

A303 Sparkford to Ilchester Dualling Scheme  
TR010036  
6.3 Environmental Statement  
Appendix 8.9 Great Crested Newt Technical  
Report

APFP Regulation 5(2)(a)  
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July 2018



Infrastructure Planning

Planning Act 2008

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(Applications: Prescribed Forms  
and Procedure) Regulations  
2009**

**A303 Sparkford to Ilchester Dualling  
Scheme**

Development Consent Order 201[X]

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**6.3 Environmental Statement  
Appendix 8.9 Great Crested Newt Technical Report**

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## Executive summary

The proposed A303 Sparkford to Ilchester Dualling scheme (hereafter referred to as 'the scheme') is to provide a continuous dual carriageway on the A303 linking the Podimore Bypass and the Sparkford Bypass.

Great crested newts (GCN) are afforded full protection under the *Conservation of Habitats and Species Regulations 2017* and the *Wildlife and Countryside Act 1981* (as amended). GCN are widely distributed throughout the lowland areas of Great Britain, but are absent from Ireland. Their populations have declined over the last century across Europe, including Britain, mainly as a result of pond loss and deterioration.

GCN presence or absence and population estimate surveys of all suitable waterbodies within 500 metres of the scheme was undertaken between March and June 2017. Surveys identified the presence of GCN within a number of these ponds. Three distinct meta-populations were identified, though only 2 would be subject to effects as a result of the scheme. Meta-population A, located at Downhead, has a medium population and meta-population C, located at Hazlegrove, has a medium population. Meta-population B located at Yarcombe was excluded from further assessment as all ponds associated with this meta-population are over 500 metres from the construction footprint of the scheme.

Unmitigated, meta-population A would be subject to Moderate Adverse effects during construction and operation, whilst meta-population C would be subject to Slight Adverse effects. Adverse effects include partial destruction of terrestrial habitats and the loss of two ephemeral ponds (neither of which support GCN).

A detailed mitigation strategy is proposed to minimise impacts and ensure that favourable conservation status of the local GCN population is maintained. A Natural England European Protected Species Mitigation licence would be required to undertake the proposed works due to the potential effects. The mitigation strategy includes the installation of exclusion and drift fencing, and relocation of GCN from areas of suitable terrestrial habitat impacted by the scheme into 2 receptor sites within the existing meta-population areas. Compensation for the habitat loss as a result of works will be detailed in the Environmental Masterplan (Figure 2.8, Volume 6.2) and would include creation of 2 new wildlife ponds and planting of areas of species rich grassland and native trees and scrub habitat. Monitoring of the 2 meta-populations would be required for up to 4 years post construction to assess the success of the mitigation programme.

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# 1 Introduction

## 1.1 Overview of the scheme

### Existing corridor

1.1.1 The A303 forms part of Highways England's Strategic Road Network (SRN) and a strategic link between the south west and the rest of the south, south-east and London. The route comprises multiple road standards, including dual carriageway, single carriageway and single carriageway sections with overtaking lanes. Speed limits also vary between 40 miles per hour and 70 miles per hour, depending on the character of the road and its surroundings.

### Existing road

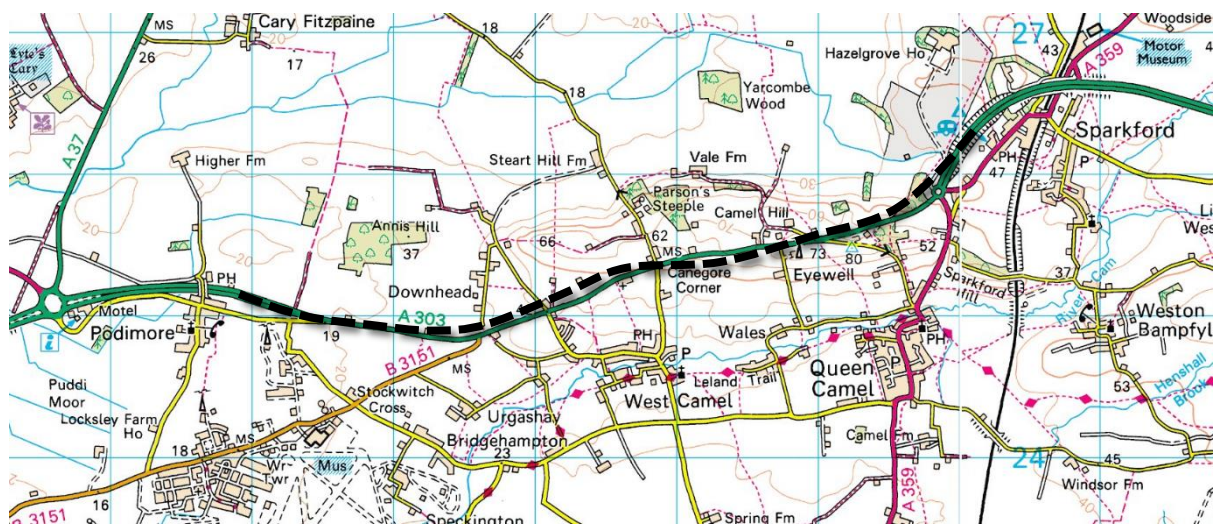
1.1.2 The section of the A303 that is being upgraded as part of this scheme commences at the eastern limits of the existing dual carriageway, the Podimore Bypass. Travelling east, the corridor reaches the junction with the B3151 before bearing north east and rising upwards through Canegore Corner to reach the crest of Camel Hill at Eyewell. This section of the corridor is characterised by a single lane road, with double white lines negating overtaking and subject to a 50 miles per hour speed limit. There are several priority junctions along the route giving access to the settlements of Queen Camel and West Camel to the south and Downhead to the north, as well as several farm accesses and parking laybys.

1.1.3 From the crest of Camel Hill, the corridor descends to meet the roundabout at the western limit of the dual carriageway Sparkford Bypass (Hazlegrove Roundabout). This section comprises 2 lanes in the westbound direction, 1 lane in the eastbound direction and is also subject to a 50 miles per hour speed limit. Hazlegrove Roundabout forms a junction between the A303 and the A359 which runs south through Queen Camel and north-east through Sparkford. The roundabout also provides access to a service station, and to a school at Hazlegrove House.

1.1.4 The section of the A303 that is to be upgraded is almost 3.5 miles, or approximately 5.6 kilometres long.

1.1.5 The extents of the scheme are illustrated in Figure 1.1 below. Figure 2.1 of Volume 6.2 shows the proposed red line boundary for the scheme.

Figure 1.1: Scheme extents



Source: Mott MacDonald Sweco Joint Venture

## Scheme proposals

1.1.6 The proposed scheme is to provide a continuous dual-carriageway linking the Podimore Bypass and the Sparkford Bypass. The scheme would involve the removal of at-grade junctions and direct accesses. The Hazlegrove Junction would be constructed to grade-separated standards and Downhead Junction and Camel Cross Junction would be constructed to compact grade-separated standards, as illustrated on Figure 2.3 General Arrangement Plans, contained in Volume 6.2.

1.1.7 A detailed description of the scheme is provided within Chapter 2 The Scheme of Volume 6.1.

## 1.2 Scope of report

1.2.1 The objectives of this report are:

- to inform the Environmental Impact Assessment (EIA)
- to present the results of the presence / absence and population assessment surveys
- to present the relative abundance of the great crested newt (GCN) populations
- to assess the potential effects of the scheme on GCN
- to provide recommendations for mitigation, habitat creation and enhancement to minimise effects on GCN and ensure that favourable conservation status of the species is maintained

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## 1.3 Legislation

1.3.1 GCN are afforded full protection under *the Conservation of Habitats and Species Regulations 2017* and the *Wildlife and Countryside Act 1981* (as amended).

1.3.2 Under Regulation 43 of the *Conservation of Habitats and Species Regulations* it is illegal to:

- deliberately capture, injure or kill a GCN
- deliberately disturb a GCN (in particular, disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, to hibernate or migrate or to affect significantly the local distribution or abundance of the species to which they belong)
- deliberately take or destroy the eggs of GCN
- damage or destroy a breeding site or resting place of GCN

1.3.3 Under Schedule 5 of the *Wildlife and Countryside Act 1981* it is illegal to:

- intentionally or deliberately kill, injure or take any GCN
- possess or control any live or dead specimen or anything derived from GCN
- intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protected by GCN
- intentionally or recklessly disturb GCN whilst they are occupying a structure or place used for that purpose

1.3.4 GCN are also listed as an Annex II species of the EU Habitats Directive, meaning they meet the criteria for site selection of Special Areas of Conservation (SACs) to specifically conserve this species. Site selection is based on evidence of a large and robust population of GCN.

## 1.4 Zone of influence (Zol)

1.4.1 The Zone of Influence (Zol) of the assessment of impacts on great crested newts for the scheme is 500 metres. This Zol is in accordance with guidance from Natural England<sup>1</sup> (*Great Crested Newt Mitigation Guidelines*, 2001). GCN are known to typically range up to 500 metres from breeding ponds in search of feeding and hibernation sites and therefore potential effects on GCN are associated with impacts within 500 metres of breeding ponds.

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<sup>1</sup> Natural England (2001) *Great crested newt mitigation guidelines* [online] available at: [http://mokrady.wbs.cz/literatura\\_ke\\_stazeni/great\\_crested\\_newt\\_mitigation\\_guidelines.pdf](http://mokrady.wbs.cz/literatura_ke_stazeni/great_crested_newt_mitigation_guidelines.pdf) (last accessed June 2018).

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## 1.5 Status of great crested newt at the national level

- 1.5.1 GCN are widely distributed throughout the lowland areas of Great Britain, but are absent from Ireland. Their populations have declined over the last century across Europe, including Britain, mainly because of pond loss and deterioration.
- 1.5.2 Historically, GCN were listed as a UK Biodiversity Action Plan (BAP) species and are now listed as a species of 'principal importance for the conservation of biodiversity in England' under Section 41 of the *Natural Environment and Rural Communities (NERC) Act 2006*. Following the production of *Biodiversity 2020*, the national strategy for England, actions were identified by experts to help in the recovery of populations of the S41 listed species. Actions identified for the recovery of GCN include the following:
- create, restore and manage ponds to provide breeding sites for GCN, and manage surrounding terrestrial habitats sympathetically
  - develop and implement methods and policies to remedy reversible adverse impacts at the population level, notably introduction of fish and invasive plants
  - develop and implement a surveillance plan to meet data needs at all spatial scales, for all appropriate stakeholders
  - review land use regulation and propose changes to improve outcomes for GCN

## 1.6 Status of great crested newt at county Level

- 1.6.1 Somerset Amphibian and Reptile Group (SARG) describe the status of GCN within the county as not uncommon, either in Somerset or the unitary authorities, although their distribution is localised and patchy and they are absent from large swathes of the county. Where they do exist, they can sometimes be found in significant numbers. In those parts of the county such as the Mendips, where the crested newt has been intensively surveyed, they have been found to be widely distributed, but fragmented into small isolated pockets, too far distant from one another for any interaction to occur between them, each population often reliant on just one suitable breeding pond. This deprives the species of the meta-population structure in which they normally exist, leaving them vulnerable to local extinction. A comparable situation is likely to occur throughout many of those parts of the county where the species is found.

## 1.7 Great crested newt ecology

- 1.7.1 The GCN annual cycle commences on emergence from hibernation. They will move from their hibernation sites between February and April toward breeding ponds. GCN breed, and live during breeding season, in a wide range of natural, semi-natural and man-made aquatic habitats including marshes, reed beds, wet



ditches and ponds. They spend the spring and summer moving between water and land to satisfy feeding and shelter needs, as well as to find mates. Most adult newts move away from ponds and into terrestrial habitat between May and July. Suitable terrestrial habitat includes woodland, scrub, hedgerows and less intensively managed grassland. They seek out crevices and holes in the ground to spend the autumn, and regularly emerge to disperse and forage in warmer, wetter conditions. They will hibernate over winter once temperatures regularly fall below 5°C overnight.

- 1.7.2 GCN are known to range 500 metres from breeding ponds in search of feeding and hibernation sites. Some GCN have been found to move over considerable distances (up to 1.3 kilometres from breeding sites) however, the vast majority inhabit an area much closer to the pond. The quality of the terrestrial habitat near to breeding ponds is important, as are the lack of barriers to dispersal (such as watercourses or busy roads).
- 1.7.3 GCN often exist in meta-populations. A meta-population is a group of associated populations. That is, a meta-population is made up from newts which breed in, and live around, a cluster of ponds. There will be some interchange of newts between ponds, although most adults consistently return to the same pond to breed. Meta-populations are much less vulnerable to habitat changes than populations based on single breeding ponds.

## 2 Methodology

### 2.1 Desk study

- 2.1.1 A detailed biological records search was requested from Somerset Environmental Records Centre (SERC) in May 2017, within a 2 kilometre radius of the scheme. All records for protected species, priority habitats and designated sites were returned. The results for GCN can be found within appendix A.
- 2.1.2 All ponds and other potentially suitable waterbodies within 500 metres of the scheme were identified using the MAGIC online viewer tool<sup>2</sup> and the use of 1:10,000 Ordnance Survey Mapping and aerial photography. These were recorded and given a unique identifier. At the time of the desk study and subsequent surveys, there were 2 options under consideration and the desk study therefore identified all potentially suitable waterbodies within 500 metres of these 2 options. Appendix B displays the locations of all waterbodies.

### 2.2 Habitat suitability index assessment

- 2.2.1 All waterbodies identified within the desk study were assessed for their potential to support GCN using the standardised Habitat Suitability Index (HSI) methodology<sup>3</sup>. The HSI is a measure of suitability and incorporates 10 indices, all of which are environmental factors known to affect this species.
- 2.2.2 The results are expressed as a HSI score between 0 and 1, with 0 being unsuitable habitat and 1 representing optimal habitat, as shown in Table 2.1. It is considered that ponds with a higher overall HSI score are more likely to support GCN than those with a lower score. The method is not sufficiently precise to conclude that ponds with a high score will support newts, or that any pond with a low score will not. It is therefore a tool to support, rather than a substitute for, GCN surveys.

Table 2.1: HSI scores

HSI score	HSI category	Predicted presence
<0.50	Poor	3%
0.50 – 0.59	Below Average	20%
0.60 – 0.69	Average	55%
0.70 – 0.79	Good	79%
>0.80	Excellent	93%

Source: Oldham et al (2000)<sup>3</sup>

<sup>2</sup> Defra (2017) MAGIC Online Map [online] available at: <http://magic.defra.gov.uk/> (last accessed April 2018).

<sup>3</sup> Oldham R.S., Keeble, J., Swan, M.J.S. and Jeffcote, M. (2000) *Evaluating the suitability of habitat for the great crested newt (Triturus cristatus)*. Herpetological Journal 10(4), 143-155

## 2.3 Field survey

2.3.1 Ponds given a 'Poor' score (<0.5) by the HSI assessment were scoped out of further surveys due to their low suitability to GCN.

2.3.2 Those ponds deemed suitable to support populations of GCN ('Below Average' or above, >0.5) were subject to presence or absence surveys. The surveys were undertaken in accordance with the guidelines outlined in the *Great Crested Newt Mitigation Guidelines*<sup>4</sup>.

2.3.3 Each survey was undertaken by a Natural England GCN Class Licence holder and assistant between March and May 2017. Initially 4 visits per pond were completed to assess presence or absence. A further 2 surveys were completed where GCN were present in order to ascertain a population estimate. At least 3 survey methods were utilised for each visit. These included:

- Bottle trapping: bottle traps are 2 litre plastic bottles with inverted funnels, which are set in the water at approximately 2 metre intervals all around the pond's edge using canes. They are set in the evening ensuring an air bubble is present and left overnight to allow amphibians to explore and get caught inside. They are removed the next morning after no more than 17 hours<sup>4</sup>.
- Torching: shortly after dusk, the pond is systematically searched from the bank using a high power (100,000 candle power) torch and counts made of any newt's present.
- Egg searching: examination of potential egg laying substrate such as marginal vegetation, dead leaves and litter. GCN lay their eggs singularly in folds of substrate and can be identified by their colour and size. Once a confirmed GCN egg is identified (confirming the presence of a breeding pond) no more egg searching is undertaken.
- Netting: Using a long-handled dip-net, GCN can be captured by sampling the area around the pond edge. The edge of the pond is systematically sampled, with at least 15 minutes of netting per 50 metres of shoreline. Netting is not a suitable indication of population size.

2.3.4 As there are numerous ponds located along and surrounding the A303 to the north and south, the area between the Sparkford Roundabout and Podimore junction was divided into 8 survey areas (by potential GCN meta-population groupings where applicable), to coordinate the survey effort. Details are provided below in Table 2.2. Pond clusters were identified, and where possible surveyed on the same nights. A cluster of ponds, where the furthest pond is within 250 metres with no significant barriers, may support a meta-population and therefore clusters were surveyed on the same night to assess the

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<sup>4</sup> English Nature (2001) *Great Crested Newt Mitigation Guidelines*

population size class estimate for the meta-population as well as the pond population.

- 2.3.5 Surveys were undertaken within 500 metres of 2 scheme options. Now that a preferred option has been chosen, several of the surveyed ponds are now outside of the 500 metre buffer.

Table 2.2: Pond survey areas

Zone reference	Pond reference	Comments
Survey area A	30,31,32	N/A
Survey area B	25,27	N/A
Survey area C	17,18,60, Trough	The Trough was not deep enough for bottle trapping and contained no vegetation for egg searching and was torched only.
Survey area D	14,15,16,45	Pond 45 was dry on first survey and remained so and was not subject to survey.
Survey area E	8,11,12,13	Pond 11 was re-assessed as HSI poor and scoped out during the first survey.
Survey area F	20,21,22,23,41,42, Ditch 1	Due to accessibility issues, Ditch 1 was torched only.
Survey area G	9,10,46,48,49	N/A
Survey area H	3,4,5,6,34,51,61	Due to barb wire fence preventing safe access, pond 6 was torched only.

## 2.4 Estimating population size class

- 2.4.1 Population size class estimates were calculated according to the *Great Crested Newt Mitigation Guidelines*<sup>4</sup>. Though these are very broad classifications, they can inform licensing and mitigation requirements. Table 2.3 summarises its application.

Table 2.3: Population size class estimates

Peak count in a single survey visit	Population size class
<10	Small
<100	Medium
>100	Large

## 2.5 Site status assessment

- 2.5.1 Following the completion of the surveys an assessment of the status of the site was then made. The importance of the site takes into account the population size class estimate but also several other factors:

- the quality and rarity of the habitat and population
- how connected the population is to the wider area
- the local significance of the population
- the size of the meta-population

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## 2.6 Survey constraints

- 2.6.1 Where GCN were not identified as occupying a pond or pond cluster, this does not guarantee their absence. There is always the risk of GCN being over-looked due to timing of surveys and scarcity of GCN on site.
- 2.6.2 Estimating population can be fraught with issues due to the detectability of GCN, the complex population dynamics and mobility between ponds amongst other factors. As a result, where licensing is required a maximum estimate is implemented.
- 2.6.3 Access was granted for all ponds except ditch 2, however some ponds were difficult to access for the full suite of surveys. Barbed wire fencing and dense vegetation prevented safe access to pond 6. As a result, only 1 survey was undertaken. Ditch 1 was only accessible for torch surveys and so only 1 method was undertaken for this waterbody. The trough was only suitable for torch surveys; however, this is not considered to be a significant constraint as it was easy to view the entire waterbody clearly through torching.
- 2.6.4 Ponds 17, 21, 30, 32, 34 and 41 dried during the survey season resulting in too few surveys being undertaken. However, this is not considered to be a significant constraint as if these ponds regularly dry during the breeding season, they are unlikely to support breeding GCN.
- 2.6.5 Some survey dates in April was subject to drops in overnight temperatures. The overnight air temperature dropped below 5 degrees due to seasonally persistent cool periods experienced during spring 2017. Despite the temperature dropping overnight for 3 of the survey dates, GCN were still detected. All other surveys were undertaken in optimal conditions.
- 2.6.6 Several ponds were subject to high proportions of vegetation cover. In most of these instances searches of terrestrial natural refugia were undertaken to increase the survey effort, or as alternative survey methods.

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## **3 Results**

### **3.1 Desk study results**

- 3.1.1 The data search results from SERC returned a total of GCN records within 1 kilometre of the scheme. Details of these records are provided in appendix A. The closest record to the site was recorded from Hazlegrove School approximately 700 metres north of the scheme footprint.

### **3.2 Description of waterbodies**

- 3.2.1 A description of the waterbodies identified within the Zone of Influence (Zol) of the scheme along with their distance from the proposed construction footprint is provided in appendix C. The majority of the waterbodies were small to medium sized ponds within an arable landscape. Other waterbodies included garden ponds, wet ditches and a trough which had newts visible in the water during the initial scoping survey.

### **3.3 Habitat suitability index**

- 3.3.1 The detailed results of the HSI surveys are provided in appendix D. The desk study identified 62 ponds, 2 wet ditches and a trough within the study area. Pond 55 was scoped out due to the Dyke Brook which has fast flowing water and forms a dispersal barrier between the pond and the scheme. Ditch 2 was inaccessible due to land access issues and therefore no HSI was undertaken on this waterbody. Additionally, ponds 38, 39, 40, 44, 45, 54 and 57 were either entirely desiccated or filled in and therefore unsuitable for supporting GCN and no HSI was undertaken on these waterbodies.
- 3.3.2 The HSI results for ponds 1, 2, 7, 11, 19, 24, 26, 35, 36, 37, 43, 50, 52, 53, 56, 58-1, 58-2, 58-2a, 59 and 62 were 'Poor' and scoped out of further survey. A total of 32 ponds were assessed as 'Below Average' or above, and were considered suitable enough for GCN to require further surveys.

### **3.4 Presence or absence**

- 3.4.1 Detailed results of the presence or absence surveys are provided in appendix E.
- 3.4.2 GCN were found to be present in ponds 3, 4, 5, 6, 10, 20, 21, 22, 23, 32, 42, 46, 51 and ditch 1.
- 3.4.3 Following presence or absence surveys, GCN were assessed as likely absent from ponds 8, 9, 12, 13, 14, 15, 16, 17, 18, 25, 27, 30, 31, 34, 41, 48, 49, 60, 61, and the trough, as no evidence of GCN was found during the surveys of these ponds.

3.4.4 In addition to GCN, the surveys found populations of smooth newt *Lissotriton vulgaris*, palmate newt *Lissotriton helveticus*, common frog *Rana temporaria* and common toad *Bufo bufo* within a number of waterbodies throughout the survey area.

### 3.5 Population size class and meta-populations

3.5.1 The maximum number of GCN found during any one survey was 28 within pond 20. The lowest maximum count for any one pond was 1, within a number of ponds. Table 3.1 shows the maximum count for each pond which was confirmed to support GCN, together with an assessment of the population size class (in accordance with Table 2.2).

Table 3.1 Population size class estimates

Pond number	Peak count in a single survey visit	Meta-population	Population size class
3	18	C	Medium
4	23	C	Medium
5	26	C	Medium
6	1	C	Small
10	1	B	Small
20	28	A	Medium
21	9	A	Small
22	4	A	Small
23	3	A	Small
32	1	N/A	Small
42	4	A	Small
46	1	B	Small
51	12	C	Medium
Ditch 1	1	A	Small

3.5.2 Based on the above results and the distribution of the ponds confirmed to support GCN, the individual populations have been divided into 3 meta-populations as shown in Table 3.1. Each meta-population is associated with areas in the landscape where GCN ponds have no more than 250 metres or significant barriers between ponds.

3.5.3 Meta-population A, located at Downhead, includes ponds 20, 21, 22, 23, 42 and ditch 1. Meta-population B located at Yarcombe, includes ponds 10 and 46. Meta-population C located at Hazlegrove, includes ponds 3, 4, 5, 6, and 51.

3.5.4 Pond 32 is over 500 metres from the other positive GCN ponds and is also isolated from meta-population A by the A303 and B3151 roads. A single GCN was recorded in this pond on 1 occasion and the pond was dry during the fourth survey visit in May. This pond is therefore not considered to be a breeding pond.

3.5.5 The population size class of meta-population B is small and meta-populations A and C are both medium population size class. The location of these meta-populations is shown in appendix B.

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## 3.6 Site status

- 3.6.1 GCN are locally common in Somerset despite a national decline. The clustering of ponds allows for a clear distinction between several meta-populations in the landscape, as shown in appendix B. The 3 meta-populations are relatively close, indicating a regular and common distribution in the area. The agricultural landscape with a large number of ponds is ideal for GCN. As outlined in section 1.6.1, GCN populations within Somerset are widely distributed, but typically fragmented into small isolated pockets, too far distant from one another for any interaction to occur between them, each population often reliant on just 1 suitable breeding pond. Therefore, the presence of 3 meta-populations associated with a number of breeding ponds within the survey area represents relatively strong GCN population compared with the county as a whole. The value of the identified populations has been assessed as Medium / County importance.



## 4 Potential impacts

### 4.1 Construction

- 4.1.1 The construction works would result in the loss of terrestrial habitat for GCN, including semi-natural broadleaved woodland, dense continuous scrub, hedgerows and field margins and areas of improved and semi-improved species-poor grassland. No aquatic habitats which have been found to support GCN would be directly impacted. However, 2 ephemeral ponds would be permanently lost. Vegetation clearance and topsoil stripping during construction within habitat suitable for GCN has potential to adversely affect this species as a result of disturbance or direct injury, potentially leading to death. In addition, the works have potential to cause noise, vibration and light (if night works) disturbance during construction and increase the risk of siltation and run-off which could impact retained GCN ponds.
- 4.1.2 No impact is likely on the population associated with pond 32 as the pond is over 350 metres from the nearest works and suitable terrestrial habitat which would be impacted within 500 metres of this pond is isolated by the A303 and busy slip road (B3151).
- 4.1.3 No impact is likely on meta-population B as it is in excess of 500 metres from any proposed works and therefore outside of the ZoI. Meta-populations A and C are both within 500 metres of the works and are therefore likely to be adversely affected. Details of the potential impacts on meta-population A and C are outlined below.

#### Meta population A – Downhead

- 4.1.4 Habitat loss: A total of 12.39 hectares and 1,562.54 linear meters of hedgerow would be impacted within 500 metres of the Downhead meta-population, of which 2.90 hectares and 598.06 linear meters would be permanent habitat loss and 9.49 hectares and 964.48 linear meters would be temporary habitat loss.
- 4.1.5 The temporary loss of terrestrial habitat within the core area (0-50 metres) of the Downhead population would be 0.23 hectare and the permanent loss would be 0.04 hectare, consisting of semi-improved grassland.
- 4.1.6 The temporary loss of habitat with the intermediate zone (50-250 metres) is anticipated to be 3.63 hectares, consisting primarily of low quality habitats including arable and semi-improved grassland. The permanent loss of terrestrial habitat in the intermediate habitat of the meta-population is 1.643 hectares, consisting of 0.003 hectare of ephemeral pond (pond 41), arable and semi-improved grassland. Pond 41 was assessed as being of 'poor' suitability for GCN and was dry during the presence / absence survey period and was

considered unsuitable for GCN. However, the habitat associated with this ephemeral pond provides a small area of high quality terrestrial habitat.

- 4.1.7 Within the intermediate zone, 551.6 metres of species rich and species poor hedgerow would be lost due to the scheme, of which 324 metres would be temporarily lost and 227.6 metres would be permanently lost. Of the permanent loss, 142 metres consists of species-poor hedgerow and 85.6 metres of species-rich hedgerow. These hedgerows provide high quality terrestrial habitat.
- 4.1.8 Within the distant habitat, a total of 4.31 hectares of habitat would be lost. This consists of 3.17 hectares of temporary loss of arable. The permanent loss of 1.14 hectares is also arable land of low value to GCN.
- 4.1.9 Within the distant habitat 1,011 metres of species rich and species poor hedgerow would be lost due to the scheme, 640.5 metres temporarily lost and 370.4 metres permanently lost. Of the permanent loss, 303.6 metres consists of species poor hedgerow and 66.8 metres of species rich hedgerow.
- 4.1.10 The total habitat either permanently or temporarily lost within 500 metres of the Downhead meta-population would be approximately 15% of the habitat available. The impact on the Downhead population would be anticipated to be moderate, due to the partial destruction of habitats within 50 metres of breeding ponds. However, sufficient high quality terrestrial habitat would be unaffected in the wider area within 500 metres of this meta-population, including an extensive hedgerow network.

Table 4.1: Summary of lost habitat broken down into habitat type, permanence, distance from ponds for meta-population A

Habitat Type	Area to be lost (Hectares)							
	Between 0m and 50m distance from nearest ponds (P=permanent, T=Temporary)		Between 50m and 250m distance from nearest ponds (P=permanent, T=Temporary)		Between 250m and 500m distance from nearest ponds (P=permanent, T=Temporary)		Total (P=permanent, T=Temporary)	
	P	T	P	T	P	T	P	T
Semi-improved grassland	0.04	0.23	1.12	2.9	0	0	1.16	3.12
Improved grassland	0	0	0	0	0	0	0	0
Arable	0	0	0.52	0.72	1.22	5.64	1.74	6.36
Dry Pond	0	0	0.003	0	0	0	0.003	0
Species-poor hedgerow	0	0	142	63.52	303.59	92.83	445.59	156.35

Habitat Type	Area to be lost (Hectares)							
	Between 0m and 50m distance from nearest ponds (P=permanent, T=Temporary)		Between 50m and 250m distance from nearest ponds (P=permanent, T=Temporary)		Between 250m and 500m distance from nearest ponds (P=permanent, T=Temporary)		Total (P=permanent, T=Temporary)	
	P	T	P	T	P	T	P	T
(length in meters)								
Species-rich hedgerow (length in meters)	0	0	85.6	260.5	66.84	547.63	152.4	808m
<b>Total</b>								
Habitat	0.04ha	0.23ha	1.643ha	3.63ha	1.22ha	5.64ha	2.903ha	9.5ha
Hedge	0m	0m	227.6m	324.02m	370.43m	640.46m	598m	964.48m

- 4.1.11 Habitat fragmentation: No temporary or permanent barriers to retained, and currently accessible, suitable habitat are proposed. The proposed realignment and widening of the road would not create additional barriers. The existing road already offers a significant barrier and the design of the improvements does not add any further barrier to GCN dispersal within 500 metres of the identified GCN ponds and there would be no fragmentation of ponds associated with this meta-population.
- 4.1.12 Injury or death: The works have the potential to disturb, damage or kill GCN and damage their resting places as a result of proposed vegetation clearance and ground works. Furthermore, any night works could disturb the nocturnal activities of resident GCN resulting from light and noise. Construction activities, in particular in proximity to ditch 1, which is immediately adjacent to the works footprint, have potential to result in siltation and run-off and an increase risk of pollution incidents, which could impact on water quality, degrade habitats and result in killing and injury of GCN.
- 4.1.13 A detailed mitigation strategy, as outlined in section 5, will be implemented which would ensure that the risk of killing and injuring GCN is minimised and would ensure that the favourable conservation status of the local GCN population is maintained. Due to the impacts on GCN, a European Protected Species Mitigation (EPSM) Licence will also need to be applied for from Natural England.
- 4.1.14 In accordance with the *Great Crested Newt Mitigation Guidelines*<sup>4</sup>, overall, unmitigated effects on meta-population A (Downhead) are anticipated to be Moderate Adverse during construction due to a partial loss of habitat within the core, intermediate and distant areas.

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## Meta population C – Hazlegrove

- 4.1.15 Construction impacts on the Hazlegrove meta-population are outlined below:
- 4.1.16 Habitat Loss: Table 4.2 details the areas to be both permanently and temporarily impacted by habitat type.
- 4.1.17 There would be no habitat loss within the core habitat (0-50 metres) or the intermediate habitat (50-250 metres) of the Hazlegrove population. Within the distant zone, a total of 3.48 hectares would be impacted between 250 and 500 metres of the meta-population. This 3.48 hectares consists of 0.47 hectares of permanent habitat loss and 3.01 hectares of temporary loss of habitats.
- 4.1.18 The temporary habitats lost in the distant zone would consist of 0.47 hectare of high quality habitat including dense scrub, broadleaved woodland and parkland habitat and 2.53 hectares low quality habitats, including improved and semi-improved grassland and arable. The permanent habitats loss within the distant zone would include a dry attenuation pond of 0.05 hectare (pond 7), assessed as being of 'poor' suitability for GCN. High quality permanent habitat loss consists of broadleaved woodland and parkland, 0.17 hectare in total. Low quality habitats lost would consist of improved and semi-improved grassland which total 0.29 hectare.
- 4.1.19 Additionally, 2.4 hectares of woodland, 540 metres from the ponds at its closest point, would be permanently lost due to the scheme. A pond (pond 53) of 'poor' suitability for GCN, would also be lost within this woodland, approximately 570 metres from the closest GCN pond. Whilst this habitat is over 500 metres from the meta-population the woodland represents a large block of high quality terrestrial habitat and there is potential that GCN associated with the Hazlegrove meta-population will use this habitat.
- 4.1.20 The total habitat either permanently or temporarily lost within 500 metres of the Hazlegrove meta-population would be approximately 4.5% of the habitat available.
- 4.1.21 Habitat fragmentation: There would be no fragmentation of retained habitat. The proposed realignment and widening of the road would not create additional barriers. The existing road already offers a significant barrier to terrestrial habitat south of the A303, and the design of the improvements would not add any further barrier.
- 4.1.22 Injury or death: The works have the potential to disturb, damage or kill GCN and damage or destroy their resting places a result of proposed vegetation clearance and ground works. Furthermore, any night works could disturb the nocturnal activities of resident GCN resulting from light and noise.

4.1.23 A detailed mitigation strategy, as outlined in Section 5, will be implemented which would ensure that the risk of killing and injuring GCN is minimised and would ensure that the favourable conservation status of the local GCN population is maintained. Due to the effects on GCN, a European Protected Species Mitigation (EPSM) Licence will also need to be applied for from Natural England.

Table 4.2: Summary lost habitat broken down into habitat type, permanence, distance from ponds for meta-population C

Habitat Type	Area to be lost (Hectares)							
	Between 0m and 50m distance from nearest ponds		Between 50m and 250m distance from nearest ponds		Between 250m and 500m distance from nearest ponds		Total	
	Perman ent	Tempor ary	Perman ent	Tempor ary	Perman ent	Tempor ary	Perman ent	Tempor ary
Semi-improved grassland	0	0	0	0	0.29	2.28	0.29	2.28
Improved grassland	0	0	0	0	0.004	0.17	0.004	0.17
Dense Continuous Scrub	0	0	0	0	0	0.13	0	0.13
Arable	0	0	0	0	0	0.08	0	0.08
Broadleaved plantation woodland	0	0	0	0	0.06	0.09	0.06	0.09
Broadleaved Semi-natural woodland	0	0	0	0	0	0	0	0
Broadleaved Parkland	0	0	0	0	0.11	0.25	0.11	0.25
Dry Pond	0	0	0	0	0.05	0	0.05	0
Species-poor hedgerow (length in meters)	0	0	0	0	126.3	87.35	0	87.35
Species-rich hedgerow (length in meters)	0	0	0	0	0	0	0	0
<b>Total</b>								
Habitat	0	0	0	0	0.47	3.01	0.47	3.01
Hedge	0	0	0	0	126.3	87.35	126.3	87.35

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4.1.24 Overall, in accordance with the *Great Crested Newt Mitigation Guidelines*<sup>4</sup>, unmitigated effects on meta-population C (Hazlegrove) during construction are anticipated to be Moderate Adverse due to a partial loss of habitat within the core, intermediate and distant areas.

## 4.2 Operation

4.2.1 Permanently lost terrestrial habitat would affect meta-population A and meta-population C. The lost habitat would be replaced with native planting of higher value for GCN, such as native broadleaved woodland, shrubs, hedgerows and species rich grassland. In the short term, whilst the replacement planting establishes within the scheme, an adverse effect is likely due to a reduction in available terrestrial habitat. There would be no loss or indirect effects to breeding ponds. In the long term, it is not anticipated that there would be any significant adverse effects on GCN.

4.2.2 No impact is likely on the population associated with pond 32 as the pond is over 350 metres from the nearest works and suitable terrestrial habitat which would be impacted within 500 metres of this pond is isolated by the A303 and busy slip road (B3151).

4.2.3 No impact is likely on meta-population B as it is in excess of 500 metres from the proposed works and therefore outside of the Zol.

4.2.4 Operational impacts on meta-population A and C are outlined below.

### Meta population A - Downhead

4.2.5 Habitat Loss: The proposed works within 500 metres of meta-population A would result in the permanent loss of 2.9 hectares of terrestrial habitat and 598 metres of linear hedgerow habitat. Table 4.1 details the areas to be both permanently and temporarily lost by habitat type. High quality habitat lost includes native hedgerows. Low quality habitats impacted include areas of short semi-improved grassland and improved grassland.

4.2.6 A total of 0.04 hectare of low quality habitat (managed semi-improved species-poor grassland) would be lost in the core area (0-50 metres). A total of 1.64 hectares of low quality habitat (including arable and semi-improved species-poor grassland), 0.003 hectare of high quality habitat (ephemeral pond) and 227.6 metres of high quality linear hedgerow habitat would be lost in the intermediate area (50-250 metres). Within the distant area (250-500 metres) 1.22 hectares of low quality habitat (comprising arable land) and 370.4 metres of high quality linear hedgerow habitat would be permanently lost.

4.2.7 Sufficient high quality terrestrial habitat would be unaffected in the wider area within 500 metres of this meta-population, including an extensive hedgerow

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network and field margins, to sustain the Downhead meta-population and a significant effect on the GCN population is not anticipated.

- 4.2.8 Habitat fragmentation: The proposed works within 500 metres of meta-population A would not fragment or create additional barriers to population dispersal. The existing road already offers a significant barrier to dispersal to habitats to the south of the A303 and the new road design would not bar access to any retained habitat not already inaccessible.
- 4.2.9 Killing and injury: The proposed road design within the vicinity of the Downhead meta-population includes the provision of gully-pots for the road drainage. These drainage features can act like pitfall traps and result in the killing and injuring of GCN. At its closest point, the new road would be 45 metres south of breeding ponds associated with the Downhead meta-population. Therefore, there is potential for gully pots to be within the core terrestrial habitat area, and therefore there is a potential for individual GCN to be impacted. The proposed drainage design along the main carriageway is for shallow sloping v-profile concrete or grass drains with associated gulley pots. There are no associated kerbs, which could channel GCN into the gulley pots and act as pitfall traps, and therefore the risk of GCN becoming trapped is significantly reduced. However, there is still potential for individual GCN to fall into the gulley pots and become trapped. Kerbs and gulley pots would be used on link roads, however, none of these are within 500 metres of any of the GCN ponds.
- 4.2.10 Overall, in accordance with the *Great Crested Newt Mitigation Guidelines*<sup>4</sup> unmitigated operational effects on meta-population A (Downhead) are anticipated to be Moderate Adverse due to a partial loss of habitat within the core, intermediate and distant areas.

## Meta population C

- 4.2.11 Habitat Loss: The proposed works within 500 metres of meta-population C would result in the permanent loss of 0.47 hectares of land. There would be no loss of habitat within the core or intermediate areas. Within the distant area, there would be a loss of 0.17 hectare of high quality woodland and parkland habitat, 0.05 hectare of ephemeral pond habitat, and 0.29 hectare of low quality managed semi-improved and improved grassland habitat.
- 4.2.12 Habitat fragmentation: The proposed works within 500 metres of meta-population C would not fragment or create additional barriers to population dispersal. The existing road already offers a significant barrier to dispersal and the new road design would not bar access to any retained habitat not already inaccessible.
- 4.2.13 Killing and injury: The proposed road design within the vicinity of the Hazlegrove meta-population includes the provision of gully-pots for the road
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drainage. These drainage features can act like pitfall traps and result in the killing and injuring of GCN. At its closest point, the new road would be 215 metres south east of breeding ponds associated with the Hazlegrove meta-population. Therefore, there is potential for gully pots to be within the intermediate terrestrial habitat area, and therefore there is a low potential for individual GCN to be impacted. The proposed drainage design along the main carriageway is for shallow sloping v-profile concrete or grass drains with associated gully pots. There are no associated kerbs, which could channel GCN into gully pots and act as pitfall traps, and therefore the risk of GCN becoming trapped is significantly reduced. However, there is still potential for individual GCN to fall into the gully pots and become trapped. Kerbs and gully pots would be used on link roads, however, none of these are within 500 metres of any of the GCN ponds.

- 4.2.14 Overall, in accordance with the *Great Crested Newt Mitigation Guidelines*<sup>4</sup> unmitigated operational effects on meta-population C (Hazlegrove) are anticipated to be Slight Adverse due to a partial loss of habitat within the intermediate and distant areas.

## 4.3 Summary

### Meta population A

- 4.3.1 The construction of the scheme would result in the temporary and permanent loss of low-quality terrestrial habitat within the core, intermediate and distant areas, and the temporary and permanent loss of high-quality habitat within the intermediate to distant areas from the breeding ponds associated with this meta-population. Furthermore, an ephemeral pond would be lost, though it is not occupied by GCN.
- 4.3.2 The operational phase of the scheme would result in the permanent loss of low-quality terrestrial habitat within the core, intermediate and distant areas, and the permanent loss of high-quality habitat within the intermediate to distant areas. An ephemeral pond would also be permanently lost, though it is not occupied by GCN and was predominantly dry through the survey season.
- 4.3.3 The population of the Downhead population is assessed as being medium and as permanent habitat loss would occur within the core, intermediate and distant zones, resulting in a partial loss of terrestrial habitat. Therefore, in accordance with the *Great Crested Newt Mitigation Guidelines*<sup>4</sup>, unmitigated effects on meta-population A (Downhead) are anticipated to be Moderate Adverse. With standard mitigation as outlined in section 5, effects would be reduced to Slight Adverse in the short-term, and following successful establishment of mitigation planting would reduce to Neutral in the long-term.



Table 4.3: Summary of predicted construction and operational effects on meta-population A

Summary of effects		Sensitivity	Magnitude (with mitigation)	Overall significance of effect with mitigation
Construction	Loss of terrestrial GCN habitat. Vegetation clearance resulting in the disturbance or direct injury or death of GCN. Noise, vibration and light (if night works) disturbance during construction and operation. Loss of non-breeding (dry) pond. Potential for injury and death during clearance and groundworks.	Medium	Minor	Slight Adverse
Operation	Loss of terrestrial GCN habitat within core, intermediate and distant areas. Loss of non-breeding pond. Potential for injury and death associated with gully pots.		Minor	Slight Adverse

## Meta population C

- 4.3.4 The construction of the scheme would result in the temporary and permanent loss of high-quality and low-quality terrestrial habitat within the intermediate and distant areas. Furthermore, there would also be the loss of a dry pond.
- 4.3.5 The operational phase of the scheme would result in the permanent loss of high-quality and low-quality terrestrial habitat within the intermediate and distant areas, and the permanent loss of high-quality habitat within the intermediate to distant areas, including the loss of a dry pond.
- 4.3.6 The population of the Hazlegrove population is assessed as being medium and as permanent habitat loss would occur within the intermediate and distant zones, resulting in a partial loss of terrestrial habitat. Therefore, in accordance with the *Great Crested Newt Mitigation Guidelines*<sup>4</sup>, unmitigated effects on meta-population C (Hazlegrove) are anticipated to be Slight Adverse. With standard mitigation as outlined in section 5 and following successful establishment of mitigation planting, effects would reduce to Neutral in the long-term.

Table 4.4: Summary of predicted construction and operational effects on Meta-population C

Summary of effects		Sensitivity	Magnitude (with mitigation)	Overall significance of effect with mitigation
Construction	Loss of terrestrial GCN habitat. Vegetation clearance resulting in the disturbance or direct injury or death of GCN.	Medium	Minor	Slight Adverse

Summary of effects		Sensitivity	Magnitude (with mitigation)	Overall significance of effect with mitigation
	Noise, vibration and light (if night works) disturbance during construction and operation. Potential for injury and even death.			
Operation	Loss of terrestrial GCN habitat within intermediate and distant areas. Potential for injury and death associated with gully pots.		Negligible	Neutral

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## 5 Mitigation and enhancement recommendations

### 5.1 Mitigation

5.1.1 Suitable terrestrial habitat within 500 metres of a number of GCN breeding ponds would be cleared as a result of the scheme. This would put GCN individuals at risk of disturbance, injury or death and would result in the reduction of available terrestrial habitat. Consequently, a EPSM licence application would be submitted to Natural England to permit the activities liable to cause these effects. The Method Statement of the EPSM licence would detail a comprehensive mitigation strategy including translocation, a sensitive working method, timing of works and a habitat replacement package. Details of this mitigation strategy are outlined below and are illustrated in appendix F.

### 5.2 Capture, exclusion and translocation

5.2.1 A relocation programme would be required to move individual GCN at risk of disturbance, injury or death during construction activities, including vegetation clearance and groundworks. Relocated GCN would be moved to a suitable location within the same spatial area as the meta-population they are from to minimise impacts on the meta-population. These areas have already been subject to population estimates. Relocation within the retained habitats is considered appropriate due to the low numbers expected to require relocation. Receptor sites would be enhanced to increase their carrying capacity. Hibernacula would be created (see below) as part of the habitat creation aspect, and these would be used as points for release. For meta-population A the hibernacula would be located at grid reference ST 56065 25210 adjacent to the pond created for enhancements to the area. For meta-population C the hibernacula would be located in close proximity to ponds 54 and 5 at grid reference ST 60114 26604.

5.2.2 Following the establishment of the receptor site, a capture and exclusion would be commenced. The relocation programme would be undertaken during the active GCN season, between February and October, but would cease once night time temperatures fall below 5°C. Exclusion fencing would be installed around the construction footprint (including any temporary working areas) within 500 metre of meta-populations A and C to ensure any GCN cannot re-enter the work site. The area of capture and exclusion would be extended over the 500 metre buffer to meet barriers to dispersal, such as roads, to ensure no newts are caught in areas of suitable habitat outside of the exclusion fencing. This is particularly relevant to the Hazlegrove population, as the woodland located 540 metres from the breeding ponds is considered to provide potential hibernation habitat, and would therefore be included within the capture and exclusion area for this meta-population.

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- 5.2.3 Amphibian exclusion fencing would be installed in accordance with the *Great Crested Newt Mitigation Guidelines*<sup>4</sup>. Drift fencing would additionally be installed within the area to be cleared. Pitfall traps and carpet tiles would be placed along the exclusion fencing and drift fencing running perpendicular to the long lengths of GCN exclusion fencing in sensitive areas and to compartmentalise sections to increase capture efficiency. A hand search would be conducted along the length of the fence lines prior to installation at each location. The proposed layout of the exclusion and drift fencing is provided in appendix F.
- 5.2.4 A minimum 60-day trapping programme (with 5 clear days at the end of the trap out) would be undertaken prior to all works within 500 metres of both the Downhead and Hazlegrove meta-populations, due to the medium populations of GCN. Any newts found during the translocation would be relocated to the respective receptor sites, within the 250 metre dispersal areas of each meta-population.
- 5.2.5 A 30-day trap out is considered sufficient to trap out ponds 41 and 7 due to these ponds being of poor suitability for GCN, and dry during the 2017 breeding season. Both ponds 41 and 7 would be entirely enclosed with exclusion fencing during the trapping period; however, pond 53 would not as it is over 500 metres from GCN ponds. If either pond is found to be holding water during the trapping period the ponds would be drained down under ecological supervision and any remaining GCN relocated. It should be noted that these ponds do not support macrophytes therefore identification of any newts should not be problematic.
- 5.2.6 The trap out will continue after the minimum trapping period until 5 clear days has been achieved. The 5 clear days may be within the last five days of the minimum trap-out period but not before. As part of the trap out visits, the exclusion fencing would be inspected and any damaged fixed. A record of fence inspection and damage repair work would be kept by the licence holder as evidence that the newt-proof barrier has been properly maintained.
- 5.2.7 Any scrub within the trap out areas (and within the working area) would be progressively strimmed in sections to increase the effectiveness of the translocation. This would occur under the supervision of an ecologist, by reducing the height to 150 millimetres above ground, hand searched by the ecologist, then taken to 50 millimetres above ground.
- 5.2.8 Once the capture programme has been completed, any potential hibernacula in the capture area would be dismantled by hand or under supervision by a licensed ecologist. Vegetation clearance and earthworks would also be supervised by a suitably experienced ecologist.

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## 5.3 Habitat clearance

- 5.3.1 Following completion of the trap out period, all remaining vegetation within the fenced off areas would be strimmed to 150 millimetres above ground, hand searched by a licenced ecologist, then taken to 50 millimetres above ground. A hand search would be undertaken, before strimming as close to the ground as possible, at least 24 hours after the initial cuts. The arisings would be removed. Any tree clearance would be undertaken at this stage, with stumps and roots removed during the destructive search, under close ecological supervision. Once the phased vegetation clearance is complete, a destructive search would be undertaken to ensure no newts remain within the works areas. Destructive searches would be carried out on features within the works footprint such as roots of scrub and trees that have to be removed, under piles of debris and fallen logs and brash.
- 5.3.2 The destructive search, undertaken with an excavator that has a toothed bucket, would follow a hand search and be undertaken under the supervision of an ecologist. Any newts uncovered would be relocated to the receptor site.
- 5.3.3 As a precautionary measure, all excavation works would be covered at the end of each shift or a ramp installed. This is to ensure that, in the unlikely event of presence within the working area, any newts that fall into the earth works are able to escape. Furthermore, excavations would be checked prior to the start of the following shift.
- 5.3.4 Following clearance of habitats, the works area would be maintained as unsuitable for GCN for the duration of the works. Should vegetation re-establish this would be removed using the phased clearance method outlined above. Exclusion fencing would remain intact around the works areas to ensure that GCN do not enter the works areas following completion of the relocation. On completion of the works, the exclusion fencing would be removed to allow GCN to access the restored habitats. The removal of fencing would be undertaken under supervision of a licenced ecologist.

## 5.4 Other mitigation measures

- 5.4.1 To minimise the risk of killing and injury of GCN, due to them becoming trapped in drainage gully pots associated with the new road, no kerbs would be installed around the gully pots which are within 500 metres of meta-population A and C. If kerbs are essential, the gully pots would be located at least 10 centimetres from the edge of the kerb to reduce the risk of GCN being channelled into the gully pots. Sloped kerbs would also be used to minimise the barrier effect for newts. It is understood that no kerbs are proposed in the drainage design within 500 metres of any GCN meta-population. Additionally, gulley pots within 500

metres of the meta-populations would be fitted with amphibian gully pot ladders<sup>5</sup> to allow a means of escape for any amphibians which become trapped.

## 5.5 Habitat creation and restoration

5.5.1 In order to mitigate for the permanent loss of terrestrial habitat and 2 dry ponds within 500 metres of GCN breeding ponds associated with 2 separate meta-populations, habitat restoration and creation is proposed. The strategy would ensure that there is sufficient terrestrial habitat to maintain favourable conservation status of the affected GCN populations. The strategy includes the reinstatement of areas of temporary construction losses, re-seeding with native species-rich grassland mixes and planting with native trees and shrubs. To mitigate for the permanent habitat losses, the landscape design would enhance areas of retained and restored habitat through creation of diverse species-rich grasslands, and diverse areas of native woodland, scrub and shrub habitats. These habitats would be subject to a habitat management plan to ensure that they remain suitable for GCN in the long-term.

5.5.2 Additionally, 2 new wildlife ponds would be created, 1 within each meta-population. These ponds would be located within suitable terrestrial habitat for shelter such as scrub, woodland or rough grassland with good connectivity to other ponds, within 500 metres of a breeding pond within the effected meta-populations. One would be located at ST 56066 25219 in the corner of the field by the hedgerow, in close proximity to meta-population A, and 1 at ST 59857 26073 at the edge of proposed scrub and linear planting and near a balancing pond, in close proximity to meta-population C. As a general guidance GCN ponds should be:

- between 100m<sup>2</sup> and 300m<sup>2</sup>
- variable depth up to 4 metres at deepest
- should hold water during at least 1 summer in every 3 years
- have the potential for extensive macrophyte cover
- have good potential for invertebrates and other amphibians
- absent of shading on the southern side

5.5.3 Habitat creation would also include the creation of 2 hibernacula within each receptor site. These hibernacula would be constructed in accordance with the *Design Manual for Roads and Bridges* (DMRB) guidance as shown in appendix G. These features would provide a safe refuge for any relocated GCN and would help increase the carrying capacity of the retained habitat.

5.5.4 Details of the proposed mitigation planting is provided in appendix F. The overall landscape strategy for the scheme is for a no net loss of habitats, with

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<sup>5</sup> McInroy, C. & Rose, T.A. (2015) *Trialling amphibian ladders within roadside gullypots in Angus, Scotland: 2014 impact study*. Herpetological Bulletin 132. pp 15-19

the creation of diverse native habitats to create a net gain in biodiversity value. Proposed habitat creation across the scheme includes:

- Individual trees - 47
- Native Woodland – 46,769m<sup>2</sup>
- Native Trees and Shrubs – 205,459m<sup>2</sup>
- Marginal Planting – 1,837m<sup>2</sup>
- Wildflower Meadow – 76,793m<sup>2</sup>
- Wet Grassland – 17,207m<sup>2</sup>
- Amenity Grassland – 203,537m<sup>2</sup>
- Wildlife Pond - 325m<sup>2</sup>
- Native Hedgerow – 3,730m
- Native Hedgerow with trees – 3,432m

5.5.5 Details of the habitat creation and reinstatement within the 2 meta-populations impacted is outlined in Table 5.1. Within the area covered by meta-population A, a total of 4.7 hectares of suitable terrestrial habitat would be reinstated or recreated (not including amenity grassland which is of low value to GCN). Within the area covered by meta-population C, a total of 2.62 hectares of suitable terrestrial habitat would be reinstated or recreated (not including amenity grassland which is of low value to GCN).

Table 5.1: Summary habitat creation

Meta population	Habitat type	Area to be created / m <sup>2</sup> (linear m for hedgerow)			
		Within 50m	50m - 250m	250m - 500m	Total
A	Native Hedgerow	61	295.9	45.71	402.61
	Native Hedgerow with Trees	0	582	768.6	1,350.6
	Reinstate to Previous Conditions	0	2,722	28,677	31,399
	Marginal Planting	64	250	0	314
	Native Trees and Shrubs	0	2,929	5,728.3	8,657.3
	Wet Grassland	733	3,703	0	4,436
	Amenity Grassland	1414	13,309	8,190.6	22,913.6
	Wildlife Pond	170	0	0	170
C	Individual Tree	0	0	1	1
	Native Trees and Shrubs	0	222.9	4,314.8	4,537.7

Meta population	Habitat type	Area to be created / m <sup>2</sup> (linear m for hedgerow)			
		Within 50m	50m - 250m	250m - 500m	Total
	Marginal Planting	0	0	111	111
	Amenity Grassland	0	1,239.1	3,263.1	4,502.2
	Wildflower and Species Rich Grassland	0	0	20,635.7	20,635.7
	Wet Grassland	0	0	718.23	718.23
	Wildlife Pond	0	0	155	155

## 5.6 Post development population monitoring

5.6.1 In accordance with the GCN Mitigation Guidelines<sup>4</sup>, for a medium scale of impact to a population of a medium size class population, monitoring would be undertaken at the ponds of the Downhead population, including the newly created pond for 4 years post construction.

5.6.2 The monitoring would be carried out by a licenced ecologist, who would undertake the monitoring by using 3 sampling methods (preferably torch, bottle trapping and egg search) per visit. Six visits would be carried out in suitable weather conditions between mid-March to mid-June (4 visits for the Hazlegrove population), with at least 2 visits during mid-April to mid-May, to undertake presence or likely absence surveys.

5.6.3 Although the ponds of the Hazlegrove population would not require monitoring post construction, as the impact is anticipated to be low, 2 years of presence or absence monitoring would be undertaken due to the large scale of the scheme and amount of clearance required.

## 5.7 Post development habitat management and monitoring

5.7.1 The mitigation area for the Hazlegrove meta-population is outside of the highways boundary and under private ownership. The management of this area would be secured via a letter of confirmation and a statement of common ground agreed by Hazlegrove Preparatory School (refer to appendix L).

5.7.2 Mitigation planting areas would be maintained by Highways England for a period of 5 years from completion of the scheme. Tree planting would be inspected during each visit to undertake maintenance operations, and any which have been subject to frost heave or wind rock would be straightened to an upright position and the ground re-firmed. The condition of stakes, ties, guys and guards and the replacement of broken or missing items would also be monitored. Non-residual herbicide would be applied twice annually in the months of April and July to the plant circles.



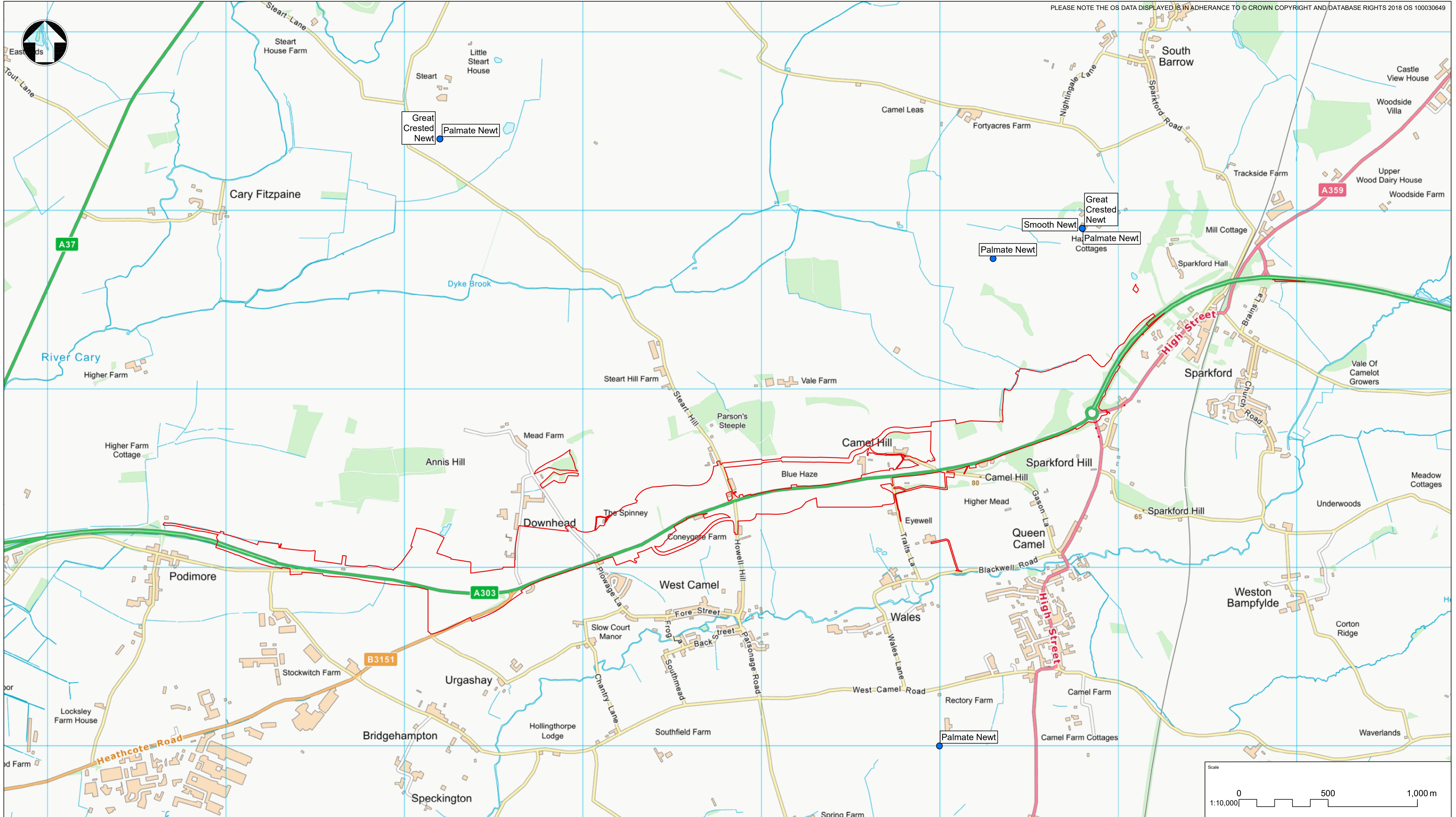
- 5.7.3 Annual inspections of the hibernacula would be conducted and any maintenance undertaken if necessary. Please refer to the figures in appendix F.
- 5.7.4 After the 5-year management period is completed the management of land outside the highways boundary would be returned to the landowner.
- 5.7.5 All post development maintenance works would be undertaken by the Highways England maintenance contractor for the area.

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## 6 Conclusion

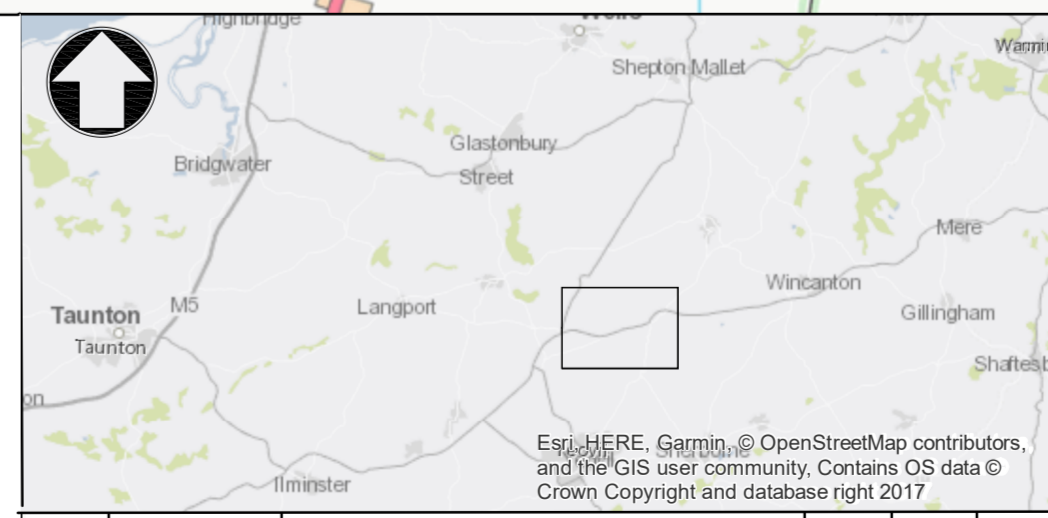
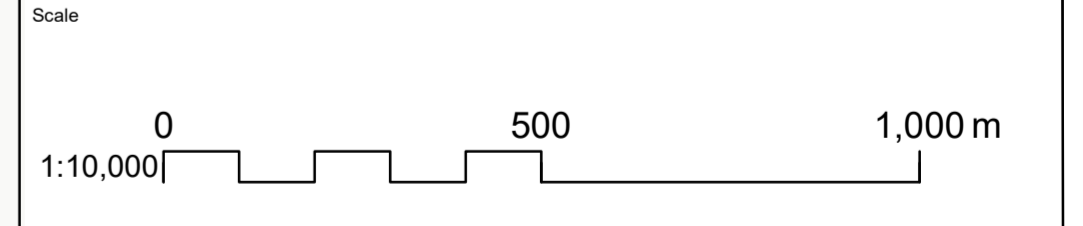
- 6.1.1 GCN are present in 3 distinct meta-populations in the study area. Two of these are subject to impacts from the proposed scheme. Meta-populations A and C support medium populations of GCN and are both within 500 metres of the scheme and subject to impacts as a result.
- 6.1.2 Unmitigated, meta-population A would be subject to Moderate Adverse effects during construction and operation of the scheme, due to the partial loss of terrestrial habitats within the core, within the intermediate and distant areas around the GCN breeding ponds. Meta-population C would be subject to Slight Adverse effects due to the partial loss of terrestrial habitat within the intermediate and distant areas around the GCN breeding ponds. As a result, an EPSM licence will be applied for through Natural England and a mitigation strategy has been devised to ensure that favourable conservation status of the local GCN population is maintained.
- 6.1.3 Mitigation includes the relocation of individual GCN from areas subject to impact to receptor sites that have been enhanced through habitat creation and the inclusion of hibernacula within the wider meta-population area. The relocation program would involve excluding and catching GCN using pitfall traps, followed by hand searching potential hibernacula and an ecological watching brief for vegetation clearance and destructive search. Compensation for the habitat loss as a result of works would be detailed in the Environmental Masterplan (Figure 2.8 of Volume 6.2) and would include creation of areas of native woodland and scrub and species-rich grassland, along with the creation of 2 new ponds. Following the successful implementation of the mitigation strategy, long-term effects on the local GCN population are anticipated to reduce to Neutral.

## **Appendix A: SERC GCN data from desk study**



**KEY**

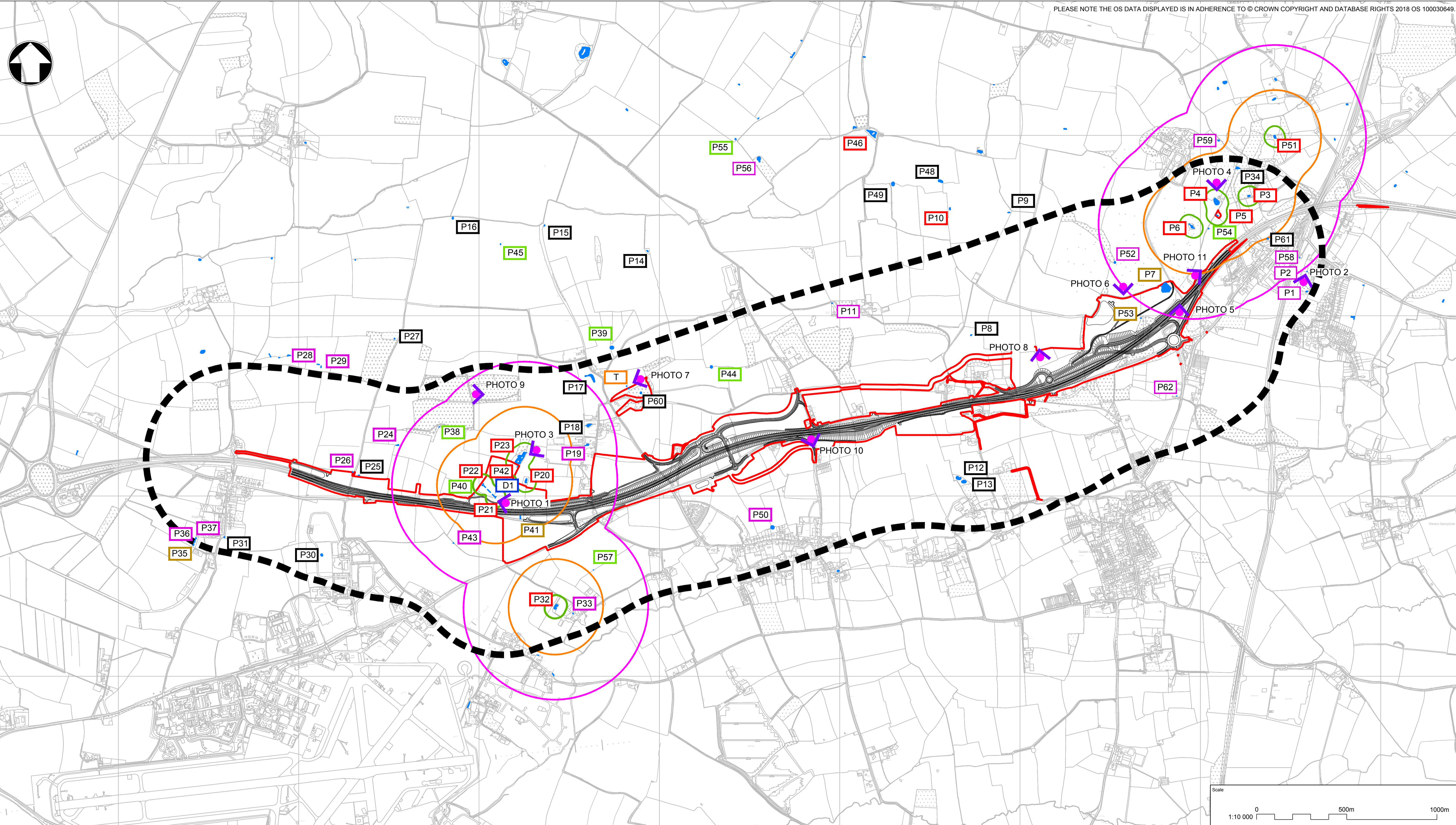
- PROPOSED RED LINE BOUNDARY
- SOMERSET ENVIRONMENTAL RECORDS CENTRE DATA



Project Title <b>A303 SPARKFORD TO ILCHESTER DUALLING</b>					
Drawing Title <b>SOMERSET ENVIRONMENTAL RECORDS CENTRE AMPHIBIAN RECORDS 2017</b>					
Drawing Status <b>Published - DEFINITION</b>					Suitability <b>A3</b>
Scale <b>AS SHOWN</b>	Designed <b>NB</b>	Drawn <b>ER</b>	Checked <b>VC</b>	Approved <b>ER</b>	
Original Size <b>A1</b>	Date <b>JULY 2018</b>	Date <b>JULY 2018</b>	Date <b>JULY 2018</b>	Date <b>JULY 2018</b>	
Drawing Number <b>HE 55 1507 - MMSJV - EBD</b>					Project Ref. No. <b>389 107</b>
Revision <b>C01</b>			Location <b>000 - DR - LB - 0056</b>		
REV.	DATE	AMENDMENT DETAILS	ORIG	CHK'D	APP'D

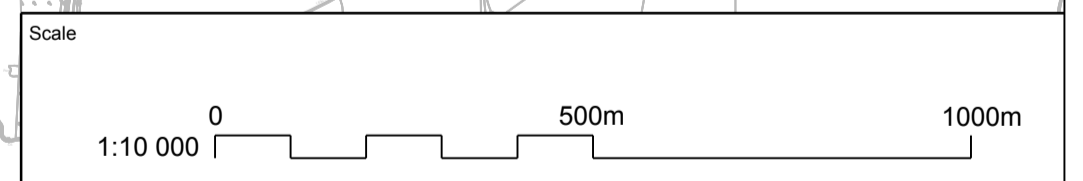
THIS DOCUMENT IS ISSUED FOR THE PARTY WHICH COMMISSIONED IT AND FOR SPECIFIC PURPOSES CONNECTED WITH THE CAPTIONED PROJECT ONLY. IT SHOULD NOT BE RELIED UPON BY ANY OTHER PARTY OR USED FOR ANY OTHER PURPOSE. WE ACCEPT NO RESPONSIBILITY FOR THE CONSEQUENCES OF THIS DOCUMENT BEING RELIED UPON BY ANY OTHER PARTY, OR BEING USED FOR ANY OTHER PURPOSE, OR CONTAINING ANY ERROR OR OMISSION WHICH IS DUE TO AN ERROR OR OMISSION IN DATA SUPPLIED TO US BY OTHER PARTIES.

## **Appendix B: Location of waterbodies and meta populations**



100  
90  
80  
70  
60  
50  
40  
30  
20  
10  
0

KEY:			
	RED LINE BOUNDARY		PONDS
	500M BUFFER AND SURVEYED AREA		DITCH
	PHOTO 3 PHOTO NUMBER, LOCATION AND DIRECTION REFER TO DRG. HE551507-MMSJV-LSI-000-DR-UU-6009		50M DISTANCE FROM GCN POND
			50M DISTANCE FROM GCN POND
			250M DISTANCE FROM GCN POND
			DITCH 1
			TROUGH
	P18 POND WITH NO GCN PRESENT		P23 POND WITH GCN PRESENT
	P19 POND SCOPED OUT		P11 POND DRY
	P44 POND NOT PRESENT		



Project Title <b>A303 SPARKFORD TO ILCHESTER DUALLING</b>				
Drawing Title <b>PHOTOGRAPHS OF TERRESTRIAL AND AQUATIC HABITATS SHEET 1 OF 2</b>				
Drawing Status <b>Published - DEFINITION</b>				Suitability <b>A3</b>
Scale 1:10000	Designed SW	Drawn PC	Checked SB	Approved ER
Original Size A1	Date 22/02/18	Date 22/06/18	Date 25/06/18	Date 26/06/18
Drawing Number HE PIN	Originator MMSJV	Volume LSI	Project Ref. No. 389107	
C01	22/06/18	DCO SUBMISSION	PC	SB ER
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD APPD
			000	- DR - UU - 6008
				C01

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PHOTO 1



PHOTO 2



PHOTO 3



PHOTO 4



PHOTO 5



PHOTO 6



PHOTO 7



PHOTO 11



PHOTO 8



PHOTO 9



PHOTO 10

Project Title  
A303 SPARKFORD TO ILCHESTER DUALLING

Drawing Title  
PHOTOGRAPHS OF TERRESTRIAL AND  
AQUATIC HABITATS SHEET 2 OF 2

Drawing Status  
Published - DEFINITION

Suitability  
A3

Scale	Designed	Drawn	Checked	Approved
NTS	SW	PC	SB	ER

Original Size	Date	Date	Date	Date
A1	22/02/18	22/06/18	25/06/18	26/06/18

Drawing Number	Originator	Volume	Project Ref. No.
HE PIN	HE551507 - MMSJV	- LSI -	389107

REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD	APP'D	Location	Type	Role	Number	Revision
C01	22/06/18	DCO SUBMISSION	PC	SB	ER	000	- DR - UU -	6009		C01

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## Appendix C: Description of waterbodies

Table C.1: Description of waterbodies

Pond reference	Description	Distance from site (m)	Presence or absence survey undertaken
1	Small pond situated at the end of a garden, woodland surrounding it has been cleared since original visit in 2016.	445	No
2	Concrete lined garden pond.	412	No
3	Pond within amenity grassland. Macrophytes present though little marginal shade. Terrestrial habitat present in field margins and nearby woodland.	300	Yes
4	Pond dominated by reeds with scattered hazel and willow trees. Dense bramble on bankside. Surrounded by poor semi-improved grassland, parkland, hedgerows and scattered scrub which would provide opportunities for sheltering.	240	Yes
5	Fenced off pond by cricket pitch. Good proportions of marginal shade and macrophytes. Terrestrial habitat provided nearby in woodland, verges and log piles.	180	Yes
6	Densely vegetated / barbed wire around perimeter of pond. Unable to access bankside as a result. Surrounded by poor semi-improved grassland, parkland, scattered oak and willow trees and bramble.	190	Yes
7	Heavily vegetated by reeds. Dry at the time of visit. Surrounding habitat comprised of poor semi-improved grassland, parkland, hedgerows and scrub. Largely defunct attenuation pond.	0	No
8	Pond within semi-improved pasture, partly shaded by willow. Horses use the pond for covershade and as drinking supply. Duckweed ( <i>Lemna minor</i> ) covers a large part of the pond surface.	32	Yes
9	Constructed pond with some shade provided by a mature willow. Little by way of true macrophytes A large proportion of the pond is covered by filamentous green algae.	684	Yes
10	Small pond with <i>Typha latifolia</i> , <i>Sparganium erectum</i> , Iris and bordered by bramble stands and sedges. Looks prone to periodic drying.	722	Yes
11	Lined garden pond - unable to be bottle trapped. This pond drains into Pond 1 in this garden, before being pumped back up to Pond 1 again. Few fish in this pond. Tenant believes that he has seen common newt in the pond.	470	No
12	Pond dominated by bulrush. Surrounded by amenity grassland and arable fields.	232	Yes
13	Pond dominated by bulrush. Surrounded by amenity grassland and arable fields.	255	Yes
14	Pond within arable land shaded by bushes and mature deciduous trees. Pond currently contains a high proportion of well-establish macrophytes, both emergent and submerged. Terrestrial habitat is provided by hedge cover and woody debris at field margins.	590	Yes
15	Pond within arable land shaded by mature deciduous trees. Terrestrial habitat is provided by hedge cover and woody debris at field margins.	900	Yes



Pond reference	Description	Distance from site (m)	Presence or absence survey undertaken
16	Pond within arable land with tall herbs and ruderals at margin. The pond contains a high proportion of terrestrial grasses which indicates periodic drying. Terrestrial habitat is provided by adjacent tussocky grassland with woody debris and by the hedge line nearby.	1215	Yes
17	Pond within pasture shaded by a series of willow trees. Terrestrial grasses present within most areas of the pond suggesting frequent drying. Terrestrial habitat consists of hedgerow of field.	60 from mitigation area, 475 to construction footprint	Yes
18	Pond within pasture close to the main farm buildings. The pond area is fenced off from the rest of the field. The pond is currently used as a duck pond which are reared and breed on the pond. Terrestrial habitat consists of hedgerow and log-piles / railways sleepers and rubble within the farmyard adjacent.	160	Yes
19	Pond within garden. Waterfowl present. Some cover at margins and terrestrial habitat in nearby hedgerows and bushes.	60	No
20	Pond within semi-improved grassland (pasture). Partially shaded by bushes and one tree. A good variety of macrophytes present. Terrestrial habitat provided by nearby hedgerows with trees.	8	Yes
21	Field pond, lots of floating grass, open to sheep accessing pond.	0 from mitigation area, 19 from construction footprint	Yes
22	Field pond, shaded by trees at one end, open at other with aquatic plants present such as water mint.	0 from mitigation area, 80 from construction footprint	Yes
23	Large pond with island in centre. Water quality looks poor with green filamentous algae at margins. Terrestrial habitat is moderate and present within nearby hedgerows with trees.	10m from mitigation area, 210 from construction footprint	Yes
24	Pond with arable field fringed with broadleaved trees. Land habitat provided by nearby dense corridor of trees and bushes.	3m	No
25	Pond with arable field fringed with broadleaved trees. Land habitat provided by nearby dense corridor of trees and bushes.	Within proposed compound area	Yes
26	Almost connected to a nearby small stream, which likely overflows into pond frequently. Heavily shaded with only leaf litter for vegetation.	5m	No
27	Pond within margin of woodland surrounded by trees and bushes. Land habitat provided by woodland and marginal area with woody debris and fallen trees.	575	Yes
28	Pond within pasture (cattle) fringed in places with small bushes of hawthorn and bramble with some willow. Land habitat limited to field boundary hedge line.	479	No

Pond reference	Description	Distance from site (m)	Presence or absence survey undertaken
29	Pond within pasture (cattle) fringed in places with small bushes of hawthorn and bramble with some willow. Land habitat limited to field boundary hedge line.	454	No
30	Pond within poor semi-improved grassland field heavily grazed by sheep. Surrounding terrestrial habitat dominated by pasture land and arable fields with limited areas to provide shelter and foraging opportunities for great crested newts. A single hawthorn tree on bankside.	345	Yes
31	Garden pond fringed with hazel and beech trees. Aquatic vegetation comprised of marsh marigold and willowherb. Surrounding terrestrial habitat comprised amenity grassland, hedgerows and scattered trees.	415	Yes
32	Garden pond within poor semi-improved grassland field. Surrounded by bankside trees and comprised aquatic vegetation.	301	Yes
33	Garden pond which is fed by dyke. Single willow tree on bankside. Koi carp present.	375	No
34	Constructed pond within garden. Filamentous green algae abundant. Terrestrial habitat present in field margins and nearby woodland. Owner stated that GCN had been seen under woodpiles adjacent to pond in recent weeks.	440	Yes
35	Largely dried out slurry pond with a large grass island. Situation within rough semi improved grassland and adjacent to arable fields.	471	No
36	Rectangular pond, slurry present, situated within rough semi improved grassland and adjacent to an arable fields / hedgerows.	486	No
37	Rectangular pond, slurry present, situated within rough semi improved grassland and adjacent to an arable fields / hedgerows.	506	No
38	Pond not present	330	No
39	Pond no longer exists	131	No
40	Pond no longer exists	0 from mitigation area, 25 from construction footprint	No
41	Small pond created by over flow of ditches, lots of leaf litter	0	No - Dry
42	Field pond that backs onto scrub, forms where ditches join	195	Yes
43	Small pond following ditch and hedge line within arable fields.	143	No
44	Pond no longer exists, should be within hedge line but isn't there anymore.	210	No
45	Pond no longer present	1200	No
46	Large pond, with an island in the middle	1500	Yes
47	Doesn't exist	Doesn't exist	No
48	Small pond situated in the corner of the woodland, surrounded by barbed wire and bramble (not accessible to pond edge)	1080	Yes
49	Small wildlife pond	1230	Yes

Pond reference	Description	Distance from site (m)	Presence or absence survey undertaken
50	Garden ornamental pond, lined and surrounds by concrete slabs, no vegetation present.	353	No
51	Field pond between two areas of woodland / new planting. Open on two sides, vegetated on the others, full of reeds, ditch fed.	53 from mitigation area, 660 from construction footprint	Yes
52	Small pond situated in the corner of the woodland, surrounded by barbed wire and bramble (not accessible to pond edge).	182	No
53	Small pond in the corner of a woodland, situated within a depression, largely dried out.	0	No
54	Depression following ditch line, pond not present	75 from mitigation area, 144 to construction footprint	No
55	Doesn't exist	1265	No
56	Small pond, well shaded.	1075	No
57	Doesn't exist	212	No
58	Small pond located at the back of Orchard Cottage, owner referred to it as a muddy pooling.	398	No
59	Wildlife pond	608	No – outside 500m buffer
60	Small conservation pond built into hillside, within grazed field.	0 from mitigation area, 344 from construction footprint	Yes
61	garden wildlife pond, lined	150 from mitigation area, 230 red from construction footprint	Yes
62	small garden pond, lined	210	No
Ditch 1	Wet Ditch	40	Yes
Trough	Trough in field – visible newts	398	Yes

## **Appendix D: Summary of HSI data**

Table D.1: Summary of HSI data

Pond number	Geographic location	Pond area (m <sup>2</sup> )	Permanence	Water quality	Shade	Waterfowl	Fish	Pond count	Terrestrial habitat	Macrophytes	HSI score	Category
1	A	35	Sometimes dries	Moderate	90	Absent	Absent	3	Moderate	25	0.45	Poor
2	A	20	Never	Moderate	10	Major	Absent	3	Moderate	5	0.5	Poor
3	A	50	Never	Good	30	Absent	Absent	8	Good	50	0.77	Good
4	A	750	Sometimes	Moderate	85	Minor	Minor	5	Moderate	80	0.69	Average
5	A	150	Never	Good	30	Absent	Absent	8	Good	35	0.84	Excellent
6	A	135	Sometimes	Moderate	98	Minor	Minor	6	Moderate	60	0.56	Below Average
7	A	135	Frequently	Moderate	98	Minor	Minor	4	Moderate	97	0.47	Poor
8	A	36	Rarely dries	Poor	60	Absent	Absent	8	Moderate	90	0.65	Average
9	A	60	Rarely dries	Poor	10	Absent	Absent	8	Moderate	0	0.62	Average
10	A	25	Frequently	Poor	50	Absent	Absent	8	Moderate	70	0.51	Below Average
11	A	3.14	Never	Poor	0	Absent	Minor	10	Poor	80	0.43	Poor
12	A	84	Sometimes	Moderate	60	Minor	Minor	4	Poor	95	0.57	Below Average
13	A	180	Sometimes	Moderate	10	Minor	Minor	4	Poor	60	0.62	Average
14	A	150	Rarely dries	Moderate	60	Absent	Absent	7	Moderate	65	0.76	Good
15	A	200	Frequently	Moderate	50	Absent	Absent	7	Moderate	15	0.58	Below Average
16	A	150	Frequently	Poor	20	Absent	Absent	7	Moderate	10	0.52	Below Average
17	A	200	Frequently	Moderate	50	Absent	Absent	7	Moderate	15	0.58	Below Average
18	A	300	Never	Poor	2	Major	Absent	7	Moderate	20	0.71	Good
19	A	150	Never	Poor	20	Major	Absent	9	Moderate	0	0.42	Poor
20	A	180	Never	Moderate	20	Absent	Absent	9	Moderate	40	0.80	Excellent
21	A	24	Sometimes	Poor	60	Absent	Absent	9	Poor	0	0.61	Average
22	A	20	Sometimes	Bad	40	Absent	Absent	9	Poor	0	0.56	Below Average
23	A	2000	Never	Bad	30	Absent	Possible	9	Moderate	0	0.50	Below Average
24	A	40	Frequently	Poor	85	Absent	Absent	8	Good	0	0.43	Poor

Pond number	Geographic location	Pond area (m <sup>2</sup> )	Permanence	Water quality	Shade	Waterfowl	Fish	Pond count	Terrestrial habitat	Macrophytes	HSI score	Category
25	A	40	Sometimes	Poor	20	Minor	Absent	8	Good	0	0.54	Below Average
26	A	7.85	Sometimes	Moderate	100	Absent	Possible	6	Moderate	0	0.41	Poor
27	A	50	Rarely dries	Moderate	80	Absent	Absent	8	Good	10	0.62	Average
30	A	48	Sometimes	Poor	2	Absent	Absent	2	Poor	95	0.57	Below Average
31	A	54	Rarely dries	Moderate	50	Minor	Possible	2	Moderate	30	0.64	Average
32	A	90	Sometimes	Moderate	10	Minor	Absent	6	Poor	70	0.65	Average
34	A	30	Never	Poor	90	Absent	Absent	8	Good	20	0.57	Below Average
35	A	<50	Dries annually	Bad	0	Absent	Possible	3	Poor	5	0.28	Poor
36	A	100	Rarely dries	Bad	0	Absent	Possible	3	Poor	5	0.4	Poor
37	A	100	Rarely dries	Bad	0	Absent	Possible	3	Poor	5	0.4	Poor
41	A	<50	Sometimes	Poor	30	Absent	Absent	3	Moderate	0	0.51	Below Average
42	A	<51	Sometimes	Moderate	60	Absent	Absent	3	Moderate	50	0.60	Average
43	A	<50	Dries annually	Poor	100	Absent	Absent	1	Poor	0	0.33	Poor
46	A	400	Never	Moderate	30	Minor	Possible	3	Moderate	10	0.72	Good
48	A	200	Rarely dries	Poor	25	Absent	Possible	2	Moderate	5	0.6	Average
49	A	<50	Rarely dries	Good	90	Absent	Absent	2	Good	20	0.60	Average
50	A	<50	Never dries	Poor	5	Absent	Absent	1	Poor	0	0.48	Poor
51	A	<50	Never dries	Poor	5	Absent	Absent	1	Poor	0	0.60	Average
52	A	<50	Never dries	Poor	100	Absent	Possible	2	Moderate	10	0.44	Poor
53	A	<50	Dries annually	Poor	100	Absent	Absent	3	Moderate	0	0.37	Poor

Pond number	Geographic location	Pond area (m <sup>2</sup> )	Permanence	Water quality	Shade	Waterfowl	Fish	Pond count	Terrestrial habitat	Macrophytes	HSI score	Category
56	A	<50	Sometimes dries	Poor	90	Absent	Absent	3	Moderate	15	0.48	Poor
58 -1	A	<50	Dries annually	Moderate	60	Absent	Possible	2	Poor	10	0.45	Poor
58 - 2	A	<50	Sometimes dries	Moderate	5	Absent	Minor	2	Poor	60	0.5	Poor
58 - 2a	A	<50	Dries annually	Poor	90	Absent	Absent	2	Poor	5	0.37	Poor
59	A	<50	Never dries	Good	0	Minor	Possible	4	Moderate	40	0.61	Average
60	A	<50	Sometimes dries	Moderate	5	Absent	Absent	1	Moderate	90	0.58	below average
61	A	<50	Never	Good	80	Absent	Absent	1	Good	90	0.63	Average
62	A	<50	Never dries	Good	10	Absent	Absent	0	Moderate	25	0	Poor

## **Appendix E: Summary of field data**

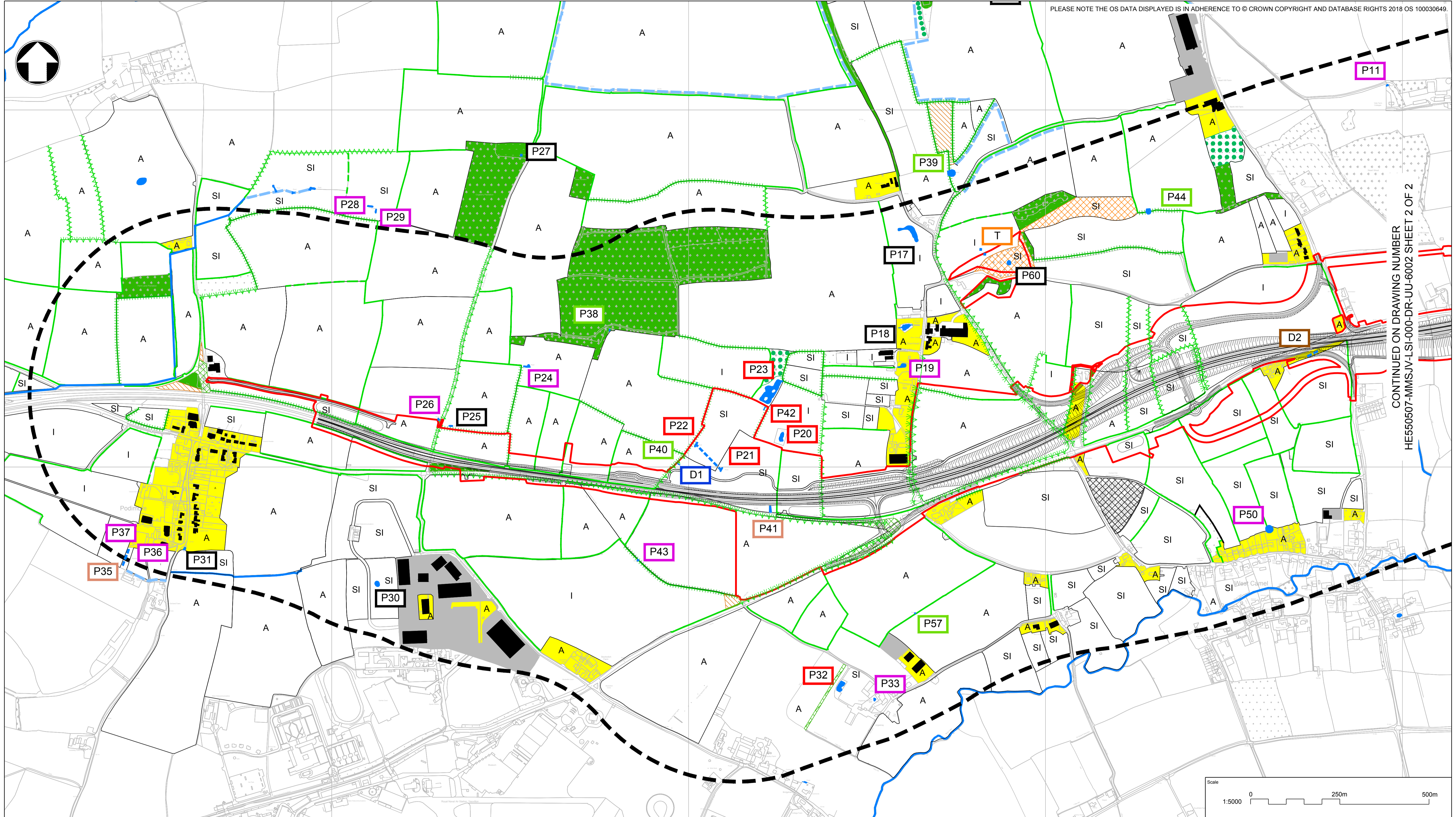


Table E.1: Summary of field survey data

Pond number	Survey 1 Date	GCN Y/N	Total of GCN found	Survey 2 Date	GCN Y/N	Total of adult GCN found	Survey 3 Date	GCN Y/N	Total of adult GCN found	Survey 4 Date	GCN Y/N	Total of adult GCN found	Survey 5 Date	GCN Y/N	Total of adult GCN found	Survey 6 Date	GCN Y/N	Total of adult GCN found	Maximum adult GCN count
3	05/04/2017	Y	18	20/04/2017	N		27/04/2017	N		09/05/2017	N		22/05/2017	Y	5	24/05/2017	Y	1	18
4	05/04/2017	Y	15	20/04/2017	Y	6	27/04/2017	Y	23	09/05/2017	N		22-May	Y	6	24/05/2017	Y	5	15
5	05/04/2017	Y	26	20/04/2017	Y	2	27/04/2017	Y	6	09/05/2017	Y	4	22-May	Y	2	24/05/2017	Y	7	26
6	Inaccessible	N		20/04/2017	Y	1													1
8	23/03/2017	N		11/04/2017	N		25/04/2017	N		09/05/2017	N								-
9	04/04/2016	N		19/04/2017	N		04/05/2017	N		12/05/2017	N								-
10	04/04/2017	Y	1	19/04/2017	N		04/05/2017	Y	1	12/05/2017	N		17/05/2017	N		25-May	N		1
12	23/03/2017	N		11/04/2017	N		25/04/2017	N		09/05/2017	N								-
13	23/03/2017	N		11/04/2017	N		25/04/2017	N		09/05/2017	N								-
14	22/03/2017	N		12/04/2017	N		24/04/2017	N		03/05/2017	N								-
15	22/03/2017	N		12/04/2017	N		24/04/2017	N		03/05/2017	N								-
16	22/03/2017	N		12/04/2017	N		24/04/2017	N		04/05/2017	N								-
17	28/03/2017	N		11/04/2017	N		25/04/2017	N - Dry		08/05/2017	N								-
18	28/03/2017	N		11/04/2017	N		25/04/2017	N		08/05/2017	N								-
20	03/04/2017	Y	1	18/04/2017	Y	12	26/04/2017	Y	18	10/05/2017	Y	28	18/05/2017	Y	10	23/05/2017	Y	8	28
21	03/04/2017	Y	9	18/04/2017	N		26/04/2017	N-Dry		17/05/2017	N-Dry		18/05/2017	N		25/05/2017	N		9
22	03/04/2017	Y	2	18/04/2017	Y	3	26/04/2017	N		10/05/2017	Y	4	17/05/2017	N		23/05/2017	Y	1	4
23	03/04/2017	N		18/04/2017	N		27-May	Y	3	10/05/2017	N		18/05/2017	N		23/05/2017	N		3
25	21/03/2017	N		10/04/2017	N		02/05/2017	N											-
26	21/03/2017	N																	-
27	21/03/2017	N		10/04/2017	N		02/05/2017	N		08/05/2017	N								-
30	20/03/2017	N		29/03/2017	N		24/04/2017	N-compl											-

Pond number	Survey 1 Date	GCN Y/N	Total of GCN found	Survey 2 Date	GCN Y/N	Total of adult GCN found	Survey 3 Date	GCN Y/N	Total of adult GCN found	Survey 4 Date	GCN Y/N	Total of adult GCN found	Survey 5 Date	GCN Y/N	Total of adult GCN found	Survey 6 Date	GCN Y/N	Total of adult GCN found	Maximum adult GCN count
								etely dried up											
31	29/03/2017	N		07/04/2017	N		24-Apr	N		03/05/2017	N								-
32	20/03/2017	Y	1	29/03/2017	N		24/04/2017	N		08/05/2017	Completely dried up - N								1
34	Not surveyed			20/04/2017	N		27/04/2017	Dry - N		09/05/2017	Dry					22/05/2017	N		-
41	03/04/2017	Pond was dry			Pond was dry		27/04/2017	Dry - N					17/05/2017	Dry-N		23/05/2017	N		-
42	03/04/2017	Y		18/04/2017	Y	2	26/04/2017	N		10/05/2017	Y	4	18/05/2017	Y	2	23/05/2017	Y	4	4
46	04/04/2017	Y	1	19/04/2017	N		04/05/2017	N		11/05/2017	N			17/05/2017		25/05/2017	N		1
48	04/04/2017	N		19/04/2017	N		05/04/2017	N		11/05/2017	N								-
49	04/04/2017	N		19/04/2017	N		04/05/2017	N		11/05/2017	Too dry								-
51	05/04/2017	Y	3	20/04/2017	Y	8	27/04/2017	Y	5	09/05/2017	N		22/05/2017	Y	12	22/05/2017	Y	3	12
60	28/03/2017	N		11/04/2017	N		25/04/2017	N		08/05/2017	N								-
61	05/04/2017	N		20/04/2017	N		27/04/2017	N		11/05/2017	N		22/05/2017	N					-
Ditch 1	03/04/2017	Y	1	26/04/2017	N		26/04/2017	N					18/05/2017	N		23/05/2017	N		1
Trough	28/03/2017	N		11/04/2017	N		25/04/2017	N		08/05/2017	N								-

## **Appendix F: Impact and mitigation drawings**



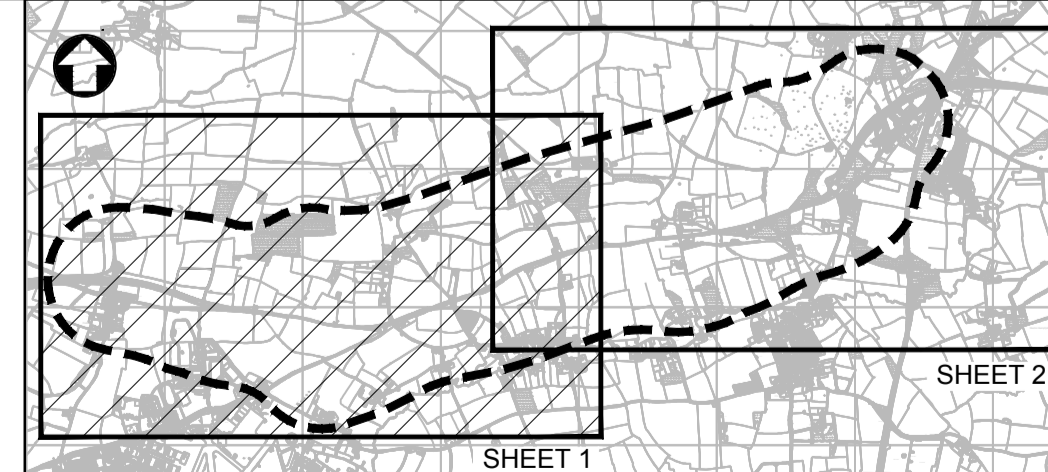
CONTINUED ON DRAWING NUMBER HE550507-MMSJV-LSI-000-DR-UU-6002 SHEET 2 OF 2

- KEY:**
- RED LINE BOUNDARY
  - 500M BUFFER AND SURVEYED AREA
  - BUILDING
  - HARDSTANDING
  - I IMPROVED GRASSLAND
  - A ARABLE
  - A AMENITY GRASSLAND

- SI POOR SEMI-IMPROVED GRASSLAND
- SI CALCAREOUS GRASSLAND SEMI-IMPROVED
- SI TALL RUDERAL
- SI BROAD-LEAVED WOODLAND SEMI-NATURAL
- SI BROAD-LEAVED WOODLAND - PLANTATION
- SI SCRUB - DENSE
- SI BROADLEAVED PARKLAND / SCATTERED TREES
- INTACT HEDGE - NATIVE SPECIES RICH
- INTACT HEDGE - NATIVE SPECIES POOR
- DEFUNCT HEDGE - NATIVE SPECIES POOR
- HEDGE AND TREE - NATIVE SPECIES RICH
- HEDGE WITH TREE - NATIVE SPECIES POOR
- FENCE
- CARAVAN SITE

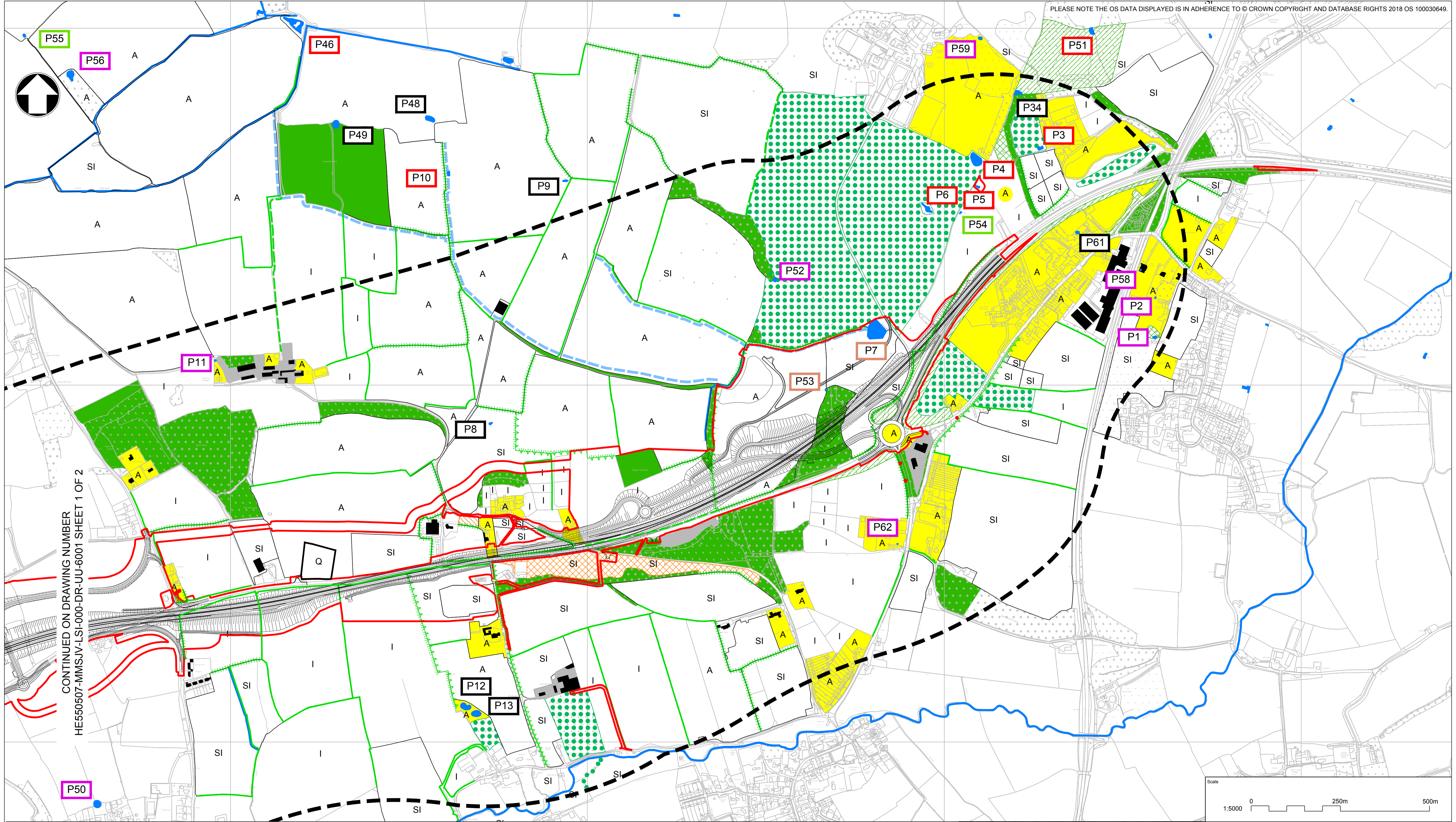
- STANDING WATER / PONDS
- RUNNING WATER
- DITCH
- D1 DITCH 1
- D2 DITCH 2 - NO ACCESS
- T TROUGH

- P18 POND WITH NO GCN PRESENT
- P23 POND WITH GCN PRESENT
- P19 POND SCOPED OUT
- P11 POND DRY
- P44 POND NOT PRESENT



Scale 1:5000 0 250m 500m				
Project Title <b>A303 SPARKFORD TO ILCHESTER DUALLING</b>				
Drawing Title <b>MAP TO SHOW DEVELOPMENT SITE AND SURVEY SITE SHEET 1 OF 2</b>				
Drawing Status <b>Published - DEFINITION</b>				Suitability <b>A3</b>
Scale 1:5000	Designed SW	Drawn PC	Checked SB	Approved ER
Original Size A1	Date 22/02/18	Date 22/06/18	Date 25/06/18	Date 25/06/18
Drawing Number HE PIN		Originator HE551507 - MMSJV - LSI -		Project Ref. No. 389107
REV. DATE		AMENDMENT DETAILS		Revision C01

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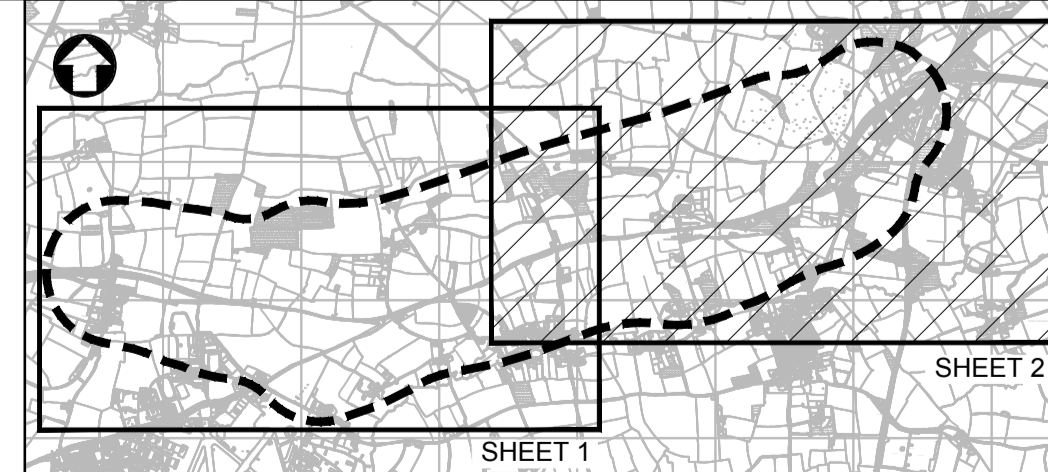
**KEY:**

	RED LINE BOUNDARY
	500M BUFFER AND SURVEYED AREA
	BUILDING
	HARDSTANDING
	IMPROVED GRASSLAND
	ARABLE
	AMENITY GRASSLAND

	SI POOR SEMI-IMPROVED GRASSLAND
	SI CALCAREOUS GRASSLAND SEMI-IMPROVED
	SI TALL RUDERAL
	SI BROAD-LEAVED WOODLAND SEMI-NATURAL
	SI BROAD-LEAVED WOODLAND - PLANTATION
	SI SCRUB - DENSE
	SI BROADLEAVED PARKLAND / SCATTERED TREES
	INTACT HEDGE - NATIVE SPECIES RICH
	INTACT HEDGE - NATIVE SPECIES POOR
	DEFUNCT HEDGE - NATIVE SPECIES POOR
	HEDGE AND TREE - NATIVE SPECIES RICH
	HEDGE WITH TREE - NATIVE SPECIES POOR
	FENCE
	CARAVAN SITE

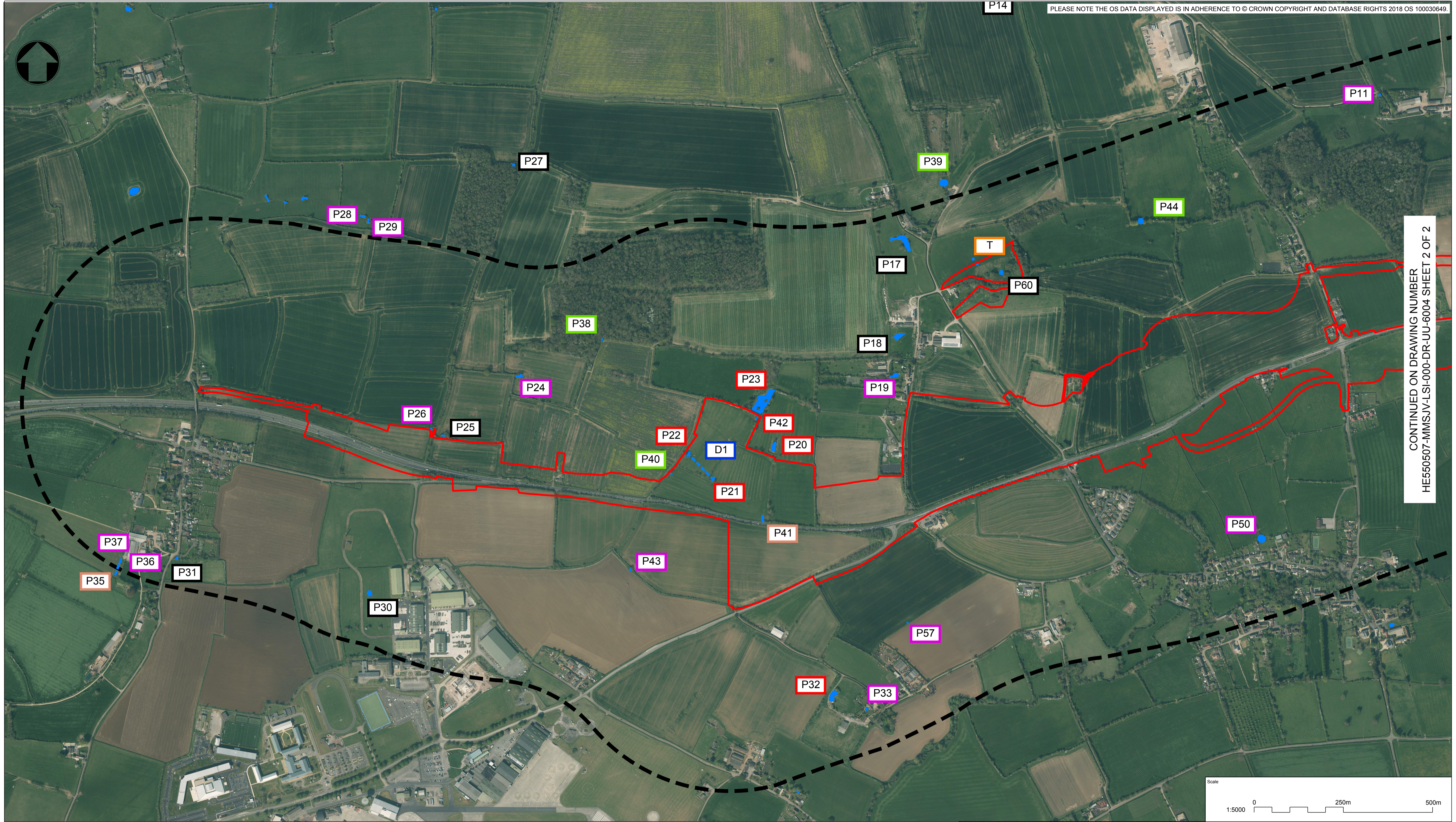
	Q QUARRY
	STANDING WATER / PONDS
	RUNNING WATER
	DITCH

	P18 POND WITH NO GCN PRESENT
	P23 POND WITH GCN PRESENT
	P19 POND SCOPED OUT
	P11 POND DRY
	P44 POND NOT PRESENT



Scale		1:5000		0 250m 500m	
Project Title					
A303 SPARKFORD TO ILCHESTER DUALLING					
Drawing Title					
MAP TO SHOW DEVELOPMENT SITE AND SURVEY AREA SHEET 2 OF 2					
Drawing Status				Published - DEFINITION	
Suitability				A3	
Scale	Designed	Drawn	Checked	Approved	
1:5000	SW	PC	SB	ER	
Original Size	Date	Date	Date	Date	
A1	24/02/18	22/06/18	25/06/18	25/06/18	
Drawing Number	Originator	Volume	Project Ref. No.		
HE PIN	MMSJV	- LSI -	389107		
C01	22/06/18	DCO SUBMISSION	PC	SB	ER
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD	APPD
Location					
000 - DR - UU - 6002					
Revision					
C01					

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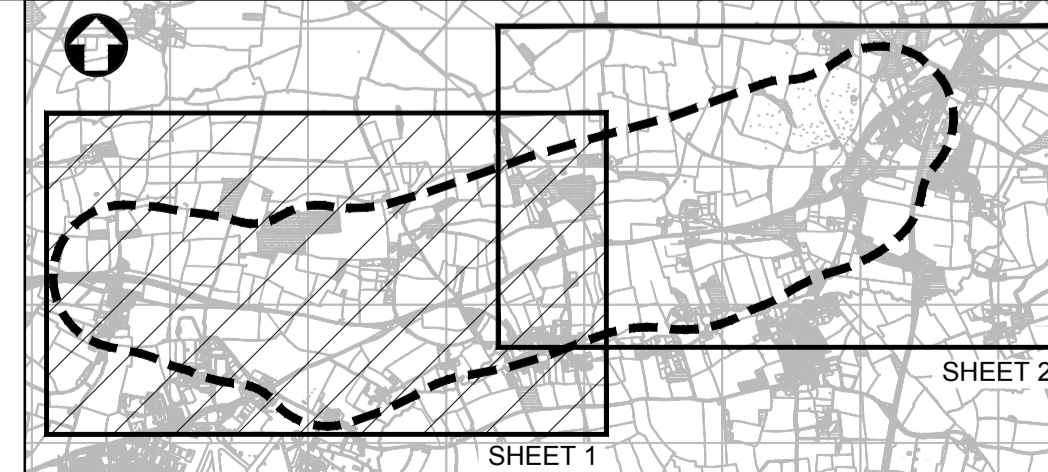
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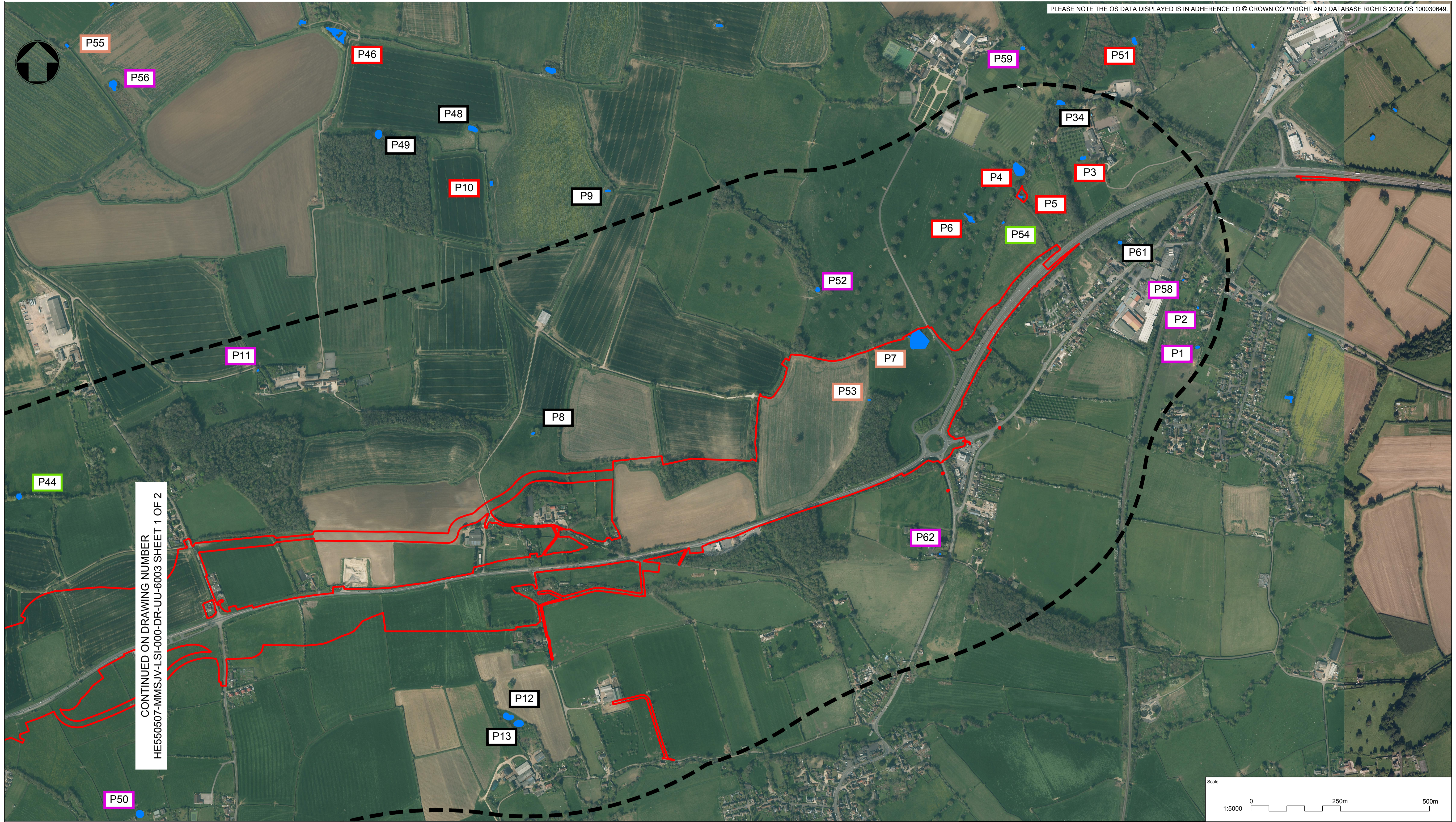
**KEY:**

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	500M BUFFER AND SURVEYED AREA		POND WITH GCN PRESENT
	DITCH		POND SCOPED OUT
	POND		POND DRY
			POND NOT PRESENT
			DITCH 1
			TROUGH

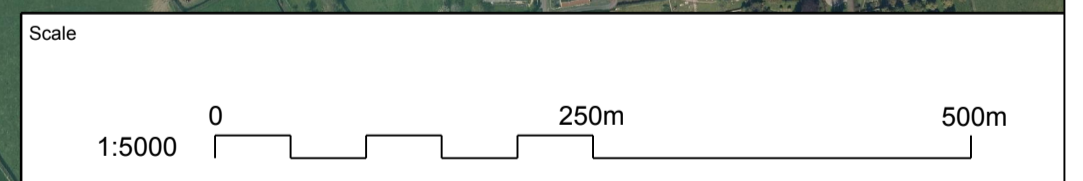
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Scale 1:5000 0 250m 500m				
Project Title A303 SPARKFORD TO ILCHESTER DUALLING				
Drawing Title AERIAL PHOTOGRAPH TO SHOW DEVELOPMENT SITE AND SURVEY AREA SHEET 1 OF 2				
Drawing Status Published - DEFINITION				Suitability A3
Scale 1:5000	Designed SW	Drawn PC	Checked SB	Approved ER
Original Size A1	Date 23/02/18	Date 22/06/18	Date 25/06/18	Date 26/06/18
Drawing Number HE PIN 000		Originator MMSJV - LSI		Volume - DR - UU - 6003
Project Ref. No. 389107		Revision C01		
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD
			APPD	

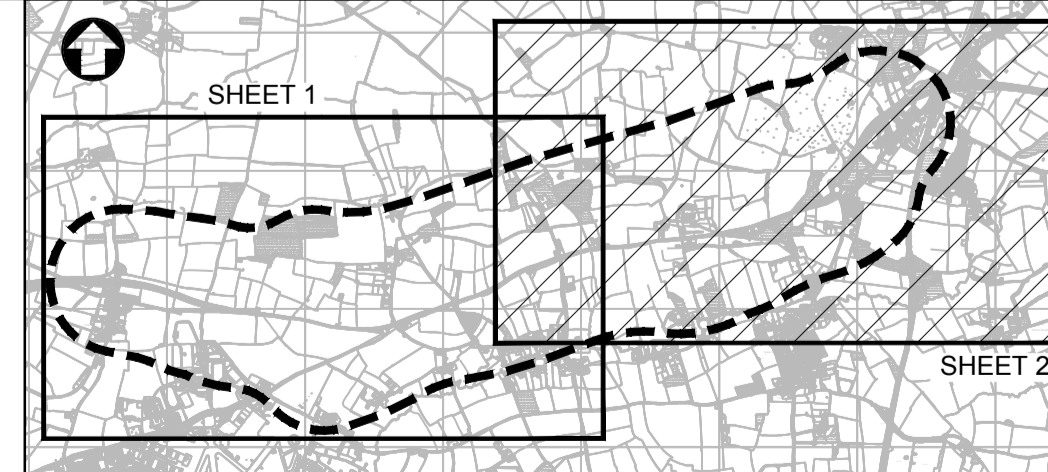


CONTINUED ON DRAWING NUMBER  
HE550507-MMSJV-LSI-000-DR-UU-6003 SHEET 1 OF 2



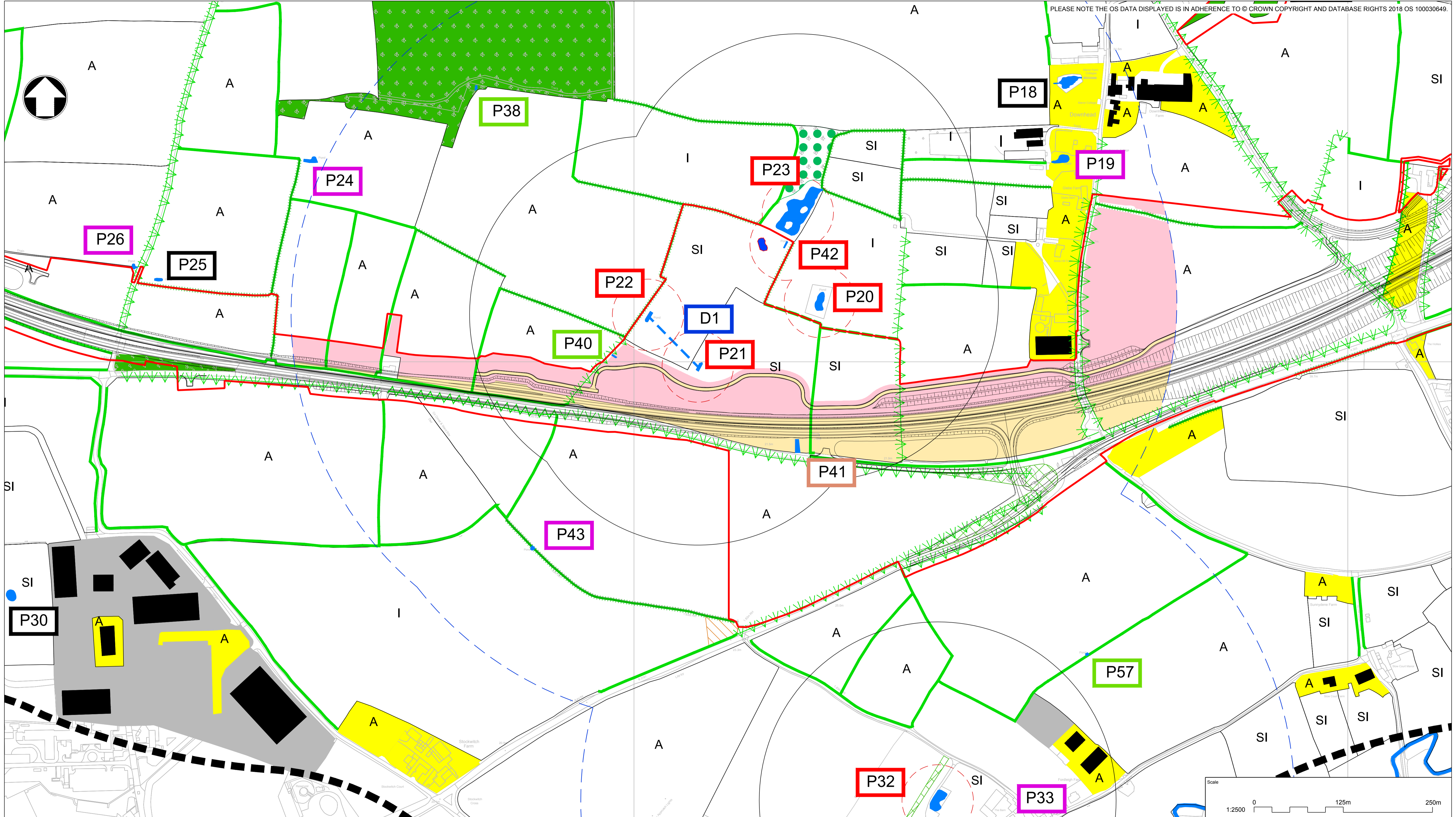
**KEY:**

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	500M BUFFER AND SURVEYED AREA		POND WITH GCN PRESENT
	DITCH		POND SCOPED OUT
	POND		POND DRY
			POND NOT PRESENT



Project Title <b>A303 SPARKFORD TO ILCHESTER DUALLING</b>				
Drawing Title <b>AERIAL PHOTOGRAPH TO SHOW DEVELOPMENT SITE AND SURVEY AREA SHEET 2 OF 2</b>				
Drawing Status <b>Published - DEFINITION</b>				Suitability <b>A3</b>
Scale 1:5000	Designed SW	Drawn PC	Checked SB	Approved ER
Original Size A1	Date 26/02/18	Date 22/06/18	Date 25/06/18	Date 26/06/18
Drawing Number HE PIN <b>000</b>		Originator Volume <b>- DR - UU - 6004</b>		Project Ref. No. <b>389107</b>
REV. DATE AMENDMENT DETAILS		ORIG CHKD APP'D		Revision <b>C01</b>

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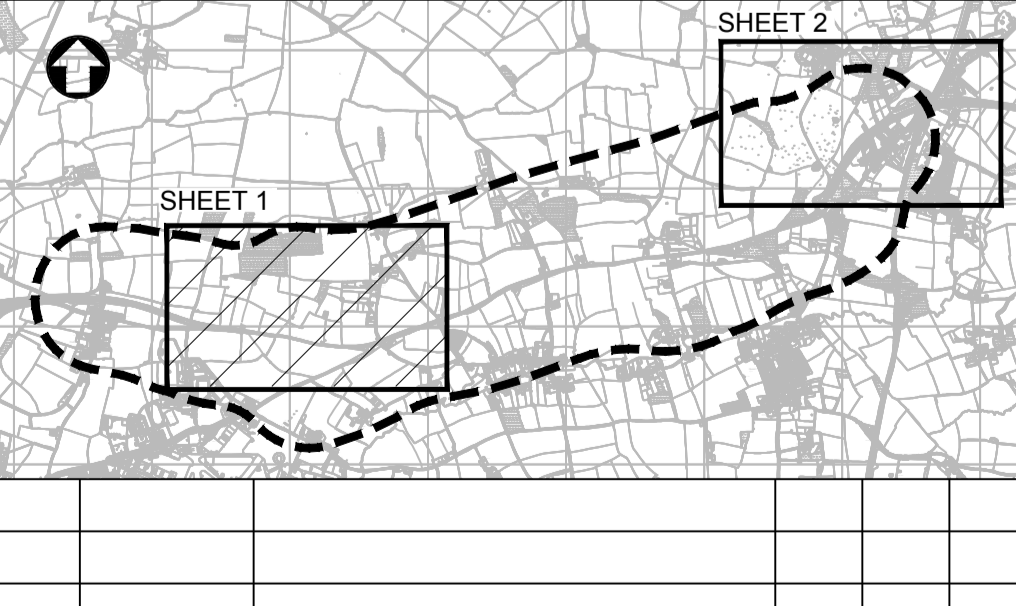
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	500M BUFFER AND SURVEYED AREA
	TEMPORARY HABITAT LOSS
	PERMANENT HABITAT LOSS
	50M POND BUFFER
	250M POND BUFFER
	500M POND BUFFER

	BUILDING
	HARDSTANDING
	IMPROVED GRASSLAND
	ARABLE
	AMENITY GRASSLAND
	POOR SEMI-IMPROVED GRASSLAND
	CALCAREOUS GRASSLAND SEMI-IMPROVED
	TALL RUDERAL

	BROAD-LEAVED WOODLAND SEMI-NATURAL
	BROAD-LEAVED WOODLAND - PLANTATION
	SCRUB - DENSE
	BROADLEAVED PARKLAND / SCATTERED TREES
	INTACT HEDGE - NATIVE SPECIES RICH
	INTACT HEDGE - NATIVE SPECIES POOR
	DEFUNCT HEDGE - NATIVE SPECIES POOR

	HEDGE AND TREE - NATIVE SPECIES RICH
	HEDGE WITH TREE - NATIVE SPECIES POOR
	FENCE
	CARAVAN SITE
	STANDING WATER / PONDS
	RUNNING WATER
	DITCH
	POND TO BE CREATED

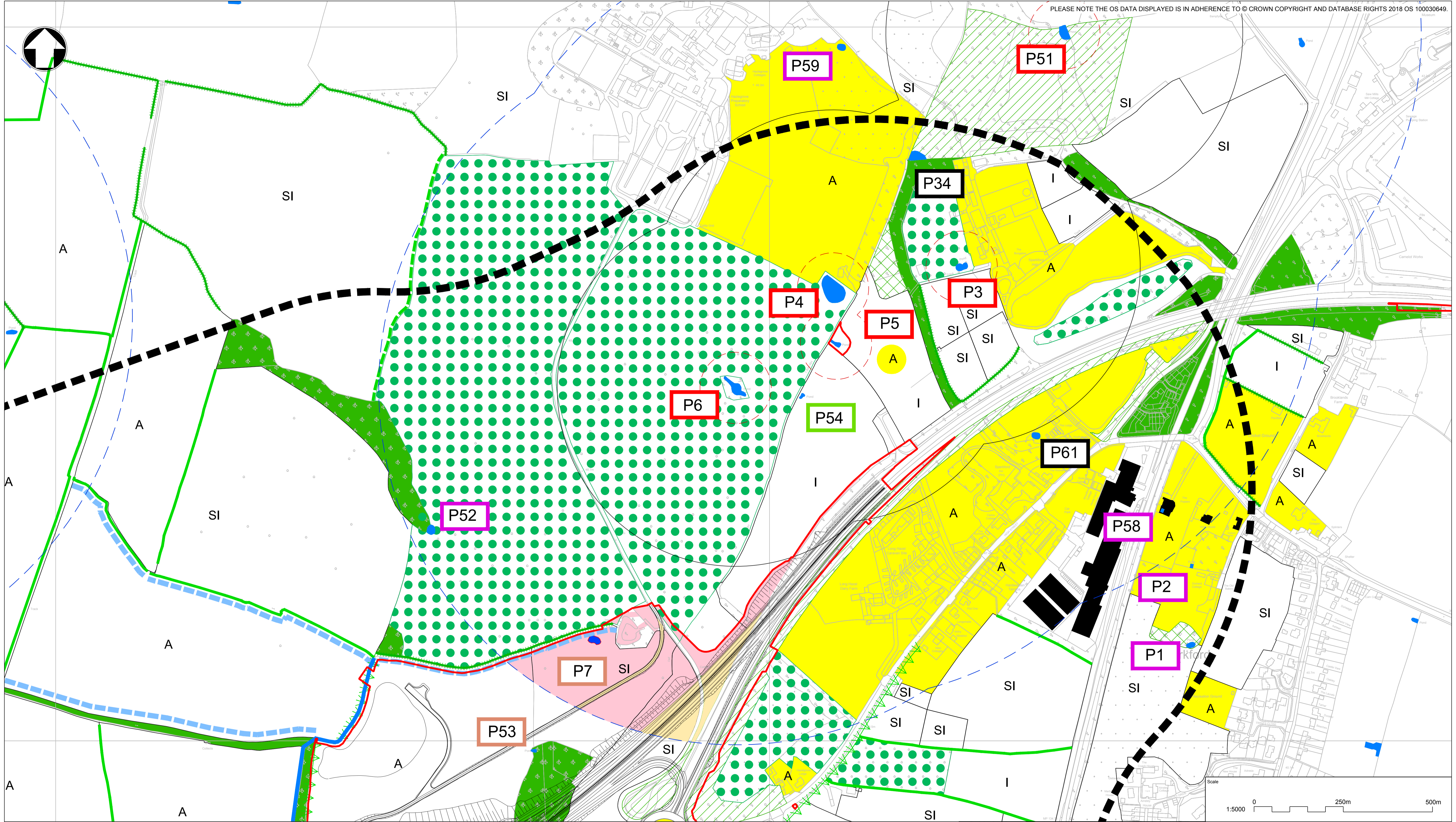
	POND WITH NO GCN PRESENT
	POND WITH GCN PRESENT
	POND SCOPED OUT
	POND DRY
	POND NOT PRESENT
	DITCH 1



Scale		1:2500		0 125m 250m	
Project Title A303 SPARKFORD TO ILCHESTER DUALLING					
Drawing Title IMPACT MAP SHEET 1 OF 2					
Drawing Status Published - DEFINITION					Suitability A3
Scale	Designed	Drawn	Checked	Approved	
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Original Size	Date	Date	Date	Date	
A1	22/02/18	25/06/18	25/06/18	26/06/18	
Drawing Number	Originator	Volume	Project Ref. No.		
HE PIN	MMSJV	- LSI -	389107		
C01	22/06/18	DCO SUBMISSION	PC	SB	ER
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD	APPD

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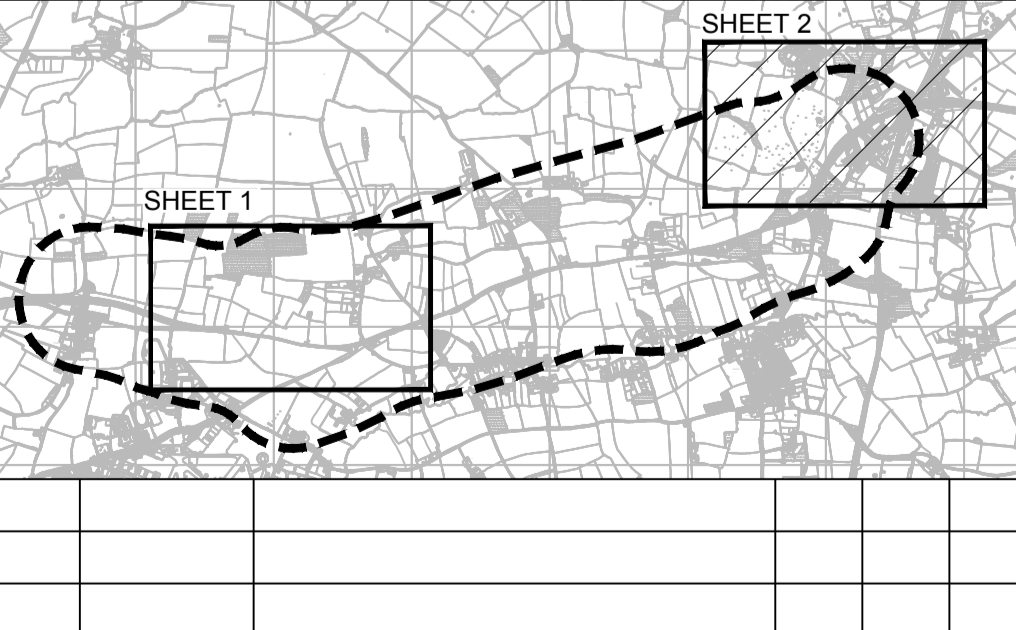
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	500M BUFFER AND SURVEYED AREA
	TEMPORARY HABITAT LOSS
	PERMANENT HABITAT LOSS
	50M POND BUFFER
	250M POND BUFFER
	500M POND BUFFER

	BUILDING
	HARDSTANDING
	IMPROVED GRASSLAND
	ARABLE
	AMENITY GRASSLAND
	POOR SEMI-IMPROVED GRASSLAND
	CALCAREOUS GRASSLAND SEMI-IMPROVED
	TALL RUDERAL

	BROAD-LEAVED WOODLAND SEMI-NATURAL
	BROAD-LEAVED WOODLAND - PLANTATION
	SCRUB - DENSE
	BROADLEAVED PARKLAND / SCATTERED TREES
	INTACT HEDGE - NATIVE SPECIES RICH
	INTACT HEDGE - NATIVE SPECIES POOR
	DEFUNCT HEDGE - NATIVE SPECIES POOR

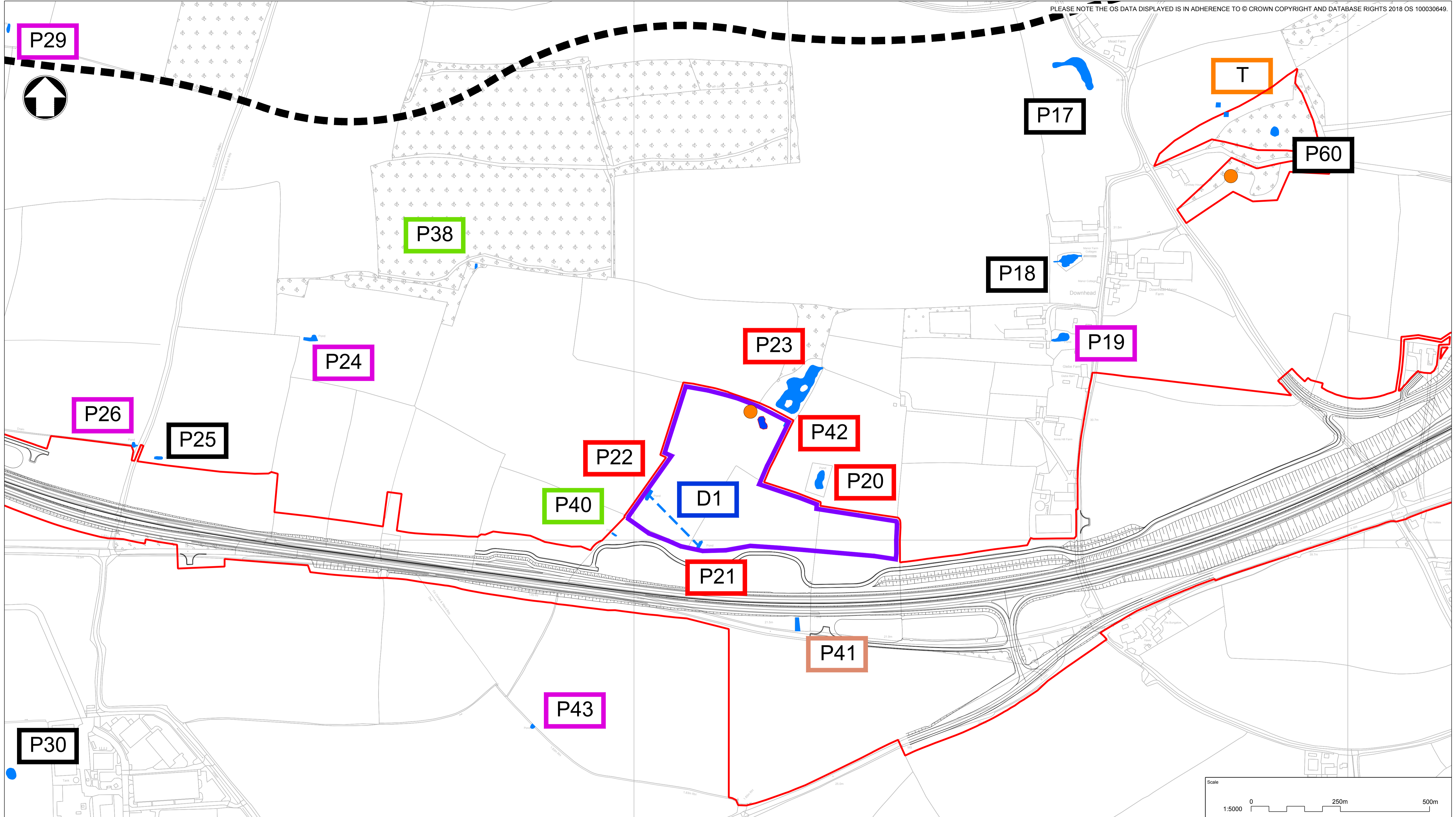
	HEDGE AND TREE - NATIVE SPECIES RICH
	HEDGE WITH TREE - NATIVE SPECIES POOR
	FENCE
	CARAVAN SITE
	STANDING WATER / PONDS
	RUNNING WATER
	DITCH
	POND TO BE CREATED

	P18 POND WITH NO GCN PRESENT
	P23 POND WITH GCN PRESENT
	P19 POND SCOPED OUT
	P11 POND DRY
	P44 POND NOT PRESENT



Scale		1:5000		0 250m 500m	
Project Title <b>A303 SPARKFORD TO ILCHESTER DUALLING</b>					
Drawing Title <b>IMPACT MAP SHEET 2 OF 2</b>					
Drawing Status <b>Published - DEFINITION</b>					Suitability <b>A3</b>
Scale	Designed	Drawn	Checked	Approved	
1:5000	SW	PC	SB	ER	
Original Size	Date	Date	Date	Date	
A1	23/02/18	25/06/18	25/06/18	26/06/18	
Drawing Number	Originator	Volume	Project Ref. No.		
HE PIN	HE551507 - MMSJV	- LSI -	389107		
	000	- DR - UU -	6007	Revision	
				C01	

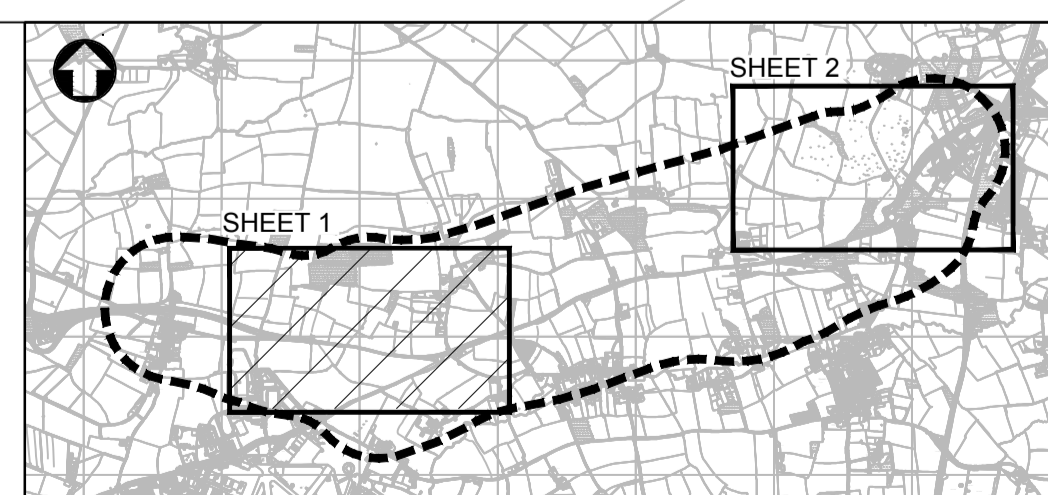
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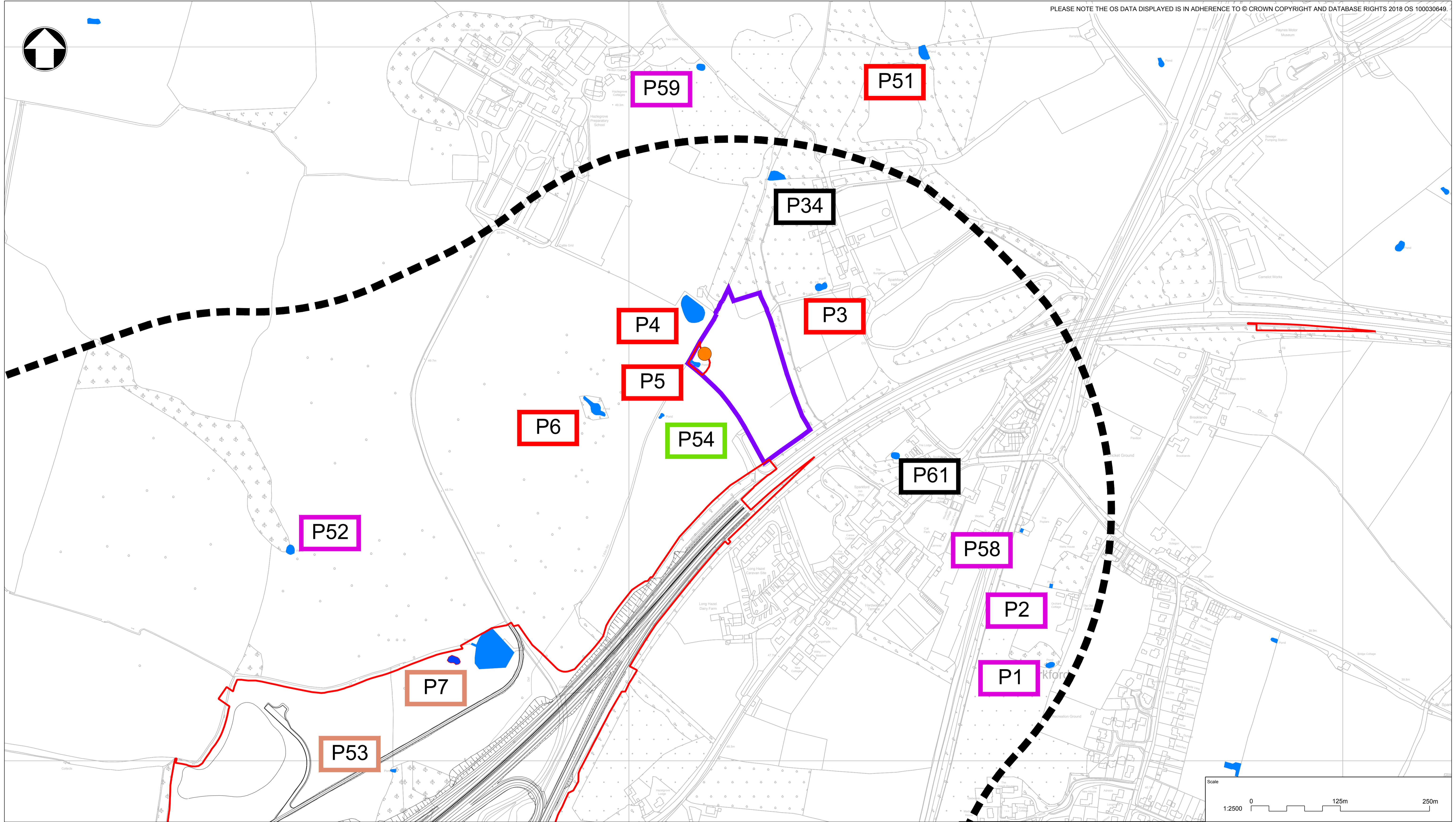
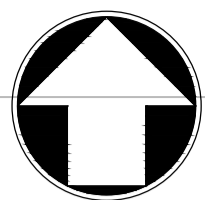
**KEY:**

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	500M BUFFER AND SURVEYED AREA		POND		POND WITH GCN PRESENT
			POND TO BE CREATED		POND SCOPED OUT
			HIBERNACULA		POND DRY
			RECEPTOR AREA		POND NOT PRESENT
					DITCH
					TROUGH



Scale				
1:5000 0 250m 500m				
Project Title A303 SPARKFORD TO ILCHESTER DUALLING				
Drawing Title MAP TO SHOW RECEPTOR SITES SHEET 1 OF 2				
Drawing Status Published - DEFINITION				Suitability A3
Scale 1:5000	Designed SW	Drawn PC	Checked SB	Approved ER
Original Size A1	Date 28/02/18	Date 25/06/18	Date 25/06/18	Date 26/06/18
Drawing Number HE PIN	Originator MMSJV	Volume LSI	Project Ref. No. 389107	
C01	25/06/18	DCO SUBMISSION	PC	SB ER
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD APPD
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				C01

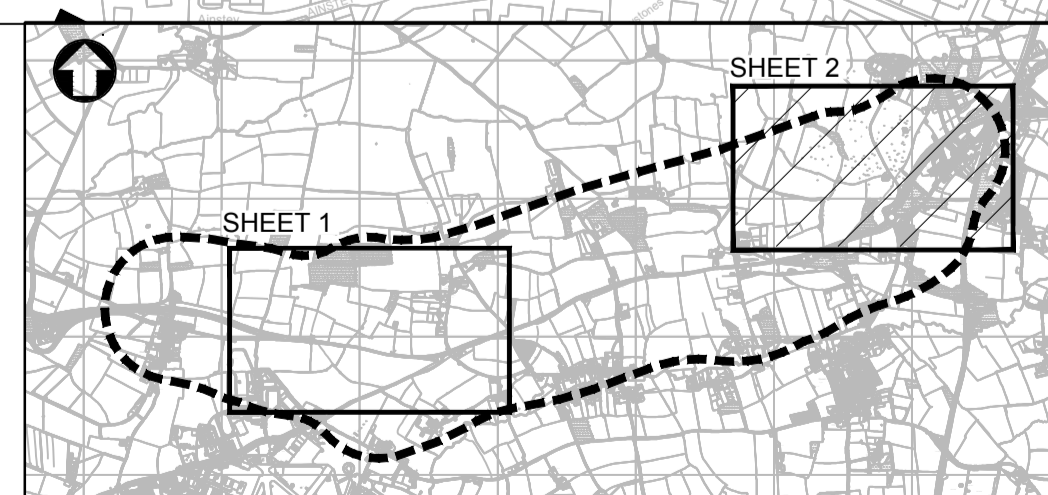
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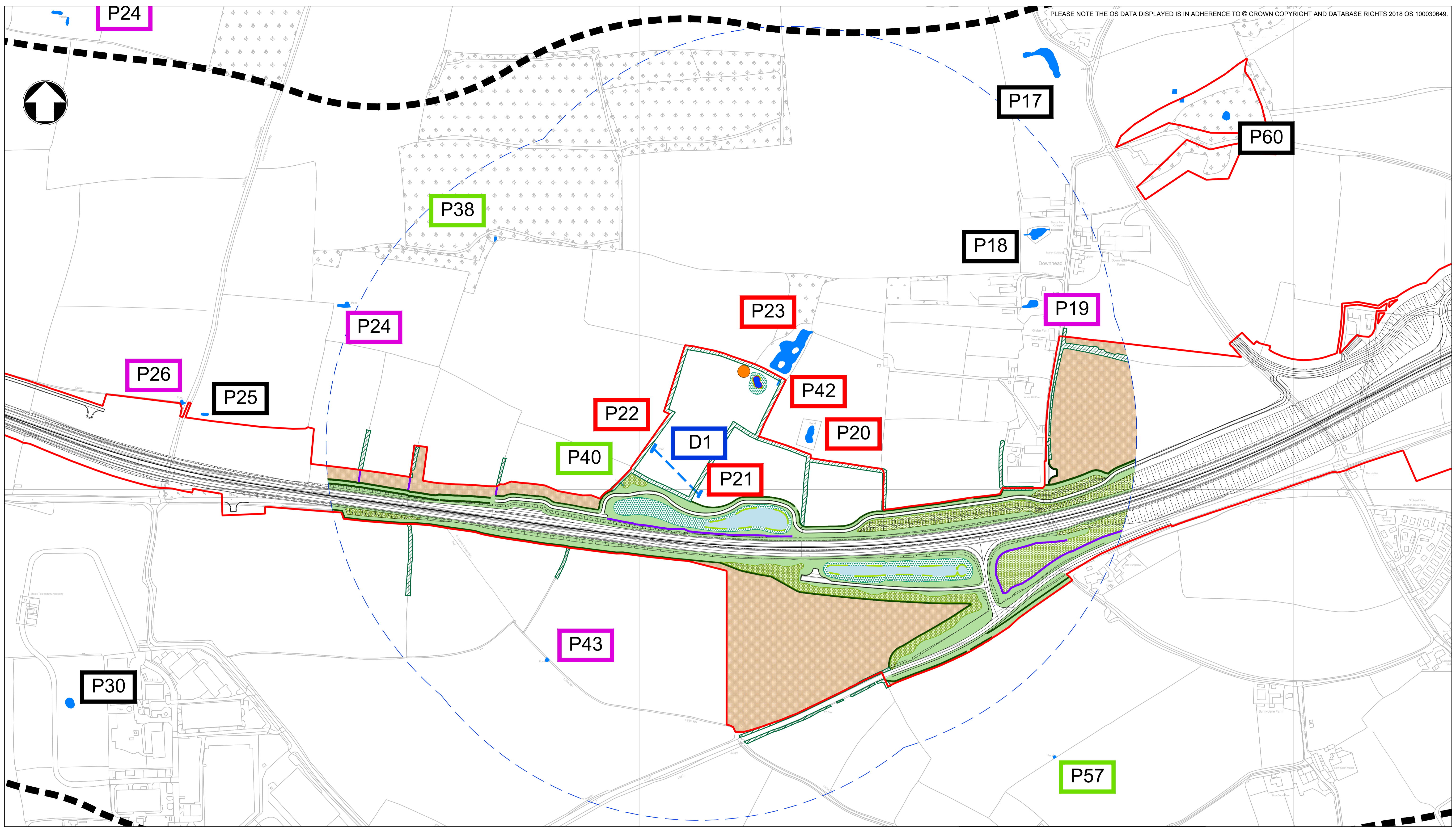
KEY:

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	500M BUFFER AND SURVEYED AREA		POND		POND WITH GCN PRESENT
			POND TO BE CREATED		POND SCOPED OUT
			HIBERNACULA		POND DRY
			RECEPTOR AREA		POND NOT PRESENT

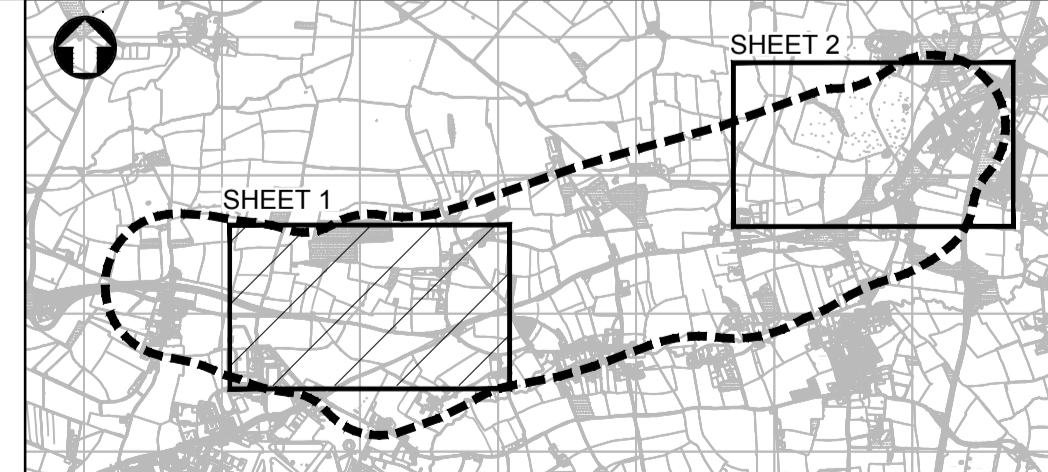


Scale 1:2500 0 125m 250m				
Project Title A303 SPARKFORD TO ILCHESTER DUALLING				
Drawing Title MAP TO SHOW RECEPTOR SITES SHEET 2 OF 2				
Drawing Status Published - DEFINITION				Suitability A3
Scale 1:2500	Designed SW	Drawn PC	Checked SB	Approved ER
Original Size A1	Date 28/02/18	Date 25/06/18	Date 25/06/18	Date 26/06/18
Drawing Number HE PIN	Originator MMSJV	Volume - LSI -	Project Ref. No. 389107	
C01	25/06/18	DCO SUBMISSION	PC	SB ER
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD APPD
			000	- DR - UU - 6013
				C01

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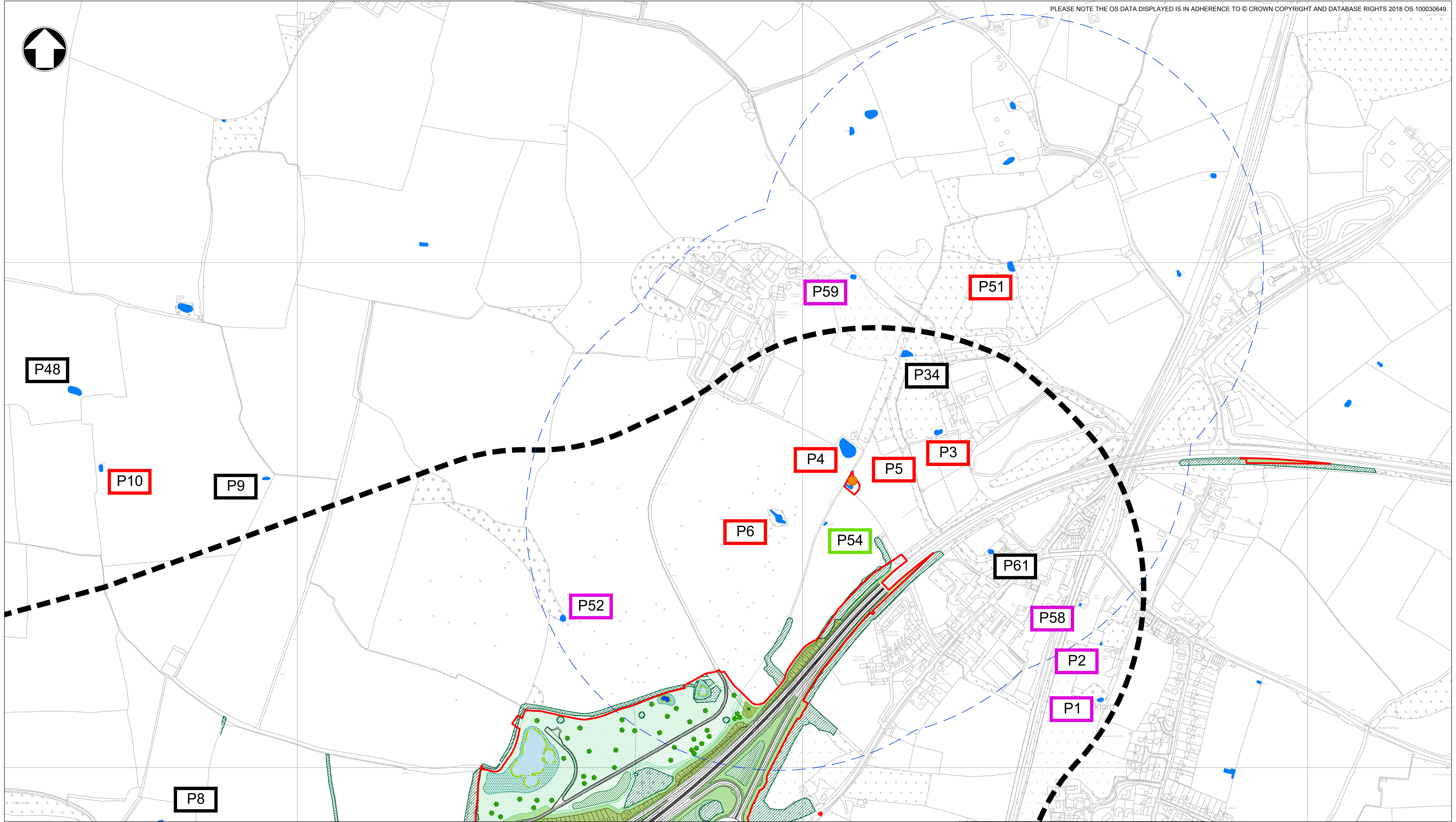


KEY:	
	RED LINE BOUNDARY
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	DITCH
	POND
	POND TO BE CREATED
	HIBERNACULA
	500M POND BUFFER
	POND WITH NO GCN PRESENT
	POND WITH GCN PRESENT
	POND SCOPED OUT
	POND DRY
	POND NOT PRESENT
	DITCH 1
	PROPOSED INDIVIDUAL TREE
	PROPOSED WOODLAND
	PROPOSED LINEAR BELTS OF TREES AND SHRUBS
	REINSTATE TO PREVIOUS CONDITIONS
	PROPOSED MARGINAL PLANTING
	PROPOSED AMENITY GRASSLAND
	PROPOSED WILDFLOWER AND SPECIES RICH GRASSLAND
	PROPOSED WET GRASSLAND
	PROPOSED ATTENUATION POND
	PROPOSED NATIVE HEDGEROW WITH INTERMITTENT TREES
	PROPOSED NATIVE HEDGEROW
	EXISTING VEGETATION TO BE RETAINED



Project Title <b>A303 SPARKFORD TO ILCHESTER DUALLING</b>				
Drawing Title <b>HABITAT CREATION AND ENHANCEMENT SHEET 1 OF 2</b>				
Drawing Status <b>Published - DEFINITION</b>				Suitability <b>A3</b>
Scale <b>NTS</b>	Designed <b>SW</b>	Drawn <b>PC</b>	Checked <b>SB</b>	Approved <b>ER</b>
Original Size <b>A1</b>	Date <b>28/02/18</b>	Date <b>25/06/18</b>	Date <b>25/06/18</b>	Date <b>26/06/18</b>
Drawing Number <b>HE PIN</b>	Originator <b>MMSJV</b>	Volume <b>- LSI -</b>	Project Ref. No. <b>389107</b>	
<b>C01</b>	<b>25/06/18</b>	<b>DCO SUBMISSION</b>	<b>PC</b>	<b>SB</b>
<b>REV.</b>	<b>DATE</b>	<b>AMENDMENT DETAILS</b>	<b>ORIG</b>	<b>CHKD</b>
			<b>APPD</b>	
			<b>000</b>	<b>- DR - UU - 6014</b>
				<b>C01</b>

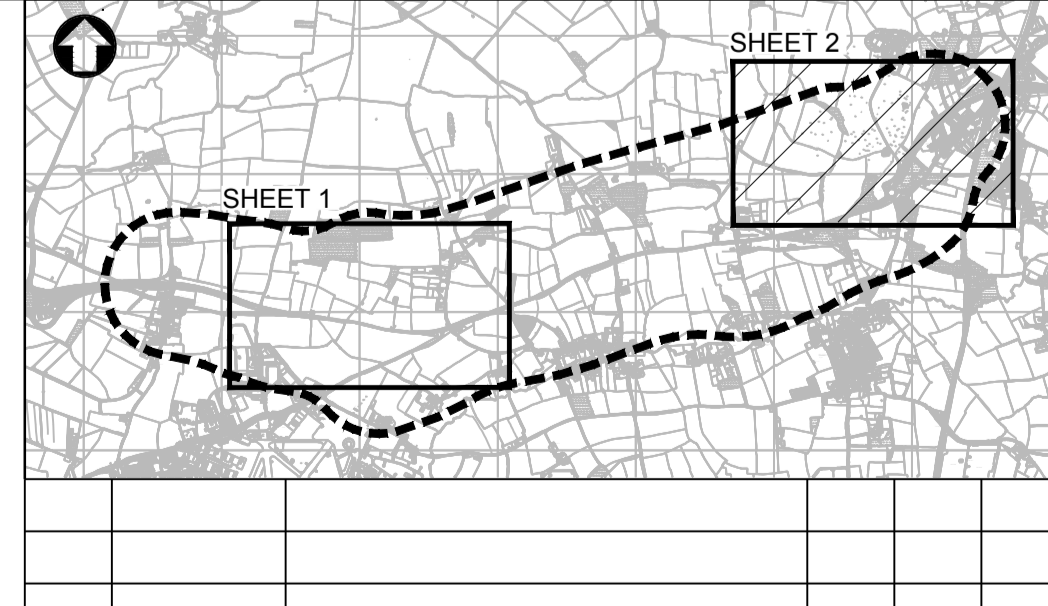
THIS DOCUMENT IS ISSUED FOR THE PARTY WHICH COMMISSIONED IT AND FOR SPECIFIC PURPOSES CONNECTED WITH THE CAPTIONED PROJECT ONLY. IT SHOULD NOT BE RELIED UPON BY ANY OTHER PARTY OR USED FOR ANY OTHER PURPOSE. WE ACCEPT NO RESPONSIBILITY FOR THE CONSEQUENCES OF THIS DOCUMENT BEING RELIED UPON BY ANY OTHER PARTY, OR BEING USED FOR ANY OTHER PURPOSE, OR CONTAINING ANY ERROR OR OMISSION WHICH IS DUE TO AN ERROR OR OMISSION IN DATA SUPPLIED TO US BY OTHER PARTIES.



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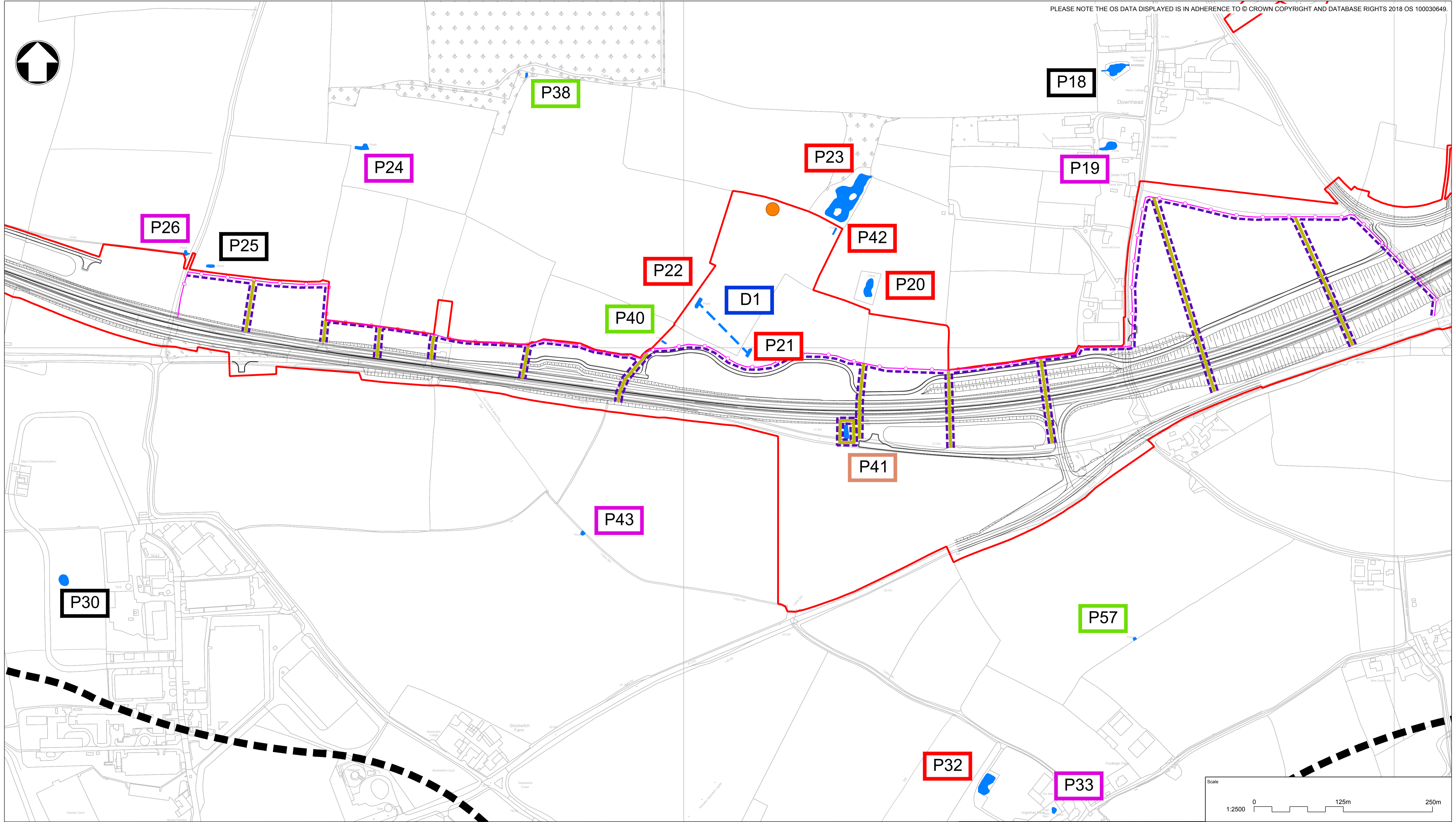
	RED LINE BOUNDARY	<b>P18</b>	POND WITH NO GCN PRESENT
	500M BUFFER AND SURVEYED AREA	<b>P23</b>	POND WITH GCN PRESENT
	DITCH	<b>P19</b>	POND SCOPED OUT
	POND	<b>P11</b>	POND DRY
	POND TO BE CREATED	<b>P44</b>	POND NOT PRESENT
	HIBERNACULA		
	500M POND BUFFER		

	PROPOSED INDIVIDUAL TREE		PROPOSED WET GRASSLAND
	PROPOSED WOODLAND		PROPOSED ATTENUATION POND
	PROPOSED LINEAR BELTS OF TREES AND SHRUBS		PROPOSED NATIVE HEDGEROW WITH INTERMITTENT TREES
	REINSTATE TO PREVIOUS CONDITIONS		PROPOSED NATIVE HEDGEROW
	PROPOSED MARGINAL PLANTING		EXISTING VEGETATION TO BE RETAINED
	PROPOSED AMENITY GRASSLAND		
	PROPOSED WILDFLOWER AND SPECIES RICH GRASSLAND		



Project Title <b>A303 SPARKFORD TO ILCHESTER DUALLING</b>				
Drawing Title <b>HABITAT CREATION AND ENHANCEMENT SHEET 2 OF 2</b>				
Drawing Status <b>Published - DEFINITION</b>				Suitability <b>A3</b>
Scale <b>NTS</b>	Designed <b>SW</b>	Drawn <b>PC</b>	Checked <b>SB</b>	Approved <b>ER</b>
Original Size <b>A1</b>	Date <b>28/02/18</b>	Date <b>25/06/18</b>	Date <b>25/06/18</b>	Date <b>26/06/18</b>
Drawing Number <b>HE PIN</b>		Originator <b>MMSJV</b>		Volume <b>LSI</b>
<b>000</b>		<b>- DR - UU -</b>		<b>6015</b>
Project Ref. No. <b>389107</b>				Revision <b>C01</b>
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD

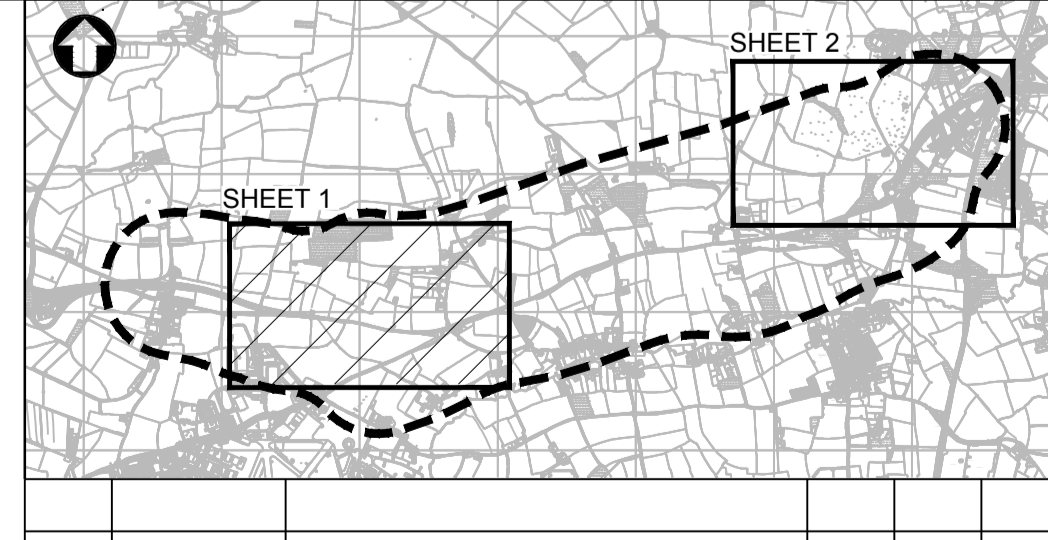
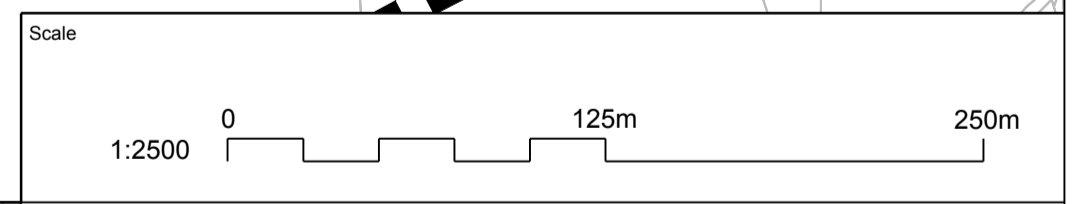
THIS DOCUMENT IS ISSUED FOR THE PARTY WHICH COMMISSIONED IT AND FOR SPECIFIC PURPOSES CONNECTED WITH THE CAPTIONED PROJECT ONLY. IT SHOULD NOT BE RELIED UPON BY ANY OTHER PARTY OR USED FOR ANY OTHER PURPOSE. WE ACCEPT NO RESPONSIBILITY FOR THE CONSEQUENCES OF THIS DOCUMENT BEING RELIED UPON BY ANY OTHER PARTY, OR BEING USED FOR ANY OTHER PURPOSE, OR CONTAINING ANY ERROR OR OMISSION WHICH IS DUE TO AN ERROR OR OMISSION IN DATA SUPPLIED TO US BY OTHER PARTIES.



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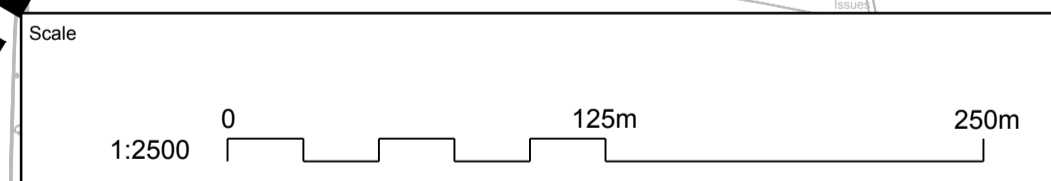
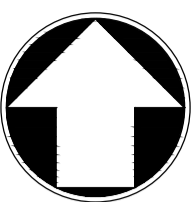
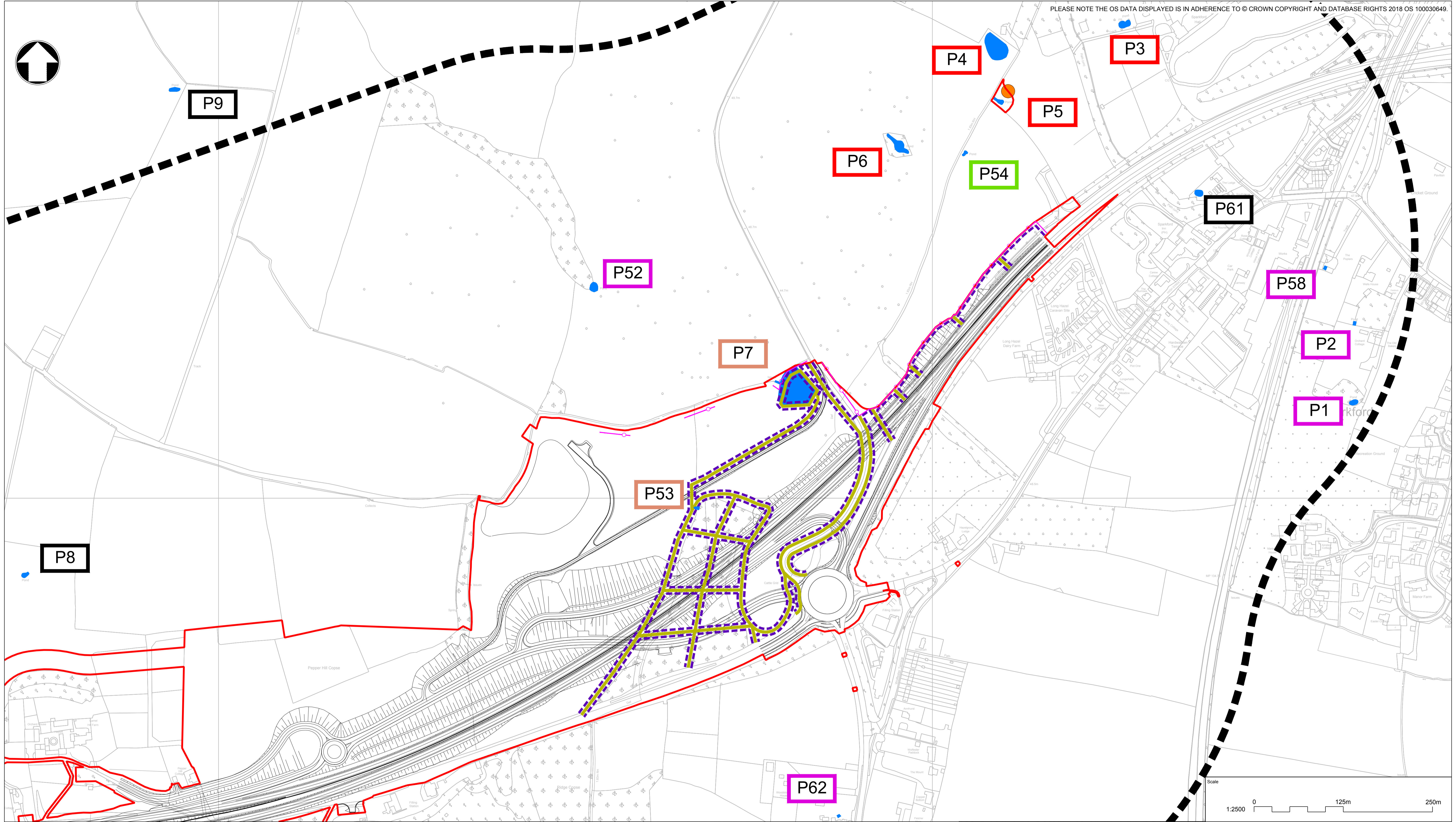
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	500M BUFFER AND SURVEYED AREA		DITCH		POND WITH GCN PRESENT
	HIBERNACULA		DITCH 1		POND SCOPED OUT
	PERMANENT EXCLUSION FENCING				POND DRY
	TEMPORARY DRIFT FENCING				POND NOT PRESENT
	PITFALL TRAPS AT 10M INTERVALS AND CARPET TILES SPACED AT 10M INTERVALS BETWEEN PITFALLS				

	POND WITH NO GCN PRESENT
	POND WITH GCN PRESENT
	POND SCOPED OUT
	POND DRY
	POND NOT PRESENT

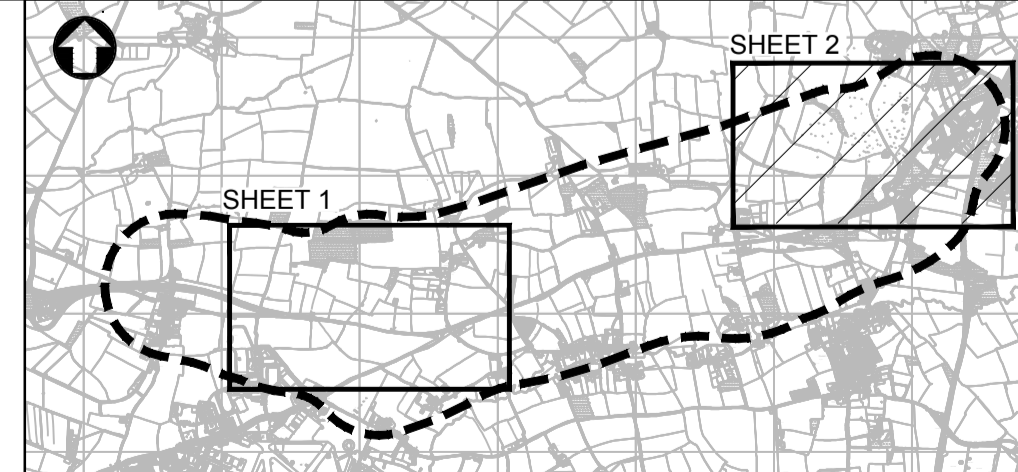


Scale					Project Title						
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Drawing Title					Drawing Status						
GCN CAPTURE AND EXCLUSION MEASURES					Published - DEFINITION						
SHEET 1 OF 2					Suitability						
					A3						
Scale	Designed	Drawn	Checked	Approved							
1:2500	SW	PC	SB	ER							
Original Size	Date	Date	Date	Date							
A1	22/02/17	25/06/18	25/06/18	26/06/18							
Drawing Number	Originator	Volume	Project Ref. No.								
HE PIN	MMSJV	- LSI -	389107								
C01	25/06/18	DCO SUBMISSION	PC	SB	ER	Revision					
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD	APPD	Location	Type	Role	Number		
						000	- DR - UU -	6010		C01	

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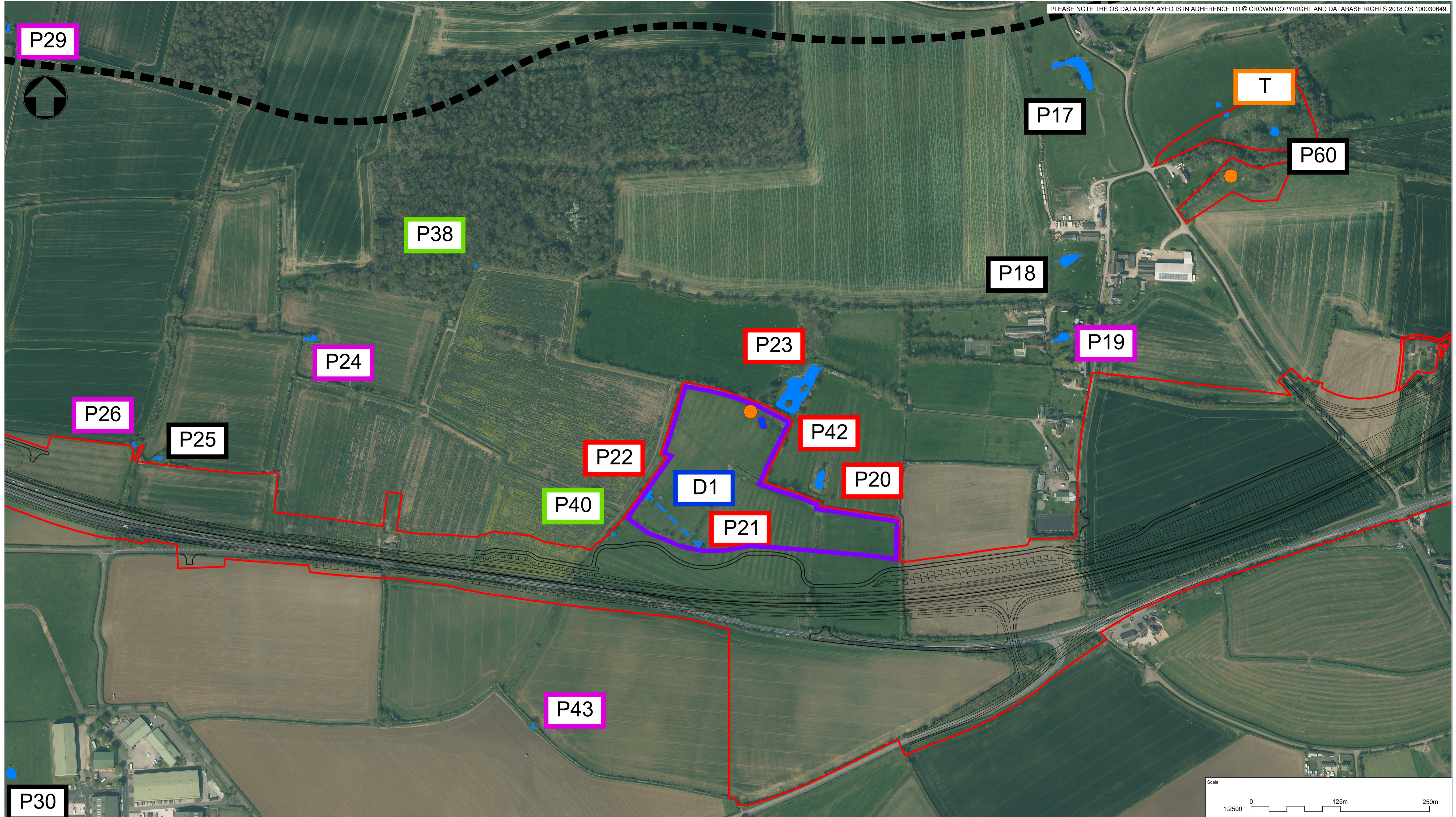


KEY:			
	RED LINE BOUNDARY		POND
	500M BUFFER AND SURVEYED AREA		DITCH
	HIBERNACULA		POND WITH NO GCN PRESENT
	PERMANENT EXCLUSION FENCING		POND WITH GCN PRESENT
	TEMPORARY DRIFT FENCING		POND SCOPED OUT
	PITFALL TRAPS AT 10M INTERVALS AND CARPET TILES SPACED AT 10M INTERVALS BETWEEN PITFALLS		POND DRY
			POND NOT PRESENT



Project Title <b>A303 SPARKFORD TO ILCHESTER DUALLING</b>				
Drawing Title <b>GCN CAPTURE AND EXCLUSION MEASURES SHEET 2 OF 2</b>				
Drawing Status <b>Published - DEFINITION</b>				Suitability <b>A3</b>
Scale <b>AS SHOWN</b>	Designed <b>SW</b>	Drawn <b>PC</b>	Checked <b>SB</b>	Approved <b>ER</b>
Original Size <b>A1</b>	Date <b>22/02/18</b>	Date <b>25/06/18</b>	Date <b>25/06/18</b>	Date <b>26/06/18</b>
Drawing Number <b>HE PIN</b>	Originator <b>MMSJV</b>	Volume <b>LSI</b>	Project Ref. No. <b>389107</b>	
<b>C01</b>	<b>25/06/18</b>	<b>DCO SUBMISSION</b>	<b>PC</b>	<b>SB</b>
<b>REV.</b>	<b>DATE</b>	<b>AMENDMENT DETAILS</b>	<b>ORIG</b>	<b>CHKD</b>
			<b>APPD</b>	
			<b>000</b>	<b>- DR - UU - 6011</b>
				<b>C01</b>

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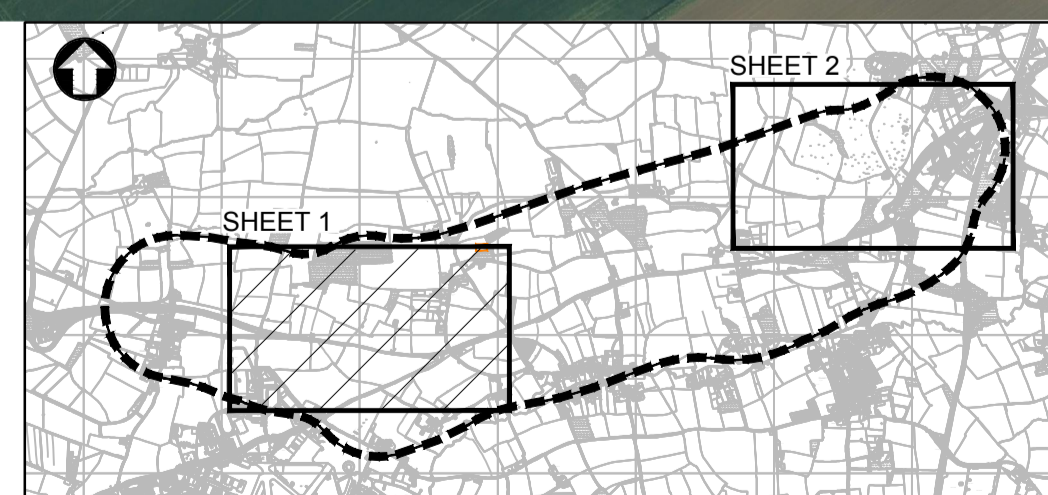


**KEY:**

- RED LINE BOUNDARY
- 500M BUFFER AND SURVEYED AREA
- DITCH
- POND
- RECEPTOR AREA: TO BE MANAGED AS EXISTING REGIME, FOR THE BENEFIT OF GREAT CRESTED NEWTS.
- NEW POND: AREAS OF MARGINAL PLANTING SHALL BE INSPECTED TWICE PER YEAR IN FEBRUARY AND OCTOBER AND THEIR CONDITION REPORTED TO THE HIGHWAYS ENGLAND. WEED CONTROL SHALL BE REQUIRED AT A FREQUENCY NO LESS THAN 3 TIMES DURING THE PERIOD OF MARCH AND OCTOBER (FOR 5 YEARS).
- HIBERNACULA: ANNUAL INSPECTIONS OF THE HIBERNACULA WILL BE CONDUCTED AND ANY MAINTENANCE UNDERTAKEN IF NECESSARY (FOR 5 YEARS).

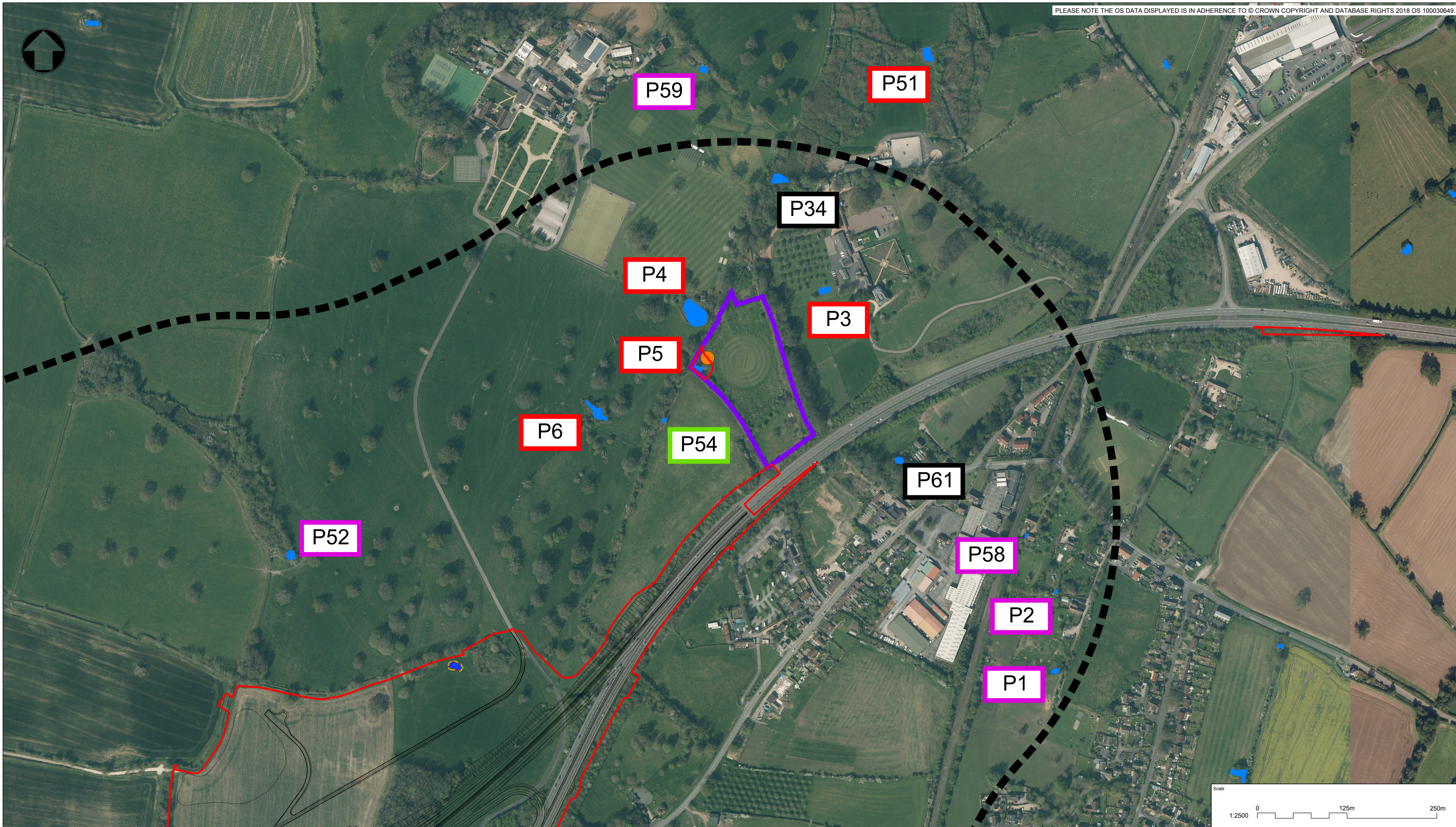
- P18 POND WITH NO GCN PRESENT
- P23 POND WITH GCN PRESENT
- P19 POND SCOPED OUT
- P11 POND DRY
- P44 POND NOT PRESENT
- D1 DITCH
- T TROUGH

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





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Drawing Title MAP TO SHOW POST DEVELOPMENT MANAGEMENT AND MAINTENANCE SHEET 1 OF 2				
Drawing Status Published - DEFINITION				Suitability A3
Scale 1:2500	Designed SW	Drawn PC	Checked SB	Approved ER
Original Size A1	Date 12/03/18	Date 22/06/18	Date 25/06/18	Date 26/06/18
Drawing Number HE PIN	Originator MMSJV	Volume LSI	Project Ref. No. 389107	
C01	25/06/18	DCO SUBMISSION	PC	SB ER
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD APPD
			000	- DR - UU - 6016
				Revision C01








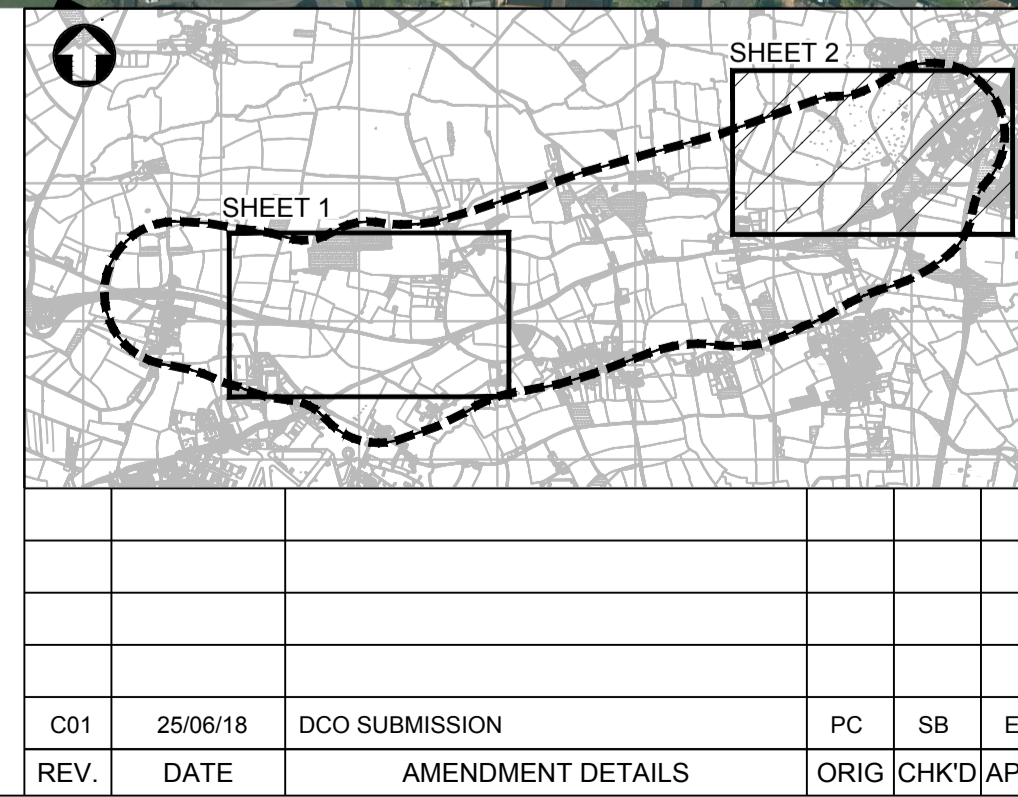


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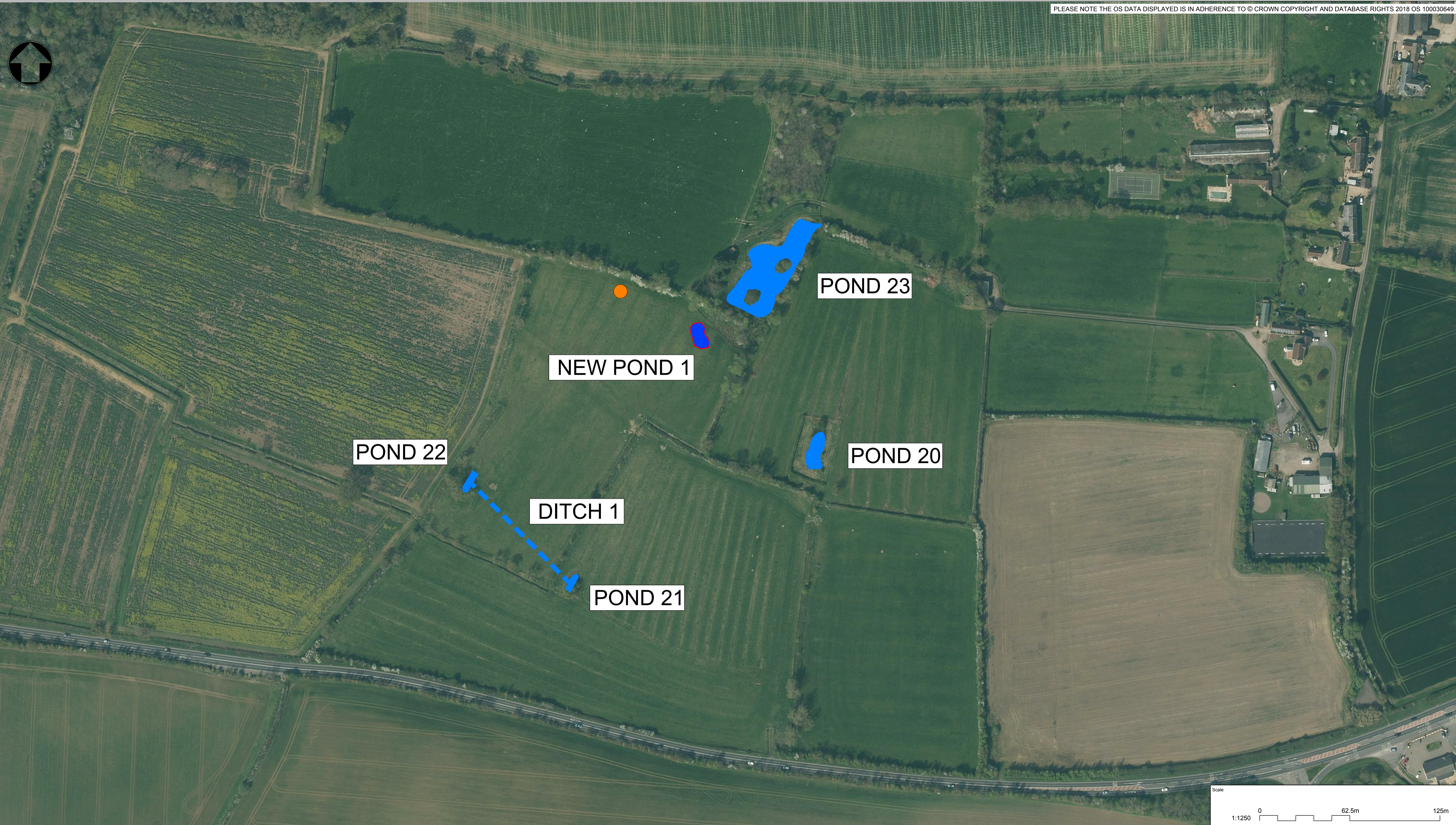
-  DCO BOUNDARY
-  DEVELOPMENT SITE 500M BUFFER AND SURVEYED AREA
-  DITCH
-  POND
-  RECEPTOR AREA: TO BE MANAGED AS EXISTING REGIME, FOR THE BENEFIT OF GREAT CRESTED NEWTS.
-  NEW POND: AREAS OF MARGINAL PLANTING SHALL BE INSPECTED TWICE PER YEAR IN FEBRUARY AND OCTOBER AND THEIR CONDITION REPORTED TO THE HIGHWAYS ENGLAND. WEED CONTROL SHALL BE REQUIRED AT A FREQUENCY NO LESS THAN 3 TIMES DURING THE PERIOD OF MARCH AND OCTOBER (FOR 5 YEARS).
-  HIBERNACULA: ANNUAL INSPECTIONS OF THE HIBERNACULA WILL BE CONDUCTED AND ANY MAINTENANCE UNDERTAKEN IF NECESSARY (FOR 5 YEARS).

-  P18 POND WITH NO GCN PRESENT
-  P23 POND WITH GCN PRESENT
-  P19 POND SCOPED OUT
-  P11 POND DRY
-  P44 POND NOT PRESENT



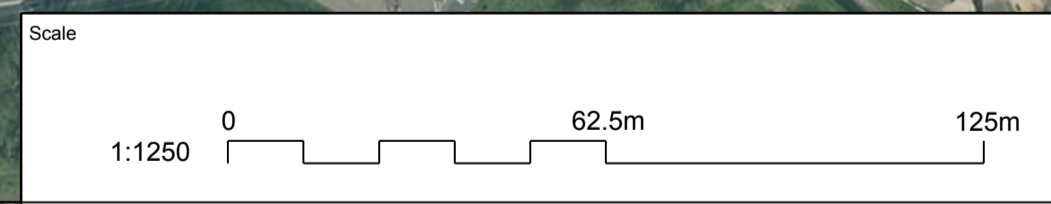
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Project Title A303 SPARKFORD TO ILCHESTER DUALLING				
Drawing Title MAP TO SHOW POST DEVELOPMENT MANAGEMENT AND MAINTENANCE SHEET 2 OF 2				
Drawing Status Published - DEFINITION				Suitability A3
Scale 1:2500	Designed SW	Drawn PC	Checked SB	Approved ER
Original Size A1	Date 12/03/18	Date 22/06/18	Date 25/06/18	Date 26/06/18
Drawing Number HE PIN HE551507 - MMSJV		Originator - LSI -		Volume - 6017
Project Ref. No. 389107				Revision C01
REV.	DATE	AMENDMENT DETAILS	ORIG	CHK'D APP'D
C01	25/06/18	DCO SUBMISSION	PC	SB ER
Location 000 - DR - UU - 6017				

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**KEY:**

- DITCH
- POND
- NEW POND
- HIBERNACULA



Scale				
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Project Title <b>A303 SPARKFORD TO ILCHESTER DUALLING</b>				
Drawing Title <b>MAP TO SHOW POST DEVELOPMENT MONITORING SHEET 1 OF 2</b>				
Drawing Status <b>Published - DEFINITION</b>				Suitability <b>A3</b>
Scale AS SHOWN	Designed SW	Drawn PC	Checked SB	Approved ER
Original Size A1	Date 12/03/18	Date 25/06/18	Date 25/06/18	Date 26/06/18
Drawing Number HE PIN	Originator MMSJV	Volume LSI	Project Ref. No. 389107	
C01	25/06/18	DCO SUBMISSION	PC	SB ER
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD APP'D
000		- DR - UU -	6018	
Location		Type	Role	Number
				C01

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NEW POND 2

POND 4

POND 3

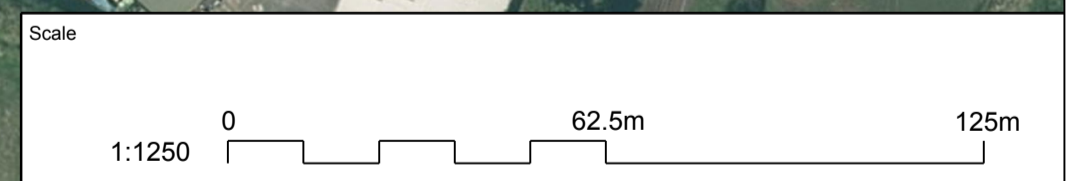
POND 5

POND 6

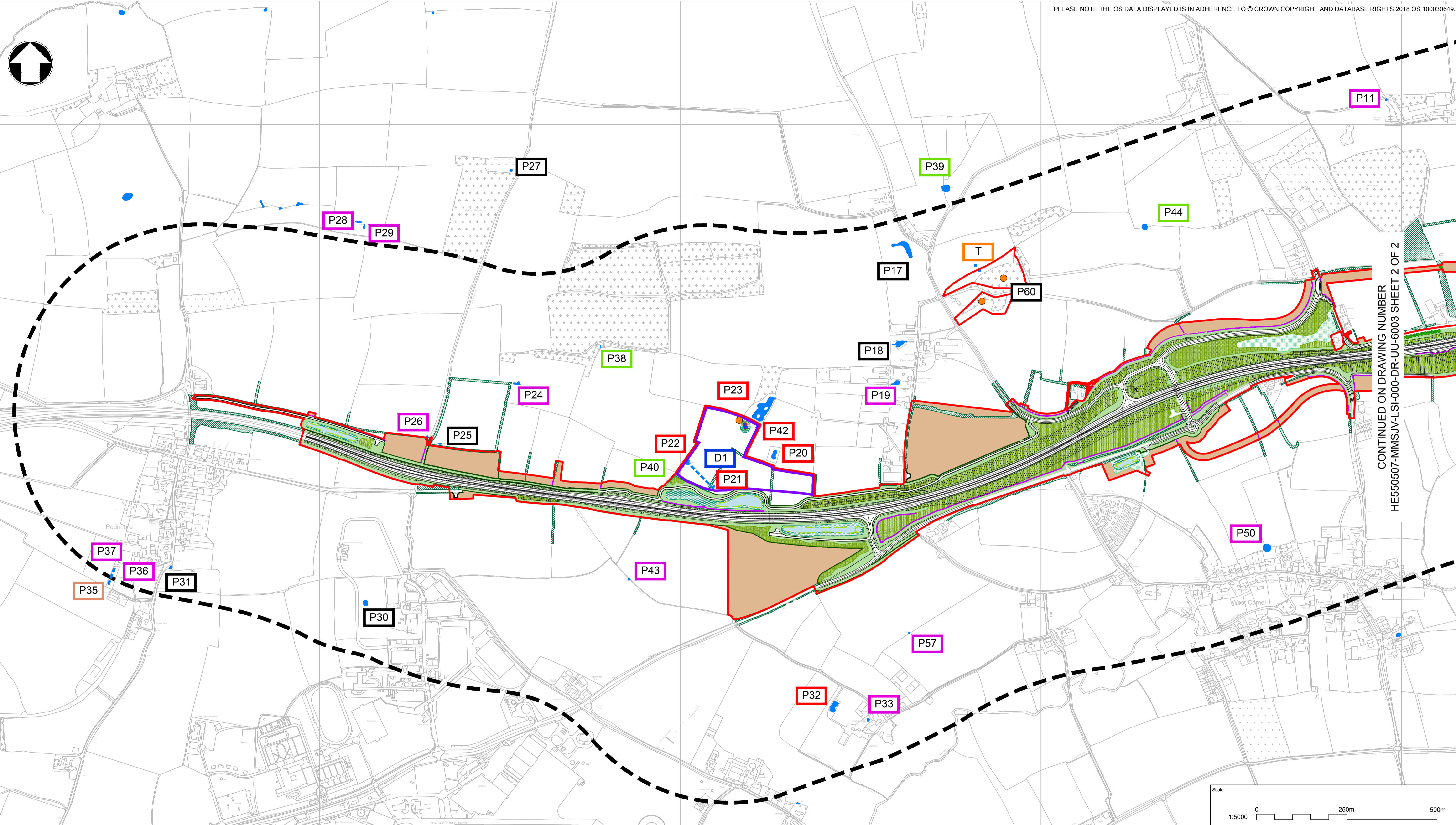
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- KEY:
- DITCH
  - POND
  - NEW POND
  - HIBERNACULA

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Scale					Project Title					
1:1250					A303 SPARKFORD TO ILCHESTER DUALLING					
Drawing Title					Drawing Status					
MAP TO SHOW POST DEVELOPMENT MONITORING SHEET 2 OF 2					Published - DEFINITION					
Suitability					A3					
Scale	Designed	Drawn	Checked	Approved						
AS SHOWN	SW	PC	SB	ER						
Original Size	Date	Date	Date	Date						
A1	12/03/18	25/06/18	25/06/18	26/06/18						
Drawing Number	Originator	Volume	Project Ref. No.							
HE PIN	MMSJV	LSI	389107							
C01	25/06/18	DCO SUBMISSION	PC	SB	ER	000		- DR - UU -	6019	Revision
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD	APPD	Location	Type	Role	Number	C01



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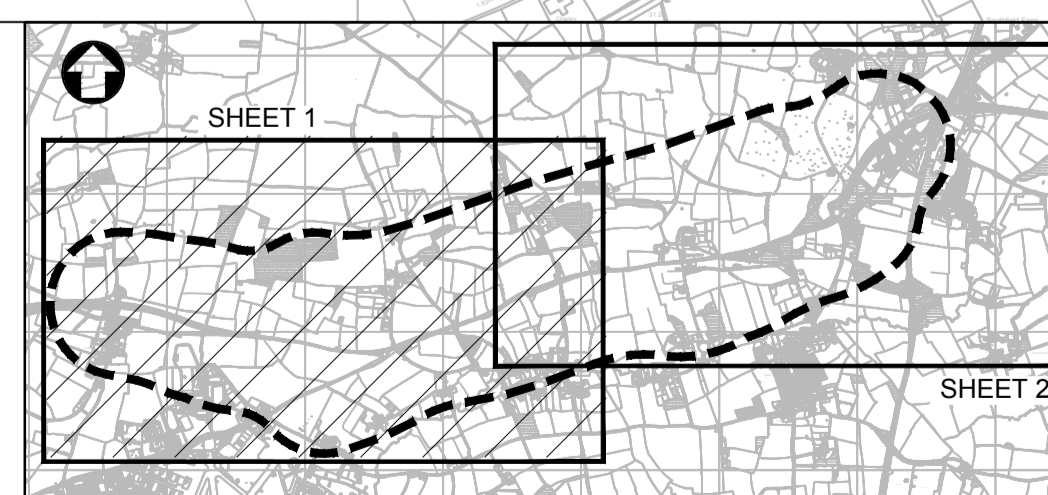
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- KEY:**
- RED LINE BOUNDARY
  - 500M BUFFER AND SURVEYED AREA
  - DITCH
  - POND
  - POND TO BE CREATED
  - HIBERNACULA
  - RECEPTOR AREA

- P18 POND WITH NO GCN PRESENT
- P23 POND WITH GCN PRESENT
- P19 POND SCOPED OUT
- P11 POND DRY
- P44 POND NOT PRESENT
- D1 DITCH 1
- T TROUGH

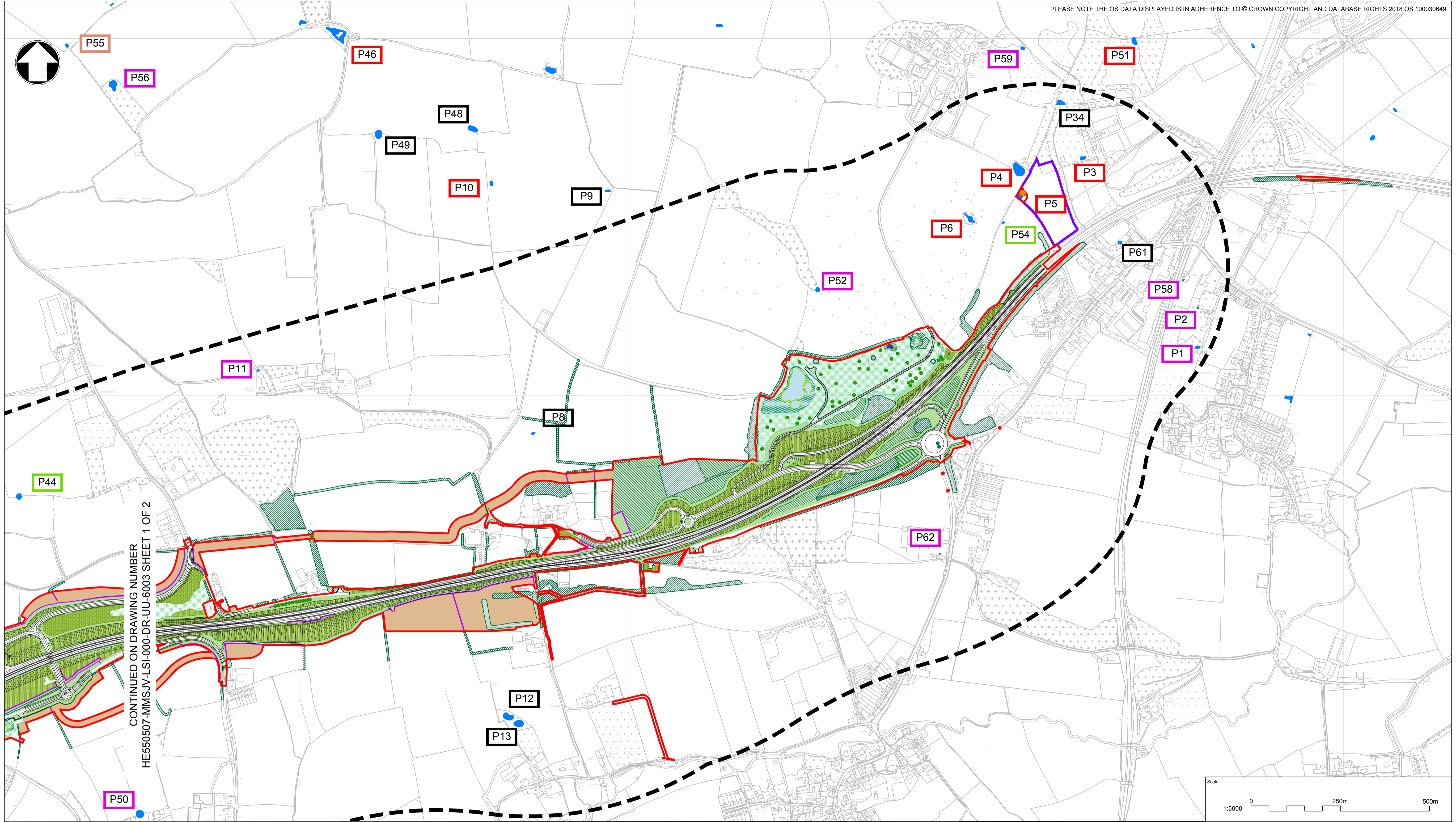
- PROPOSED INDIVIDUAL TREE
- PROPOSED WOODLAND
- PROPOSED LINEAR BELTS OF TREES AND SHRUBS
- REINSTATE TO PREVIOUS CONDITIONS
- PROPOSED MARGINAL PLANTING
- PROPOSED AMENITY GRASSLAND
- PROPOSED WILDFLOWER AND SPECIES RICH GRASSLAND

- PROPOSED WET GRASSLAND
- PROPOSED ATTENUATION POND
- PROPOSED NATIVE HEDGEROW WITH INTERMITTENT TREES
- PROPOSED NATIVE HEDGEROW
- EXISTING VEGETATION TO BE RETAINED



Scale				
1:5000 0 250m 500m				
Project Title				
A303 SPARKFORD TO ILCHESTER DUALLING				
Drawing Title				
FINAL DEVELOPMENT LAYOUT AND MITIGATION MEASURES SHEET 1 OF 2				
Drawing Status				Suitability
Published - DEFINITION				A3
Scale	Designed	Drawn	Checked	Approved
1:5000	SW	PC	SB	ER
Original Size	Date	Date	Date	Date
A1	12/04/18	25/06/18	25/06/18	26/06/18
Drawing Number		Originator	Volume	Project Ref. No.
HE PIN		MMSJV	- LSI -	389107
C01	25/06/18	DCO SUBMISSION	PC SB ER	Revision
REV.	DATE	AMENDMENT DETAILS	ORIG CHKD APPD	Location
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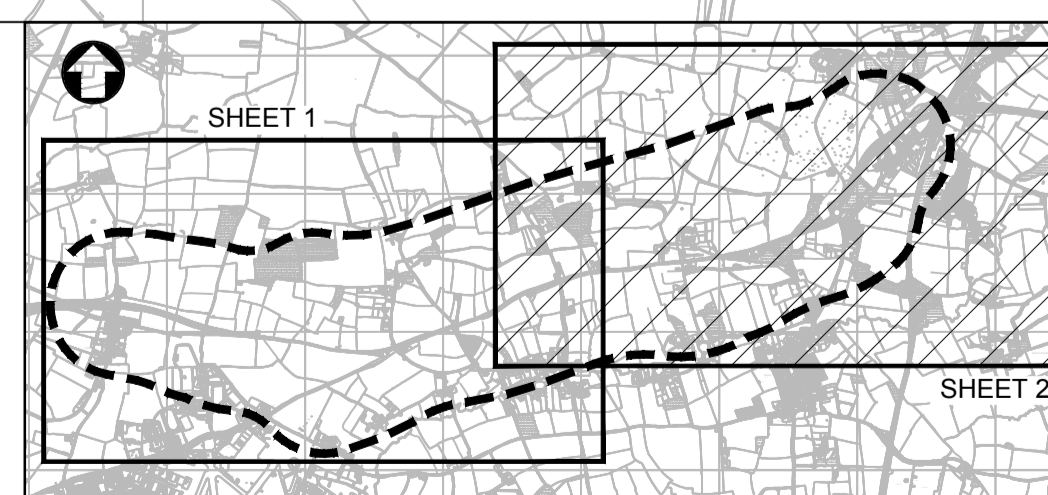
**KEY:**

- RED LINE BOUNDARY
- 500M BUFFER AND SURVEYED AREA
- DITCH
- POND
- POND TO BE CREATED
- HIBERNACULA
- RECEPTOR AREA

- P18 POND WITH NO GCN PRESENT
- P23 POND WITH GCN PRESENT
- P19 POND SCOPED OUT
- P11 POND DRY
- P44 POND NOT PRESENT
- D1 DITCH 1
- T TROUGH

- PROPOSED INDIVIDUAL TREE
- PROPOSED WOODLAND
- PROPOSED LINEAR BELTS OF TREES AND SHRUBS
- REINSTATE TO PREVIOUS CONDITIONS
- PROPOSED MARGINAL PLANTING
- PROPOSED AMENITY GRASSLAND
- PROPOSED WILDFLOWER AND SPECIES RICH GRASSLAND

- PROPOSED WET GRASSLAND
- PROPOSED ATTENUATION POND
- PROPOSED NATIVE HEDGEROW WITH INTERMITTENT TREES
- PROPOSED NATIVE HEDGEROW
- EXISTING VEGETATION TO BE RETAINED



Scale 1:5000 0 250m 500m				
Project Title <b>A303 SPARKFORD TO ILCHESTER DUALLING</b>				
Drawing Title <b>FINAL DEVELOPMENT LAYOUT AND MITIGATION MEASURES SHEET 2 OF 2</b>				
Drawing Status <b>Published - DEFINITION</b>				Suitability <b>A3</b>
Scale 1:5000	Designed SW	Drawn PC	Checked SB	Approved ER
Original Size A1	Date 12/04/18	Date 25/06/18	Date 25/06/18	Date 26/06/18
Drawing Number HE PIN	Originator MMSJV	Volume - LSI -	Project Ref. No. 389107	
C01	25/06/18	DCO SUBMISSION	PC	SB
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD
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			000	- DR - UU - 6021
			Type	Role
			Number	Revision
			C01	

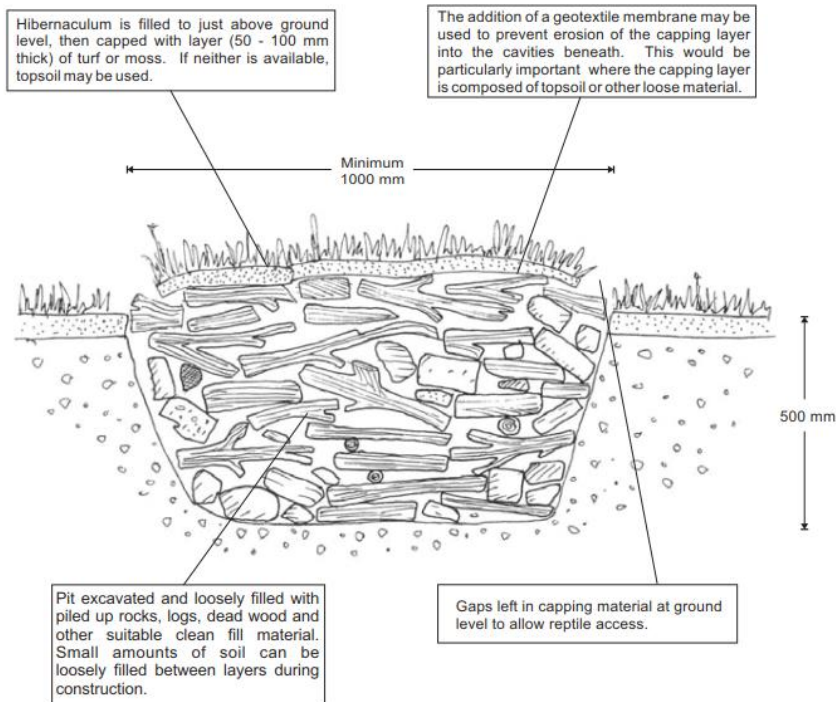
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## **Appendix G: Hibernacula design**

Figure G.1: Hibernacula design

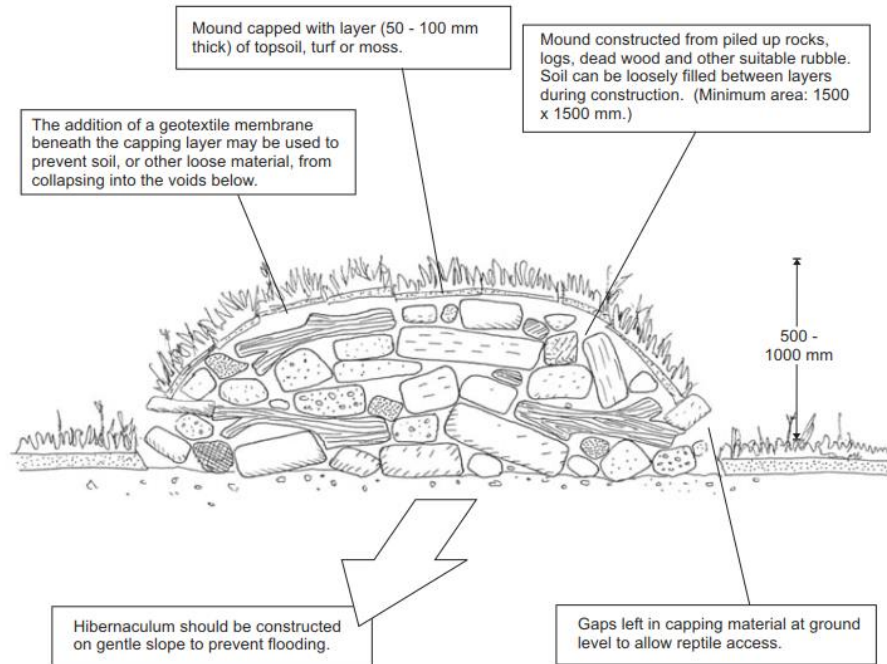
**Hibernaculum on free-draining ground**

Where ground conditions allow, the hibernaculum should be incorporated into a shallow pit. This design is more likely to remain frost-free, and will be less obtrusive and thus unlikely to be subject to interference.



**Hibernaculum on impermeable ground**

Where ground conditions are impermeable, then an 'above-ground' or mounded design should be utilised in order to prevent the hibernaculum from flooding. This design should also be used if it is not possible to excavate a pit for any other reason.



## **Appendix H: Raw survey data**



Survey Area A

Pond reference		30		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				4	Torch power: ≥ 1,000,000 cp			No. of traps used in pond: 11-50 traps						eggs found?	larvae found? (any method)
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
20/03/2017	3	4	1	Adult totals:	0	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
29/03/2017	11	5	0	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
24/04/2017	1	1	1	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
03/05/2017	8	5	0	Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>								0							
Comments and constraints:				Dried out on visit 3. No survey completed. Too dry to bottle trap on survey 4 but still torched.											

Pond reference		31		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				3	Torch power: ≥ 1,000,000 cp			No. of traps used in pond: >50 traps						eggs found?	larvae found? (any method)
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
29/03/2017	11	3	0	Adult totals:	0	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
06/04/2017	5	4	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
03/05/2018	8	3	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>								0							
Comments and constraints:															

Pond reference		32		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				4	Torch power: ≥ 1,000,000 cp			No. of traps used in pond: 1-10 traps						eggs found?	larvae found? (any method)
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		1	0	0	0	0	0	0	0	0	No	No
20/03/2017	3	2	2	Adult totals:	1	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
29/03/2017	11	3	0	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
24/04/2017	-1	0	0	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
03/05/2017	8	4	0	Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>								1							
Comments and constraints:				Netting not used. Survey 3 pond dried out, no survey undertaken. Survey 4 only torching											

Survey Area B

Pond reference		25		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				2	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)
					≥ 1,000,000 cp			11-50 traps							
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
21/03/2017	5	2	3	Adult totals:	0	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
10/04/2018	4	0	0	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					0										
Comments and constraints:				Completely dried out on visit 3											

Pond reference		27		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				4	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)
					≥ 1,000,000 cp			>50 traps							
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
21/03/2017	5	2	3	Adult totals:	0	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
10/04/2017	4	1	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
02/05/2017	6	1	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
08/05/2017	6	0	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					0										
Comments and constraints:				Only 5 traps used for Survey 4, rapidly drying											

Survey Area C

Pond reference		60		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				4	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)
					≥ 1,000,000 cp			11-50 traps							
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
28/03/2017	11	5	0	Adult totals:	0	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
11/04/2017	3	5	3	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
25/04/2017	0	4	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
08/05/2017	7	5	1	Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					0										
Comments and constraints:				Too cold to bottle trap on visit 3, netting and torching difficult due to vegetation cover											

Pond reference		17				Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:					3		Torch power: ≥ 1,000,000 cp			No. of traps used in pond: >50 traps						eggs found?	larvae found? (any method)
					Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.			
(1) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0	0	No	No
28/03/2017	11	4	0	0	Adult totals:	0	0	0	0	0	0	0	0	0			
(2) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0	0	No	No
11/04/2017	3	1	3	0	Adult totals:	0	0	0	0	0	0	0	0	0			
(3) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0	0	No	No
25/04/2017	0	0	2	0	Adult totals:	0	0	0	0	0	0	0	0	0			
(4) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0	0	No	No
					Adult totals:	0	0	0	0	0	0	0	0	0			
(5) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0			
					Adult totals:	0	0	0	0	0	0	0	0	0			
(6) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0			
					Adult totals:	0	0	0	0	0	0	0	0	0			
(7) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0			
					Adult totals:	0	0	0	0	0	0	0	0	0			
(8) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0			
					Adult totals:	0	0	0	0	0	0	0	0	0			
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>						0											
Comments and constraints:						Visit 3 almost totally dry, small area remaining that wouldn't have been appropriate for trapping (even if it was warm enough) too cold to trap. Dried up after this											

Pond reference		18				Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:					4		Torch power: ≥ 1,000,000 cp			No. of traps used in pond: varies						eggs found?	larvae found? (any method)
					Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.			
(1) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0	0	No	No
28/03/2017	11	1	0	0	Adult totals:	0	0	0	0	0	0	0	0	0			
(2) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0	0	No	No
11/04/2017	3	2	3	0	Adult totals:	0	0	0	0	0	0	0	0	0			
(3) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0	0	No	No
25/04/2017	0	1	3	0	Adult totals:	0	0	0	0	0	0	0	0	0			
(4) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0	0	No	No
08/05/2017	8	3	4	0	Adult totals:	0	0	0	0	0	0	0	0	0			
(5) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0			
					Adult totals:	0	0	0	0	0	0	0	0	0			
(6) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0			
					Adult totals:	0	0	0	0	0	0	0	0	0			
(7) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0			
					Adult totals:	0	0	0	0	0	0	0	0	0			
(8) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0			
					Adult totals:	0	0	0	0	0	0	0	0	0			
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>						0											
Comments and constraints:						Visit 2 - Possible contamination, Landowner believes effluent from a chemical toilet has been dumped into the pond. Visit 3 too cold for bottle trapping											

Pond reference		Trough				Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:					4		Torch power: ≥ 1,000,000 cp			No. of traps used in pond: varies						eggs found?	larvae found? (any method)
					Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.			
(1) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0	0	No	No
28/03/2017	11	0	0	0	Adult totals:	0	0	0	0	0	0	0	0	0			
(2) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0	0	No	No
11/04/2017	3	2	0	0	Adult totals:	0	0	0	0	0	0	0	0	0			
(3) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0	0	No	No
25/04/2017	0	3	1	0	Adult totals:	0	0	0	0	0	0	0	0	0			
(4) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0	0	No	No
08/05/2017	7	0	0	0	Adult totals:	0	0	0	0	0	0	0	0	0			
(5) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0			
					Adult totals:	0	0	0	0	0	0	0	0	0			
(6) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0			
					Adult totals:	0	0	0	0	0	0	0	0	0			
(7) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0			
					Adult totals:	0	0	0	0	0	0	0	0	0			
(8) Date:	Air temp	Veg cover	Turbidity			0	0	0	0	0	0	0	0	0			
					Adult totals:	0	0	0	0	0	0	0	0	0			
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>						0											
Comments and constraints:						Manmade trough with hard base and shallow, so bottle trapping and netting are not possible, there was also no vegetation to undertake an egg search.											

Survey Area D

Pond reference		14		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				4	Torch power: ≥ 1,000,000 cp			No. of traps used in pond: varies						eggs found?	larvae found? (any method)
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
22/03/2017	1	2	1	Adult totals:	0	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
12/04/2017	5	2	1	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
24/04/2017	1	2	3	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
03/05/2017	8	1	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					0										
Comments and constraints:															

Pond reference		15		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				4	Torch power: ≥ 1,000,000 cp			No. of traps used in pond: 1-10 traps						eggs found?	larvae found? (any method)
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
22/03/2017	1	0	4	Adult totals:	0	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
12/04/2017	5	5	1	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
24/04/2017	1	0	0	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
08/05/2017	8	1	0	Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					0										
Comments and constraints:															

Pond reference		16		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				4	Torch power: ≥ 1,000,000 cp			No. of traps used in pond: 1-10 traps						eggs found?	larvae found? (any method)
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
22/03/2017	1	2	3	Adult totals:	0	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
12/04/2017	5	2	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
24/04/2017	1	3	4	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
04/05/2017	8	1	4	Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0		
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					0										
Comments and constraints:															

Survey Area E

Pond reference		8		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				4	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)
					≥ 1,000,000 cp			11-50 traps							
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
23/03/2017	6	3	4	Adult totals:	0	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
11/04/2017	3	1	1	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
26/04/2017	-1	3	0	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
09/05/2017	6	1	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					0			0			0				
Comments and constraints:				Visit 3 too cold for bottle trapping											

Pond reference		12		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				4	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)
					≥ 1,000,000 cp			11-50 traps							
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
23/03/2017	6	3	1	Adult totals:	0	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
11/04/2017	3	3	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
25/04/2017	-1	3	0	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
09/05/2017	6	1	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					0			0			0				
Comments and constraints:				Visit 3 too cold for bottle trapping											

Pond reference		13		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				4	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)
					≥ 1,000,000 cp			11-50 traps							
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
23/03/2017	6	3	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
11/04/2017	3	3	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
26/04/2017	-1	4	0	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
09/05/2017	6	1	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					0			0			0				
Comments and constraints:				Visit 3 too cold for bottle trapping											

Survey Area F

Pond reference		20		Method:	Torch			Bottle-trap			Net			Egg search	Larvae	
No. of survey visits to this pond:				6	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)	
					≥ 1,000,000 cp			11-50 traps								
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.			
(1) Date:	Air temp	Veg cover	Turbidity		6	1	0	0	1	0	0	0	0	0	Yes	No
03/04/2017	7	3	0	Adult totals:	7			1			0					
(2) Date:	Air temp	Veg cover	Turbidity		2	0	0	6	4	0	0	0	0	0	Yes	No
18/04/2017	3	3	1	Adult totals:	2			10			0					
(3) Date:	Air temp	Veg cover	Turbidity		6	11	0	0	1	0	0	0	0	0	Yes	No
26/04/2017	2	1	1	Adult totals:	17			1			0					
(4) Date:	Air temp	Veg cover	Turbidity		5	6	0	9	8	0	0	0	0	0	No	No
10/05/2017	9	3	1	Adult totals:	11			17			0					
(5) Date:	Air temp	Veg cover	Turbidity		1	3	0	2	4	0	0	0	0	0	No	No
18/05/2017	5	3	1	Adult totals:	4			6			0					
(6) Date:	Air temp	Veg cover	Turbidity		2	4	0	1	1	0	0	0	0	0	Yes	No
23/05/2017	12	3	1	Adult totals:	6			2			0					
(7) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
(8) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					17											
Comments and constraints:				Large koi in pond should be removed to avoid detrimental impacts to newts												

Pond reference		21		Method:	Torch			Bottle-trap			Net			Egg search	Larvae	
No. of survey visits to this pond:				4	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)	
					≥ 1,000,000 cp			1-10 traps								
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.			
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	3	6	0	0	0	0	No	No
03/04/2017	7	3	1	Adult totals:	0			9			0					
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
18/04/2017	3	1	1	Adult totals:	0			0			0					
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
26/04/2017	2	4	4	Adult totals:	0			0			0					
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
18/05/2017	5	2	2	Adult totals:	0			0			0					
(5) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
(6) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
(7) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
(8) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					9											
Comments and constraints:				Pond too dry to bottle-trap or net on survey 4. Pond dry on survey 5, therefore only 4 surveys												

Pond reference		22		Method:	Torch			Bottle-trap			Net			Egg search	Larvae	
No. of survey visits to this pond:				6	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)	
					≥ 1,000,000 cp			11-50 traps								
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.			
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	2	2	0	0	0	0	No	No
03/04/2017	7	1	0	Adult totals:	0			2			0					
(2) Date:	Air temp	Veg cover	Turbidity		1	0	0	2	0	0	0	0	0	0	No	No
18/04/2017	3	0	2	Adult totals:	1			2			0					
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
26/04/2017	2	0	2	Adult totals:	0			0			0					
(4) Date:	Air temp	Veg cover	Turbidity		1	1	1	1	0	0	0	0	0	0	No	No
10/05/2017	9	0	3	Adult totals:	2			1			0					
(5) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
18/05/2017	5	0	4	Adult totals:	0			0			0					
(6) Date:	Air temp	Veg cover	Turbidity		0	0	0	1	0	0	0	0	0	0	No	No
23/05/2017	9	0	3	Adult totals:	0			1			0					
(7) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
(8) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					2											
Comments and constraints:				No vegetation for egg search. Netting only used for survey 3 in place of bottle-trapping												

Pond reference		23		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				6	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)
					≥ 1,000,000 cp			1-10 traps							
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
03/04/2017	8	2	0	Adult totals:	0			0			0				
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
18/04/2017	1	2	3	Adult totals:	0			0			0				
(3) Date:	Air temp	Veg cover	Turbidity		1	2	0	0	0	0	0	0	0	Yes	No
27/04/2017	6	2	0	Adult totals:	3			0			0				
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
10/05/2017	6	1	4	Adult totals:	0			0			0				
(5) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
18/05/2017	5	1	4	Adult totals:	0			0			0				
(6) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
23/05/2017	9	1	3	Adult totals:	0			0			0				
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					3										
Comments and constraints:				Netting only used on survey 3 in place of bottle trapping. Dense algae cover on pond											

Pond reference		41		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				0	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)
					≥ 1,000,000 cp			1-10 traps							
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(2) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(3) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(4) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(5) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(6) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					0										
Comments and constraints:				Pond completely dry											

Pond reference		42		Method:	Torch			Bottle-trap			Net			Egg search	Larvae	
No. of survey visits to this pond:				6	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)	
					≥ 1,000,000 cp			1-10 traps								
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.			
(1) Date:	Air temp	Veg cover	Turbidity		0	2	0	0	1	0	0	0	0	0	No	No
03/04/2017	8	2	1	Adult totals:	2			1			0					
(2) Date:	Air temp	Veg cover	Turbidity		2	0	0	0	0	0	0	0	0	0	Yes	No
18/04/2017	1	1	3	Adult totals:	2			0			0					
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
26/04/2017	2	3	1	Adult totals:	0			0			0					
(4) Date:	Air temp	Veg cover	Turbidity		1	1	1	1	1	0	0	0	0	0	No	No
10/05/2017	7	0	2	Adult totals:	2			1			0					
(5) Date:	Air temp	Veg cover	Turbidity		0	1	1	0	0	0	0	0	0	0	No	No
18/05/2017	5	0	2	Adult totals:	1			0			0					
(6) Date:	Air temp	Veg cover	Turbidity		1	3	0	1	0	0	0	0	0	0	Yes	No
23/05/2017	12	3	2	Adult totals:	4			1			0					
(7) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
(8) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					4											
Comments and constraints:				Netting used on survey 3 in place of bottle-trapping												

Pond reference		Ditch 1		Method:	Torch			Bottle-trap			Net			Egg search	Larvae	
No. of survey visits to this pond:				5	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)	
					≥ 1,000,000 cp			1-10 traps								
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.			
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	1	1	0	0	0	0	No	No
03/04/2017	7	3	0	Adult totals:	0			0	1		0	0				
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
18/04/2017	3	5	1	Adult totals:	0			0	0		0	0				
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
26/04/2017	3	4	0	Adult totals:	0			0	0		0	0				
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
18/05/2017	5	4	1	Adult totals:	0			0	0		0	0				
(5) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
23/05/2017	12	4	1	Adult totals:	0			0	0		0	0				
(6) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
(7) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
(8) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>								1								
Comments and constraints:																

### Survey Area G

Pond reference		9		Method:	Torch			Bottle-trap			Net			Egg search	Larvae	
No. of survey visits to this pond:				4	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)	
					≥ 1,000,000 cp			1-10 traps								
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.			
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
04/04/2018	3	3	3	Adult totals:	0			0			0	0				
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
19/04/2017	3	1	1	Adult totals:	0			0			0	0				
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
04/05/2017	8	1	3	Adult totals:	0			0			0	0				
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
11/05/2017	11	2	3	Adult totals:	0			0			0	0				
(5) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0	0				
(6) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0	0				
(7) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0	0				
(8) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0	0				
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>								0								
Comments and constraints:																

Pond reference		10		Method:	Torch			Bottle-trap			Net			Egg search	Larvae	
No. of survey visits to this pond:				6	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)	
					≥ 1,000,000 cp			1-10 traps								
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.			
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
04/04/2017	3	3	3	Adult totals:	0			0			0	0				
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
19/04/2017	3	4	1	Adult totals:	0			0			0	0				
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	1	0	0	0	0	0	No	No
04/05/2017	8	3	2	Adult totals:	0			0	1		0	0				
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
11/05/2017	11	4	2	Adult totals:	0			0			0	0				
(5) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
16/05/2017	15	4	3	Adult totals:	0			0			0	0				
(6) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
25/05/2017	14	4	4	Adult totals:	0			0			0	0				
(7) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0	0				
(8) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0	0				
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>								1								
Comments and constraints:																



Pond reference		46		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				6	Torch power: ≥ 1,000,000 cp			No. of traps used in pond: varies						eggs found?	larvae found? (any method)
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity											No	No
04/04/2017	2	1	4	Adult totals:	1	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity											No	No
19/04/2017	6	2	1	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity											No	No
11/05/2017	11	2	4	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity											No	No
09/05/2017	6	1	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity											No	No
16/05/2017	15	1	4	Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity											Yes	No
25/05/2017	14	1	3	Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>								1							
Comments and constraints:															

Pond reference		48		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				4	Torch power: ≥ 1,000,000 cp			No. of traps used in pond: 11-50 traps						eggs found?	larvae found? (any method)
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity											No	No
04/04/2017	2	2	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity											No	No
19/04/2017	3	2		Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity											No	No
04/05/2017	8	2	4	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity											No	No
11/05/2017	11	2	1	Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>								0							
Comments and constraints:															

Pond reference		49		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				3	Torch power: ≥ 1,000,000 cp			No. of traps used in pond: 11-50 traps						eggs found?	larvae found? (any method)
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity											No	No
04/04/2017	2	5	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(2) Date:	Air temp	Veg cover	Turbidity											No	No
19/04/2017	6	5	2	Adult totals:	0	0	0	0	0	0	0	0	0		
(3) Date:	Air temp	Veg cover	Turbidity											No	No
04/05/2017	7	2	3	Adult totals:	0	0	0	0	0	0	0	0	0		
(4) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(5) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(6) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0	0	0	0	0	0	0	0	0		
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>								0							
Comments and constraints:															

Survey Area H

Pond reference		3		Method:	Torch			Bottle-trap			Net			Egg search	Larvae	
No. of survey visits to this pond:				6	Torch power: ≥ 1,000,000 cp			No. of traps used in pond: 11-50 traps						eggs found?	larvae found? (any method)	
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.			
(1) Date:	Air temp	Veg cover	Turbidity		3	0	1	5	9	0	0	0	0	0	Yes	No
05/04/2017	2	2	2	Adult totals:	3			14			0					
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
20/04/2017	8	3	0	Adult totals:	0			0			0					
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	Yes	No
27/04/2017	6	2	3	Adult totals:	0			0			0					
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	No	No
09/05/2017	7	3	3	Adult totals:	0			0			0					
(5) Date:	Air temp	Veg cover	Turbidity		1	4	0	0	0	0	0	0	0	0	Yes	No
22/05/2017	9	3	1	Adult totals:	5			0			0					
(6) Date:	Air temp	Veg cover	Turbidity		0	0	0	1	0	0	0	0	0	0	No	No
24/05/2017	13	3	3	Adult totals:	0			1			0					
(7) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
(8) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					14											
Comments and constraints:				Netting not used												

Pond reference		4		Method:	Torch			Bottle-trap			Net			Egg search	Larvae	
No. of survey visits to this pond:				6	Torch power: ≥ 1,000,000 cp			No. of traps used in pond: varies						eggs found?	larvae found? (any method)	
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.			
(1) Date:	Air temp	Veg cover	Turbidity		6	3	0	7	0	0	0	0	0	0	No	No
05/04/2017	4	3	1	Adult totals:	9			7			0					
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	2	4	0	0	0	0	0	No	No
20/04/2017	7	3	1	Adult totals:	0			6			0					
(3) Date:	Air temp	Veg cover	Turbidity		13	7	0	0	3	0	0	0	0	0	Yes	No
27/04/2017	8	2	1	Adult totals:	20			3			0					
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	0	Yes	No
09/05/2017	6	4	2	Adult totals:	0			0			0					
(5) Date:	Air temp	Veg cover	Turbidity		1	4	0	1	0	0	0	0	0	0	No	No
22/05/2017	9	4	2	Adult totals:	5			1			0					
(6) Date:	Air temp	Veg cover	Turbidity		1	2	0	0	2	0	0	0	0	0	Yes	No
24/05/2017	14	4	1	Adult totals:	3			2			0					
(7) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
(8) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					20											
Comments and constraints:				Netting not used												

Pond reference		5		Method:	Torch			Bottle-trap			Net			Egg search	Larvae	
No. of survey visits to this pond:				6	Torch power: ≥ 1,000,000 cp			No. of traps used in pond: 11-50 traps						eggs found?	larvae found? (any method)	
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.			
(1) Date:	Air temp	Veg cover	Turbidity		19	3	1	0	3	0	0	0	0	0	No	No
05/04/2017	4	2	1	Adult totals:	22			3			0					
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	2	0	0	0	0	0	0	No	No
20/04/2017	7	2	2	Adult totals:	0			2			0					
(3) Date:	Air temp	Veg cover	Turbidity		1	3	1	0	1	0	0	0	0	0	Yes	No
27/04/2017	8	3	1	Adult totals:	4			1			0					
(4) Date:	Air temp	Veg cover	Turbidity		0	1	0	0	3	0	0	0	0	0	No	No
09/05/2017	6	3	1	Adult totals:	1			3			0					
(5) Date:	Air temp	Veg cover	Turbidity		0	2	0	0	0	0	0	0	0	0	No	No
22/05/2017	9	2	3	Adult totals:	2			0			0					
(6) Date:	Air temp	Veg cover	Turbidity		1	5	1	0	1	0	0	0	0	0	Yes	No
24/05/2017	14	3	0	Adult totals:	6			1			0					
(7) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
(8) Date:	Air temp	Veg cover	Turbidity													
				Adult totals:	0			0			0					
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					22											
Comments and constraints:				Netting not used												

Pond reference		6		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				2	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)
					≥ 1,000,000 cp			varies							
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
05/04/2017	4	3	2	Adult totals:	0			0			0				
(2) Date:	Air temp	Veg cover	Turbidity		1	0	0	0	0	0	0	0	0	No	No
20/04/2017	7	2	3	Adult totals:	1			0			0				
(3) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(4) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(5) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(6) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					1										
Comments and constraints:					Bottle trapping not used as pond edge not accessible. Netting only used for survey 1.										

Pond reference		34		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				3	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)
					≥ 1,000,000 cp			11-50 traps							
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
05/04/2017	4	0	4	Adult totals:	0			0			0				
(2) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
20/04/2017	8	5	1	Adult totals:	0			0			0				
(3) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
27/04/2017	6	4	1	Adult totals:	0			0			0				
(4) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(5) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(6) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					0										
Comments and constraints:					Too shallow to bottle trap. Search of natural refugia undertaken on first three surveys. Pond was too dry to survey after this										

Pond reference		51		Method:	Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				6	Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)
					≥ 1,000,000 cp			11-50 traps							
				Sex/life stage:	Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Veg cover	Turbidity		2	1	0	0	0	0	0	0	0	No	No
05/04/2017	2	3	1	Adult totals:	3			0			0				
(2) Date:	Air temp	Veg cover	Turbidity		1	0	0	3	4	0	0	0	0	No	No
20/04/2017	8	3	1	Adult totals:	1			7			0				
(3) Date:	Air temp	Veg cover	Turbidity		2	1	0	0	2	0	0	0	0	Yes	No
27/04/2017	6	3	1	Adult totals:	3			2			0				
(4) Date:	Air temp	Veg cover	Turbidity		0	0	0	0	0	0	0	0	0	No	No
10/05/2017	7	3	1	Adult totals:	0			0			0				
(5) Date:	Air temp	Veg cover	Turbidity		1	5	0	2	4	0	0	0	0	No	No
22/05/2017	9	3	1	Adult totals:	6			6			0				
(6) Date:	Air temp	Veg cover	Turbidity		1	1	0	0	1	0	0	0	0	No	No
24/05/2017	13	4	2	Adult totals:	2			1			0				
(7) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
(8) Date:	Air temp	Veg cover	Turbidity												
				Adult totals:	0			0			0				
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>					7										
Comments and constraints:					Netting not used										

Pond reference		61		Method:			Torch			Bottle-trap			Net			Egg search	Larvae
No. of survey visits to this pond:				4			Torch power:			No. of traps used in pond:			eggs found?	larvae found? (any method)			
				>= 1,000,000 cp			1-10 traps										
Sex/life stage:				Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.					
(1) Date:	Air temp	Veg cover	Turbidity	Adult totals:			0	0	0	0	0	0	0	0	No	No	
20/04/2017	7	4	1	0			0	0	0	0	0	0	0				
(2) Date:	Air temp	Veg cover	Turbidity	Adult totals:			0	0	0	0	0	0	0	0	No	No	
27/04/2017	8	3	1	0			0	0	0	0	0	0	0				
(3) Date:	Air temp	Veg cover	Turbidity	Adult totals:			0	0	0	0	0	0	0	0	No	No	
11/05/2017	6	5	4	0			0	0	0	0	0	0	0				
(4) Date:	Air temp	Veg cover	Turbidity	Adult totals:			0	0	0	0	0	0	0	0	No	No	
22/05/2017	9	5	4	0			0	0	0	0	0	0	0				
(5) Date:	Air temp	Veg cover	Turbidity	Adult totals:			0	0	0	0	0	0	0				
(6) Date:	Air temp	Veg cover	Turbidity	Adult totals:			0	0	0	0	0	0	0				
(7) Date:	Air temp	Veg cover	Turbidity	Adult totals:			0	0	0	0	0	0	0				
(8) Date:	Air temp	Veg cover	Turbidity	Adult totals:			0	0	0	0	0	0	0				
<b>Peak adult count for this pond in any one visit (by torch, trap or net):</b>										0							
Comments and constraints:				Lined pond therefore unable to bottle trap													