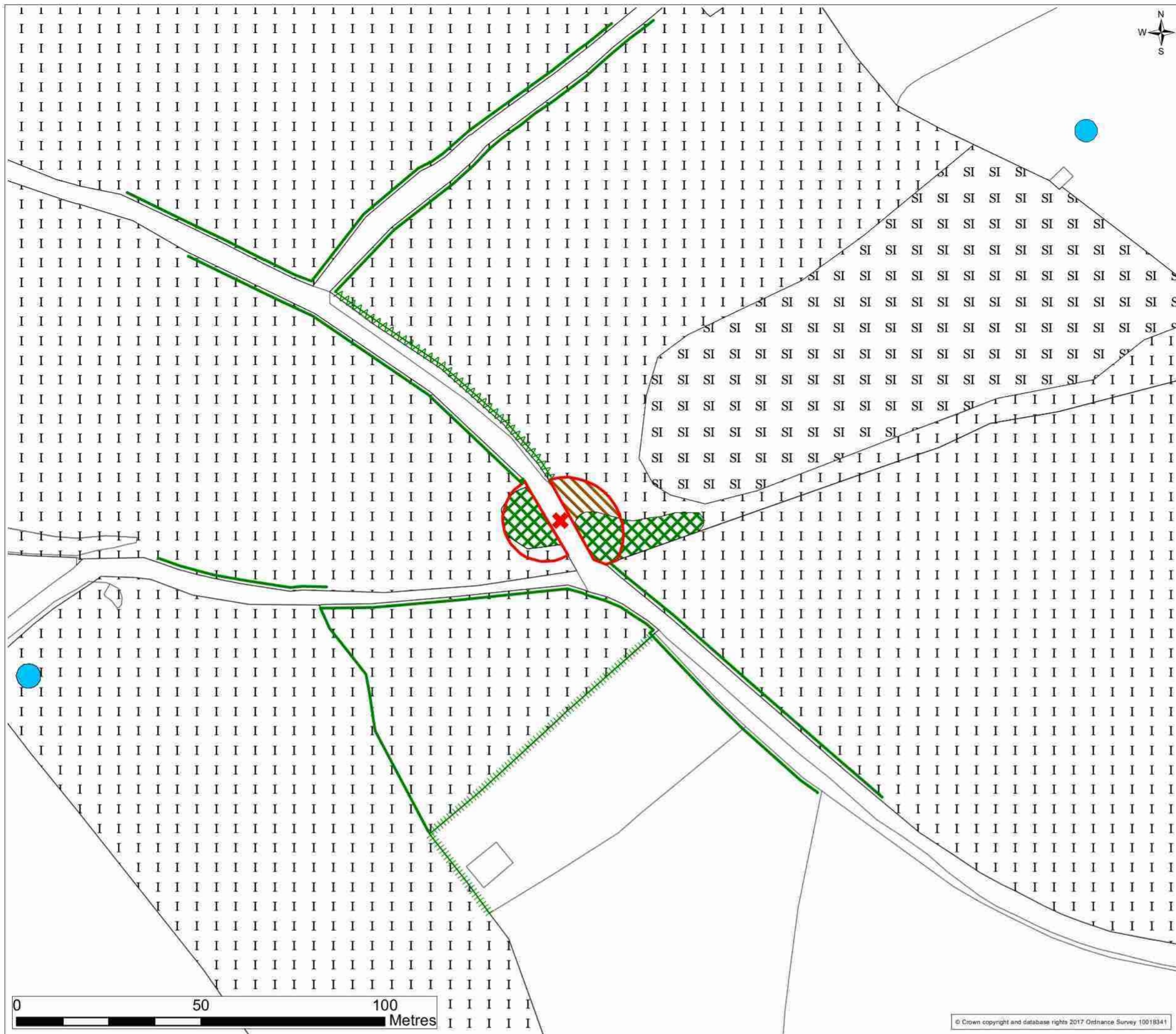


FIGURE 2

- Legend**
- ✕ ESB/10m4ch location
 - Footprint of proposed works
 - A2.1 Dense/continuous scrub
 - B4 Improved grassland
 - B6 Poor semi-improved grassland
 - C3.1 Other tall herb and fern - ruderal
 - G1 Standing water
 - J2.1.1 Species rich hedgerow
 - J2.1.2 Species poor hedgerow
 - J2.3.2 Hedge and trees - species poor



Rev.	Date	Purpose of revision	FL	LW	CK	CK
0	29/11/2017	Initial Issue				
			Drawn	Check'd	Rev'd	Apprd

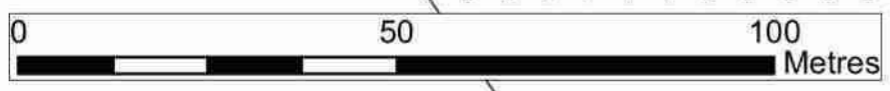


Client: highways england

Project: ESB/10m4ch Canards Grave Road Bridge

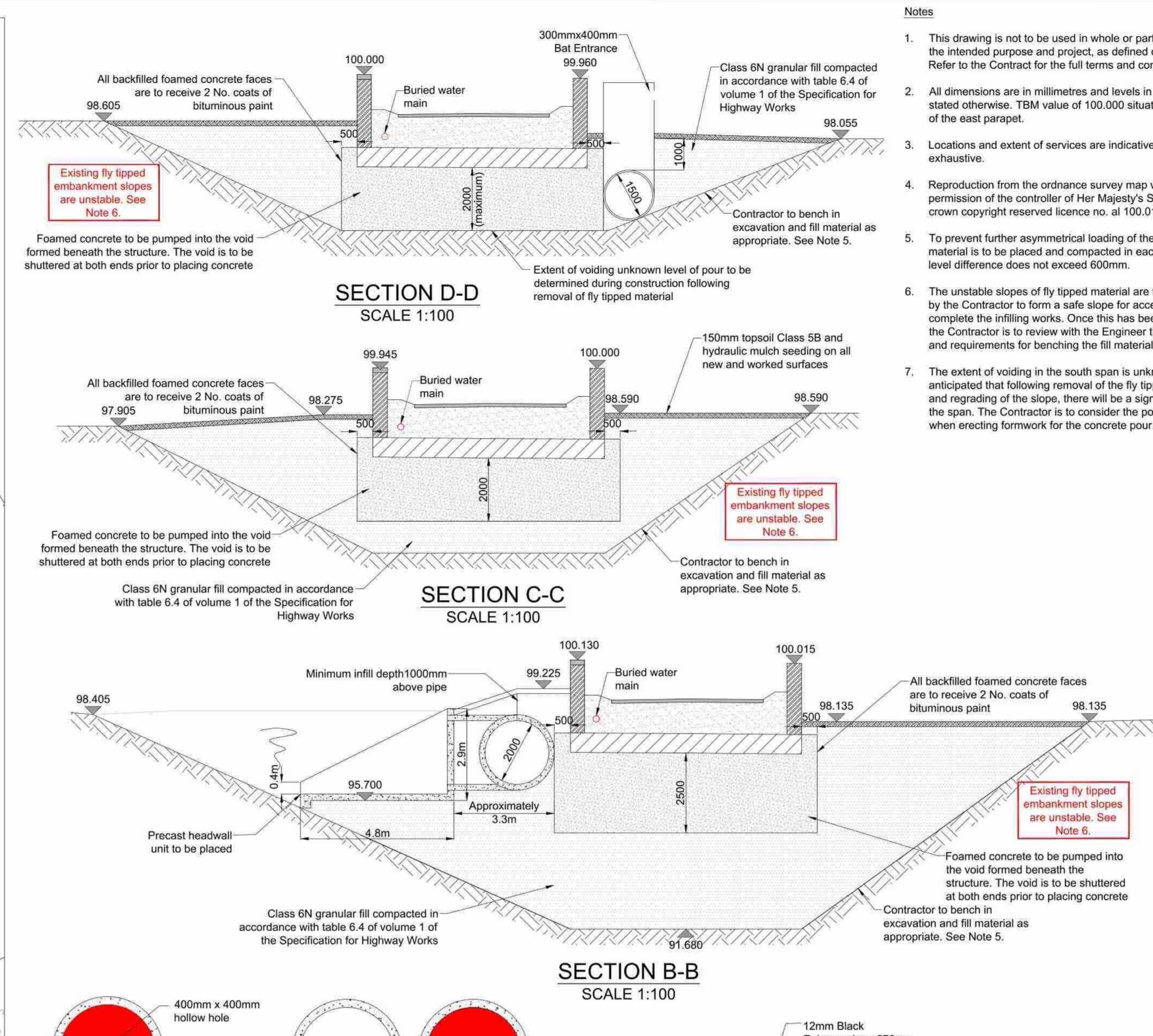
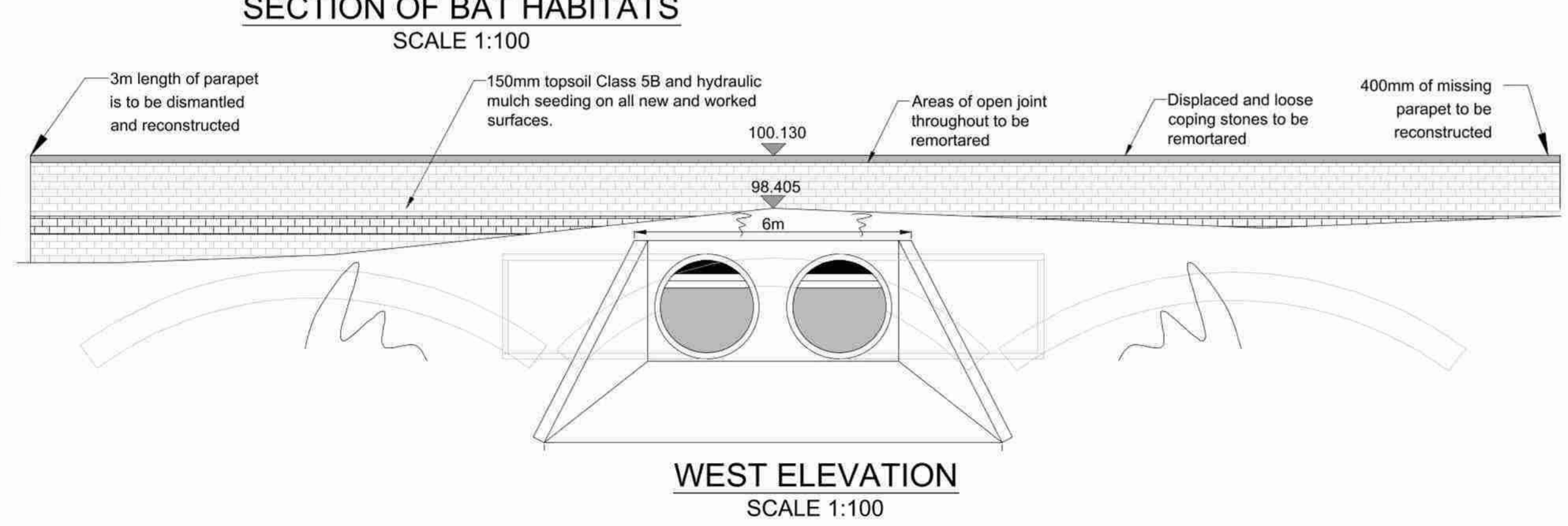
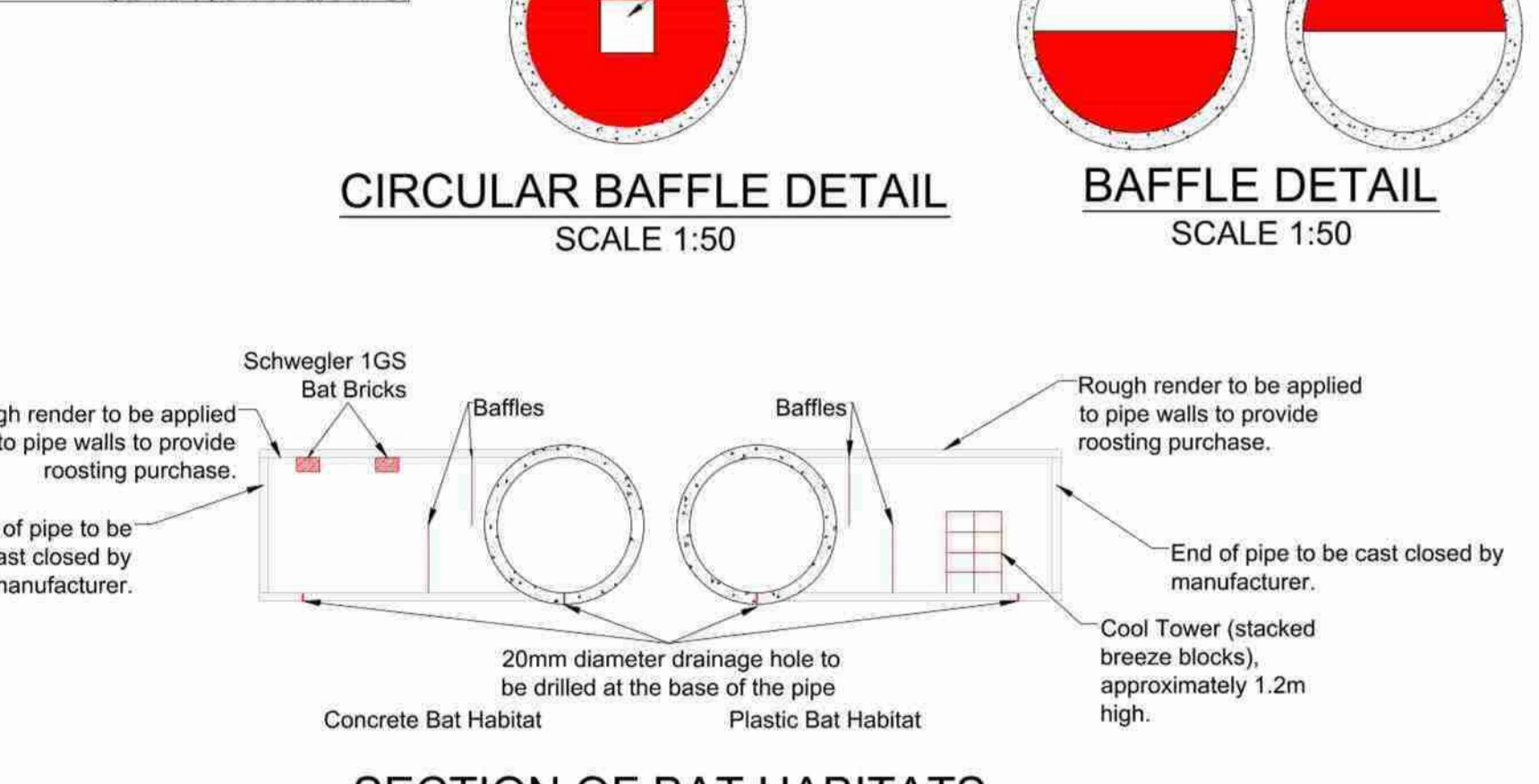
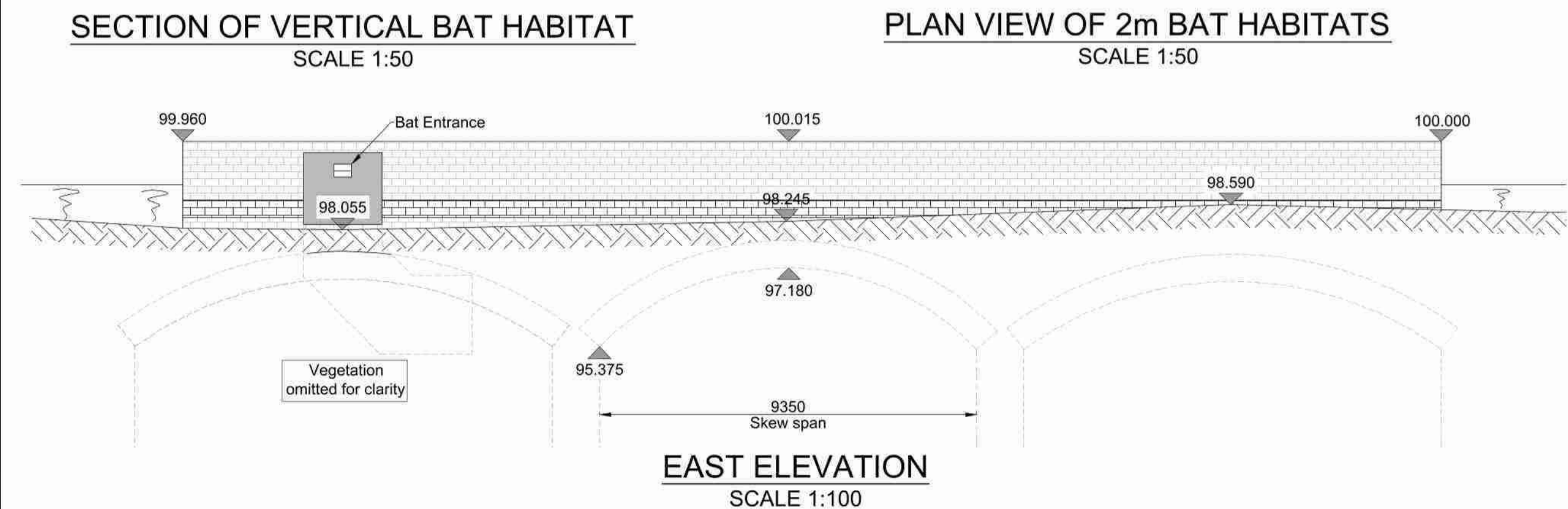
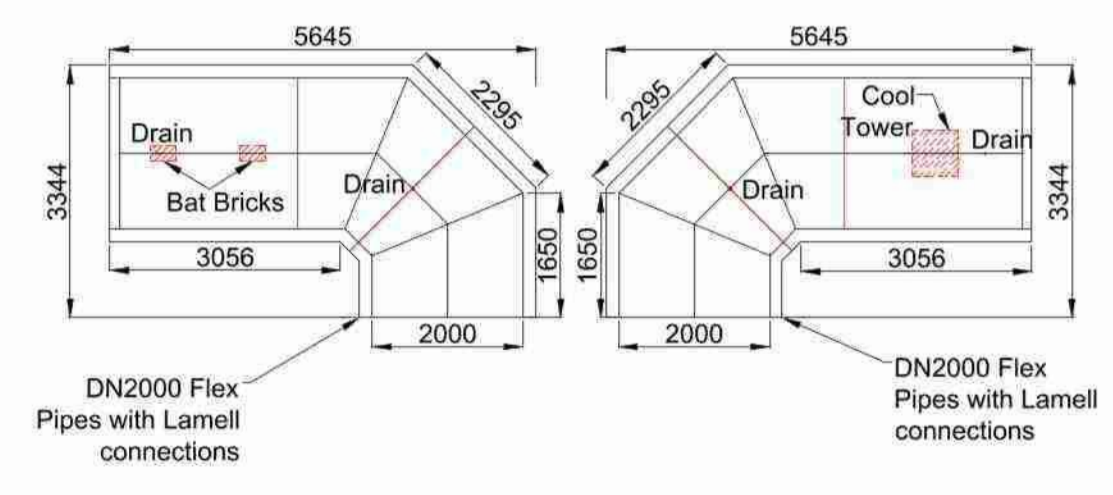
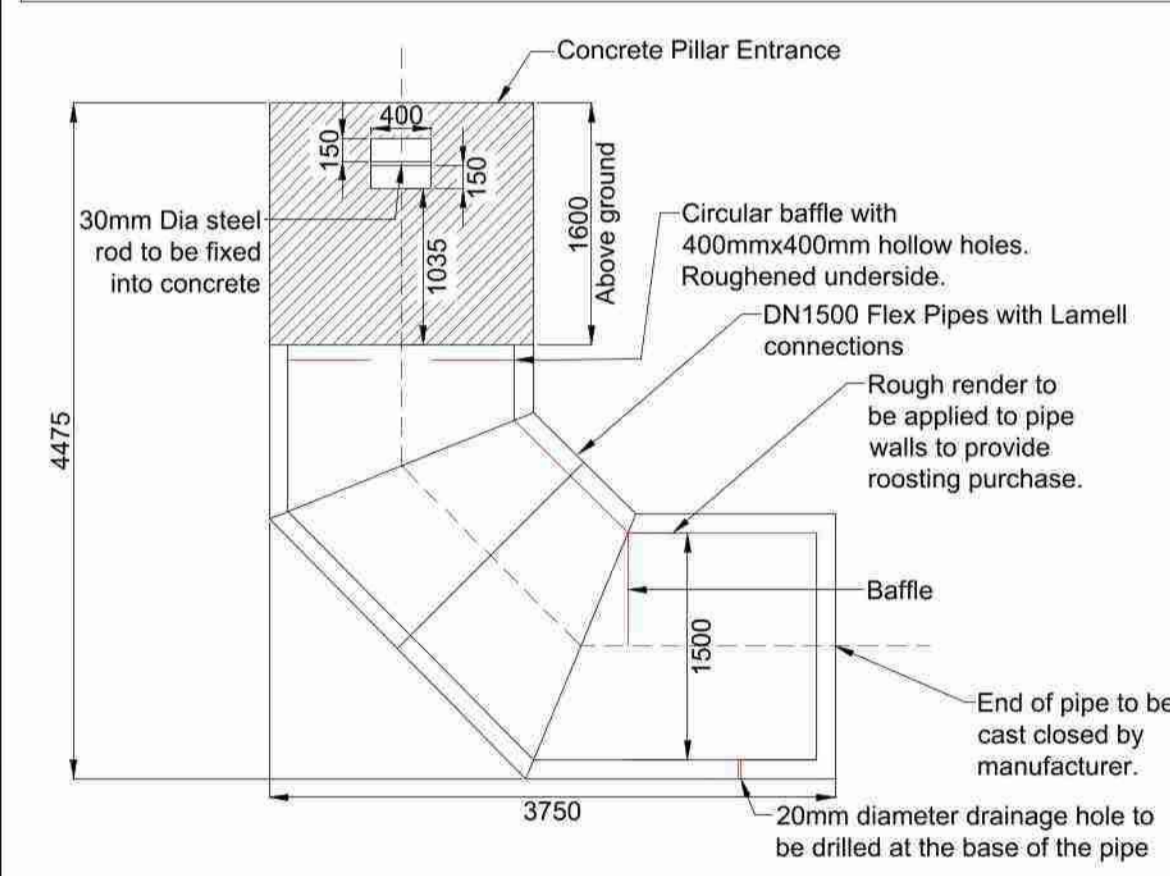
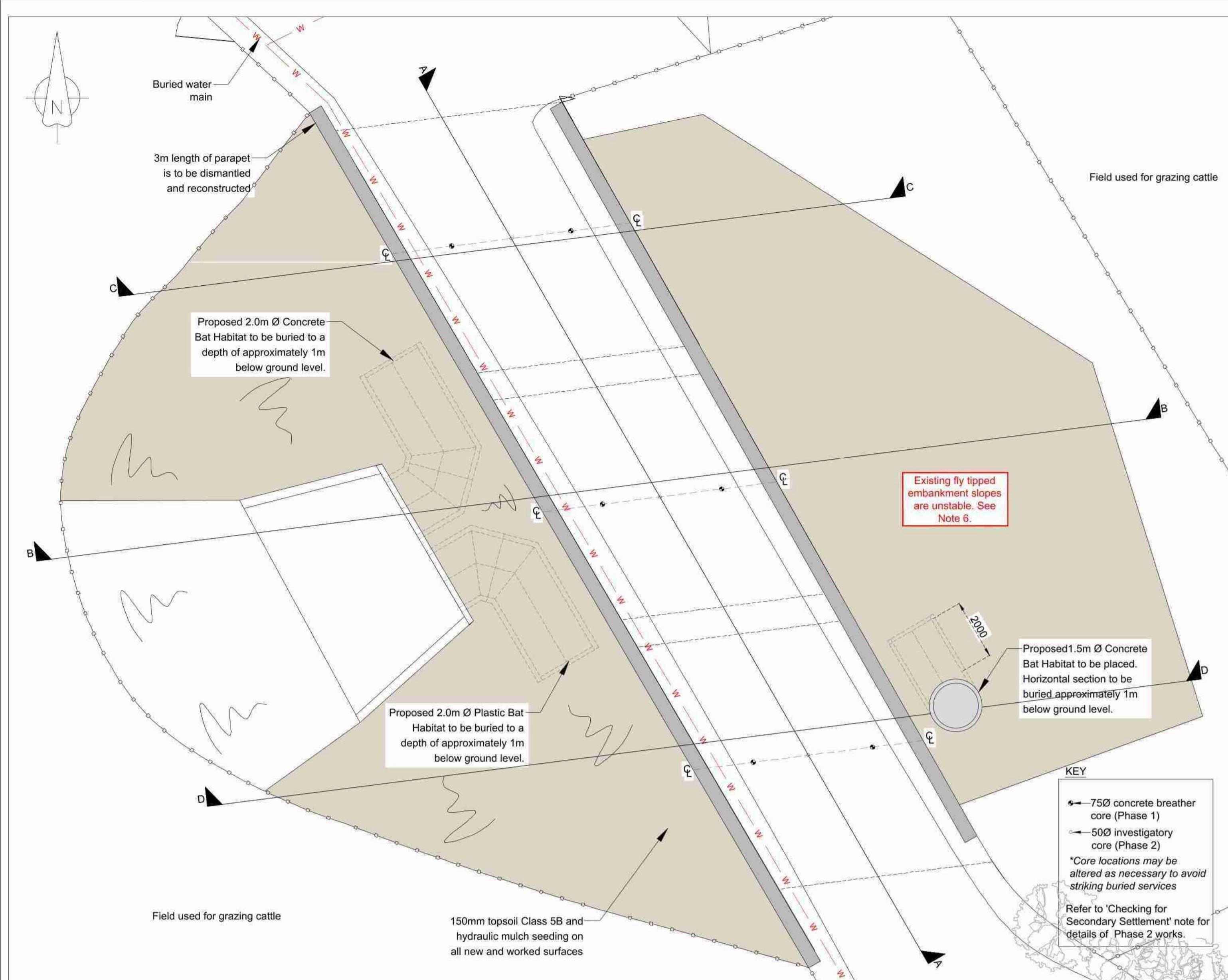
Drawing Title: Figure 2: Phase 1 habitat survey results

Scale @ A3	1:1,000	DO NOT SCALE
Jacobs No.	B18280DW/02	



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- Notes**
- This drawing is not to be used in whole or part other than for the intended purpose and project, as defined on this drawing. Refer to the Contract for the full terms and conditions.
 - All dimensions are in millimetres and levels in metres unless stated otherwise. TBM value of 100.000 situated on north end of the east parapet.
 - Locations and extent of services are indicative only and not exhaustive.
 - Reproduction from the Ordnance Survey map with the permission of the controller of Her Majesty's Stationery Office copyright reserved licence no. al 100.017326.
 - To prevent further asymmetrical loading of the pier, fill material is to be placed and compacted in each span so the level difference does not exceed 600mm.
 - The unstable slopes of fly tipped material are to be regraded by the Contractor to form a safe slope for access and to complete the infilling works. Once this has been completed the Contractor is to review with the Engineer the slope angle and requirements for benching the fill material into the slope.
 - The extent of voiding in the south span is unknown. It is anticipated that following removal of the fly tipped material and regrading of the slope, there will be a significant void in the span. The Contractor is to consider the possible slope when erecting formwork for the concrete pour.

FOR INFORMATION

REV	REVISION DATE	PURPOSE OF REVISION	DRAWN	CHECKED	APPROVED
01					

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WEBSITE: WWW.JACOBS.COM

CLIENT: Historical Railways Estate on behalf of the DfT

PROJECT: MAJOR WORKS PROGRAMME 2012-15

DRAWING TITLE: STRUCTURE ESB/10m4ch
CANARDS GRAVE ROAD BRIDGE
PROPOSED GENERAL ARRANGEMENT

DRAWING STATUS: FORM B

SCALE: AS NOTED @ A1 DO NOT SCALE

JACOBS No. B16280DW

CLIENT No. ESB/10m4ch

DRAWING NUMBER: Figure 3

REV 0

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Appendix A. Natural England Consultation Response

Date: 08 September 2016
Our ref: DAS2169/183946
Your ref: ESB/10m4ch



BY EMAIL ONLY: [REDACTED]@jacobs.com

Customer Services
Hornbeam House
Crewe Business Park
Electra Way
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CW1 8GJ

0300 080 3900

Dear [REDACTED]

Discretionary Advice Service (Charged Advice)

Development proposal and location: ESB/10m4ch Works to infill Canards grave road bridge, (nearest postcode BA4 4PF)

Thank you for your DAS request dated 21 April 2015.

This advice is being provided as part of Natural England's Discretionary Advice Service. Jacobs UK Ltd has asked Natural England to provide advice upon:

- Potential impacts on designated sites
- Biological survey methodology
- Ecological mitigation plan

This advice is provided in accordance with the Quotation and Agreement dated 12 May 2016.

The following advice is based upon the information within the Proposed Survey Methodology (21 April 2016) and your updating emails dated 23 May and 7 June, and our telephone conversation on 6 September 2016.

The bridge is located on Ridge Road to the south west of Shepton Mallet. The bridge carries the road over a now dismantled railway line. Friars Oven Site of Special Scientific Interest (SSSI) lies 600m to the west of the structure. The area under and around the bridge is considered excellent for foraging bats as insect activity is high due to the large amounts of cattle and horse manure present in the fields and also tipped next to and under the bridge. The dismantled railway line is likely to provide a commuting route through the landscape for bats and [REDACTED] bats in particular.

The bridge has 3 arches, all of which are partially infilled by rubble and fly tipping. It is now necessary to completely infill the arches in order to support the road securely in the long term.

It has been confirmed that there is access for bats to the north eastern arch and the central arch. There is also a substantial void under the south eastern arch.

Surveys have confirmed:

- A [REDACTED] bat hibernating in the north eastern arch;
- Small numbers of [REDACTED] bats forage around the bridge and use it to night roost;
- Small numbers of [REDACTED] also day roost in the bridge;
- [REDACTED] and at least one [REDACTED] bat roost under the bridge.

██████████ are likely to be connected to the North Somerset & Mendip Bats Special Area of Conservation (SAC) and the Mells Valley Bats SAC. The site is well connected through the landscape to important maternity and hibernation sites.

Surveying the bridge for bats presents several problems because of risks to the health and safety of personnel. The access to the bridge is very steep and dangerous, particularly in the dark. There is fly-tipped asbestos sheeting under the arches, meaning that face masks and suits are necessary when accessing the arches. At least one fire has been lit under the arches since surveying began (possibly disturbing or even injuring roosting bats).

As the access to the voids under the arches is very constrained, static detectors can be deployed with a high degree of confidence of detecting the very directional calls of ██████████ bats and of identifying any roosting bats present.

We note that the survey methodology proposed does not follow the guidance set out for Horseshoe bat surveys set out in English Nature's Bat Mitigation Guidelines. However, static detectors will be deployed continuously from April to September 2016 and one long dusk emergence survey will be undertaken every month between May and September 2016. Mitigation is likely to involve the construction of replacement roost features within the infill material, using concrete pipes

Advice

We note that the site presents particular difficulties for surveying. With these difficulties in mind, we consider that the surveys proposed will provide adequate data on which to make professional judgments about impacts on different bat species and the potential for Likely Significant Effects on the North Somerset & Mendip and Mells Valley Bats SACs.

It would be helpful if a summary of the data obtained could be provided when the final manual dusk survey is undertaken in September 2016 and when the static surveys are completed in February 2017. When we receive the full data findings, we will provide written confirmation of our advice on the mitigation proposed.

Regionally Important Geographical Site (RIGS)

The three arch bridge is a RIGS due to the exposure of a section of Rhaetian sediments which is the best in the Mendip area. We understand that Jacobs' engineering team is investigating this issue and whether there is a solution which makes the bridge safe whilst leaving the geological interest exposed.

The advice on this proposal, and the guidance contained within Natural England's standing advice relates to this case only and does not represent confirmation that a species licence (should one be sought) will be issued. Please see **Annex 1** for information regarding licensing for bats.


For clarification of any points in this letter, please contact Alison Howell on 07867 900 281.

The advice provided in this letter has been through Natural England's Quality Assurance process

The advice provided within the Discretionary Advice Service is the professional advice of the Natural England adviser named below. It is the best advice that can be given based on the information provided so far. Its quality and detail is dependent upon the quality and depth of the information which has been provided. It does not constitute a statutory response or decision, which will be made by Natural England acting corporately in its role as statutory consultee to the competent authority after an application has been submitted. The advice given is therefore not binding in any way and is provided without prejudice to the consideration of any statutory consultation response or decision which may be made by Natural England in due course. The final judgement on any proposals by Natural England is reserved until an application is made and will be made on the information then available, including any modifications to the proposal made after receipt of discretionary advice. All pre-application advice is subject to review and revision in the light of changes in relevant

considerations, including changes in relation to the facts, scientific knowledge/evidence, policy, guidance or law. Natural England will not accept any liability for the accuracy, adequacy or completeness of, nor will any express or implied warranty be given for, the advice. This exclusion does not extend to any fraudulent misrepresentation made by or on behalf of Natural England.

Yours sincerely


Somerset, Avon, Wiltshire Team

cc: commercialservices@naturalengland.org.uk

Annex 1 European Protected Species

A licence is required in order to carry out any works that involve certain activities such as capturing the animals, disturbance, or damaging or destroying their resting or breeding places. Note that damage or destruction of a breeding site or resting place is an absolute offence and unless the offences can be avoided (e.g. by timing the works appropriately), it should be licensed. In the first instance it is for the developer to decide whether a species licence will be needed. The developer may need to engage specialist advice in making this decision. A licence may be needed to carry out mitigation work as well as for impacts directly connected with a development. Further information can be found in Natural England's ['How to get a licence'](#) publication.

If the application requires planning permission, it is for the local planning authority to consider whether the permission would offend against Article 12(1) of the Habitats Directive, and if so, whether the application would be likely to receive a licence. This should be based on the advice Natural England provides at formal consultation on the likely impacts on favourable conservation status and Natural England's [guidance](#) on how the three tests (no alternative solutions, imperative reasons of overriding public interest and maintenance of favourable conservation status) are applied when considering licence applications.

Natural England's pre-submission Screening Service can screen application drafts prior to formal submission, whether or not the relevant planning permission is already in place. Screening will help applicants by making an assessment of whether the draft application is likely to meet licensing requirements, and, if necessary, provide specific guidance on how to address any shortfalls. The advice should help developers and ecological consultants to better manage the risks or costs they may face in having to wait until the formal submission stage after planning permission is secured, or in responding to requests for further information following an initial formal application.

The service will be available for new applications, resubmissions or modifications – depending on customer requirements. More information can be found on [Natural England's website](#).

Appendix B. Survey data

Table B.1 : Bat activity target notes

Date	Survey Type	Description
26 May 2016	Dusk Emergence	[REDACTED] emerged from Arch 1 at 21:54.
26 May 2016	Dusk Emergence	[REDACTED] light sampling behaviour noted under Arch 1.
26 May 2016	Dusk Emergence	[REDACTED] foraging under Arch 1 and Arch 2 continued until 23:46.
26 May 2016	Dusk Emergence	[REDACTED] recorded on IR camcorder (only) emerging from Arch 3 at 21:43.
26 May 2016	Dusk Emergence	[REDACTED] calls heard briefly at 22:14 and 22:17 but not seen. Automated detectors recorded [REDACTED] bat in Arch 3 at 21:50 suggesting the bat may have emerged from Arch 3.
21 June 2016	Dusk Emergence	[REDACTED] Emerged from Arch 1 at 22:17.
21 June 2016	Dusk Emergence	[REDACTED] foraging under Arch 1 and Arch 2 continued throughout survey. Number of animals estimated at 2.
18-19 July 2016	Dusk emergence and dawn re-entry	[REDACTED] activity was recorded by automated detectors at 21:32 and 21:23 in Arch 1 and Arch 3 respectively suggesting that this species was day roosting in the structure.
8-9 August 2016	Dusk emergence and dawn re-entry	[REDACTED] was observed emerging from Arch 3 at 21:36 and re-entering at 21:37.
8-9 August 2016	Dusk emergence and dawn re-entry	[REDACTED] seen foraging under Arch 1 and Arch 2, possibly present in Arch 1 at start of dawn survey
13-14 September 2016	Dusk emergence and dawn re-entry	A [REDACTED] emerged from Arch 1 at 19:55. Light sampling and foraging behaviour was noted in Arch 1 and Arch 2.
13-14 September 2016	Dusk emergence and dawn re-entry	At 20:1 [REDACTED]s commuted in from the north side of the structure and entered Arch 3.
13-14 September 2016	Dusk emergence and dawn re-entry	A [REDACTED] was recorded flying in Arch 1 at 05:25. It was not seen so it was not established for certain if it was present in the arch at the start of the survey or if it flew in from elsewhere. [REDACTED] calls were recorded in the arch until 05:35.
13-14 September 2016	Dusk emergence and dawn re-entry	A [REDACTED] was noted commuting from south to north above the structure at 20:05 then descended into the northern arch where it appeared to remain flying but may have perched briefly.
13-14 September 2016	Dusk emergence and dawn re-entry	[REDACTED] foraging activity under the structure (estimated 2 or 3 individuals) continued until 21:40