Cottam Parkway Railway Station

Common Toad Survey Report

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Lancashire County Council

Cottam Parkway Railway Station

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Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
P01.1	21/05/2021	Common Toad Survey Report. First draft for client comment	Bradley Fairclough	Ryan Knight	Kris Long	Pippa Hamshaw
P01.2	01/09/2021	Revision following client comment	Ryan Knight	Kris Long	Kris Long	Pippa Hamshaw

Contents

Executive Summary

Jacobs UK Ltd (Jacobs) was commissioned by Lancashire County Council (LCC) to undertake a range of ecological surveys to inform the Cottam Parkway Railway Station scheme (hereafter referred to as the 'scheme'). The scheme will serve the North West Preston Strategic Housing Location. It will comprise a new road to the proposed railway station connecting from Cottam Link Road with a bridge over the Lancaster Canal and a car park to serve the railway station.

As part of the ecological support to inform the scheme, Jacobs have completed surveys for common toad (*Bufo bufo*). The purpose of the survey was to establish an ecological baseline for common toad to inform an Environmental Impact Assessment for the scheme. This information is to be included within the Environmental Statement (ES) which will be submitted for planning consideration in 2022.

A desk study exercise was undertaken in March 2020. This included a request to Lancashire Environmental Records Network for existing common toad records within a 1km radius of the scheme. One hundred and thirty-seven desk study records for common toad were received. In addition, a search for toad survey records gathered for the adjacent Preston Western Distributor / East West Link Road was undertaken. This road scheme was under construction at the time of survey.

The scope of the common toad field surveys was informed by a common toad risk assessment which considered the number and locations of ponds within 1km of the scheme and the potential impacts that the scheme may have on common toads. Potential common toad populations associated with a total of six ponds were deemed to be of medium to high risk of impacts. These ponds were subject to field surveys in accordance with standard guidance. Field surveys included migration route surveys, initial torch surveys and breeding population counts.

No common toads were identified along any potential migration routes. Common toads were recorded at two ponds; P23 and P24. Taken together, the peak counts of adult common toads recorded in both ponds constituted a good population size class with 144 adults counted in P23 and 15 adults in P24.

In consideration of the desk study and field survey results, alongside the conservation value of common toad (species of principal importance and Lancashire Biodiversity Action Plan species), the common toad population associated with the survey area was considered to be of **District importance.** Due to the presence of common toads, P23 and P24 also qualify as habitats of principal importance. Therefore, both ponds are considered to be of **County importance**.

A robust assessment of the potential impacts on common toad associated with the scheme will be detailed within the Ecology Chapter (Chapter 6) of an ES, along with any prescribed mitigation and compensation measures, opportunities for enhancement, requirements for pre and / or post construction monitoring and an assessment of residual impacts (where appropriate).

1. Introduction

1.1 Background

Jacobs UK Ltd. (Jacobs) was commissioned by Lancashire County Council (LCC) to provide ecological services to inform the proposed Cottam Parkway Railway Station scheme (hereafter referred to as the 'scheme').

The scheme comprises (but not exhaustively): a road connecting to Cottam Link Road at the Sidgreaves junction roundabout; a bridge over the Lancaster Canal connecting to the railway station; station platforms; buildings and associated structures; a footbridge over the railway; and a 250 / 500 space car park. The scheme is related to the permitted Preston Western Distributor (PWD) and the East West Link Road (EWLR) scheme which includes Cottam Link Road.

The completion of a range of ecological surveys was required in order to inform the scheme design options appraisal and to establish an accurate baseline against which the impacts of the scheme (both temporary and permanent) could be assessed in line with the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines for Ecological Impact Assessment (CIEEM, 2018). This report presents the results of the common toad (*Bufo bufo*) surveys undertaken between February and April (inclusive) 2021.

The surveys were undertaken in consideration of the proposed scheme layout (incorporating the proposed access road; car park, train station and any temporary working areas) and any adjacent land deemed to be of relevance to the assessment within a 1km radius of the scheme. This survey area is shown in Figure 1 in Appendix A.

1.2 Site Context

The scheme is located within a semi-rural area approximately 4km north-west of central Preston and to the immediate south-west of the largely residential area of Cottam. The central grid reference for the site is SD 48714 31645[1]. Land use within the scheme and wider survey area largely comprises pasture land used for grazing and / or fodder production. This land is bound by a network of hedgerows and tree lines with occasional woodlands, small watercourses, waterbodies, farmsteads and dwellings. Both the Lancaster Canal and the Preston to Blackpool rail line run east to west through the scheme. Sidgreaves Lane leading to Darkinson Lane runs north to south through the western section of the scheme.

Pasture land dominates much of the wider area, particularly to the west of the scheme. The east boundary of the scheme is bordered by Lea Road with Westleigh Conference Centre and sports pitches further eastwards; to the south is pasture land and Aston and Lea Golf Club further beyond. To the north is pasture land with both existing and new housing developments further northwards. In addition, the construction of the PWD scheme and Cottam Link Road was also underway along the west and north boundaries of the scheme at the time of survey.

1.3 Aims and Objectives

The primary aim of this report is to present an accurate baseline of common toad within the survey area and to assess the collected data in conjunction with the relevant good practice survey guidance, planning policies and legislative framework.

The key objectives of the common toad surveys and this report are to:

- Undertake a search for non-statutory sites designated for common toads within 1km of the scheme;
- Undertake a search for existing common toad records within 1km of the scheme;

[1] Ordnance Survey National Grid reference system used throughout the report.

- Undertake a preliminary risk assessment for common toad in terms of assessing suitable migration routes and potential breeding ponds;
- Undertake surveys to confirm the presence / absence of common toads, migration routes and breeding populations;
- Provide an evaluation of the common toad population(s) within the survey area;
- Provide sufficient field data to inform design options and to facilitate the completion of an impact assessment on any common toad populations associated with the scheme; and,
- Provide sufficient field data to inform any avoidance, mitigation and compensation requirements (which are to be detailed within an Environmental Statement (ES) chapter where required).

1.4 Legislative, Planning Policy, and Biodiversity Framework

A summary of the legislation and policy framework for common toad is provided below.

1.4.1 Wildlife and Countryside Act 1981 (as amended)

Common toads are only protected from sale and trade under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Section 9(5) of the Wildlife and Countryside Act 1981 (as amended) make it an offence to:

- Sell, offer or expose for sale, or possess or transport for the purpose of sale, any live or dead wild animal included in Schedule 5, or any part of, or anything derived from, such an animal; or
- Publish or cause to be published any advertisement likely to be understood as conveying that they buy or sell, or intend to buy or sell, any of those things.

The scheme would not result in the contravention of this legislation.

1.4.2 Natural Environment and Rural Communities (NERC) Act 2006

Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. There are 56 habitats and 943 species of principal importance which were initially identified as requiring conservation action under the UK Biodiversity Action Plan (BAP) and which continue to be regarded as priorities under the UK Post-2010 Biodiversity Framework. The Section 41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40 of the Natural Environment and Rural Communities Act 2006 "to have regard" to the conservation of biodiversity in England, when carrying out their normal functions. Common toad is listed under Section 41 and is therefore a species of principal importance (SoPI) in England.

1.4.3 Lancashire Biodiversity Action Plan

Local BAPs integrate the conservation measures provided in the UK BAP to enhance biodiversity at the local and regional level. Common toad is included within the Lancashire BAP long list of species as a result of its inclusion as a SoPI and has a distribution throughout Lancashire (Lancashire Biodiversity Partnership, 2010). It does not have a Species Action Plan.

2. Methods

2.1 Desk Study

The desk study exercise comprised a search for information on non-statutory designated sites and common toad records from Lancashire Environmental Records Network (LERN) and from previous PWD / EWLR reports. In addition, a common toad risk assessment was undertaken.

2.1.1 Non-Statutory Designated Sites

Information of non-statutory designated sites, such as Biological Heritage Sites (BHS), within 1km of the scheme was obtained from Lancashire Environmental Records Network (LERN - data received 31st March 2020). The BHS citations were searched for information pertaining to common toad.

2.1.2 Common Toad Records

The following data sources were used in order to gather information on common toad:

- Records of common toad within 1km of the scheme were obtained from LERN (data received 31st March 2020).
- The PWD and EWLR Environmental Statement. Chapter 6, Volume 2 (Jacobs, 2017); Common Toad Survey Report (Jacobs, 2016); and Common Toad Baseline Monitoring Report (Jacobs, 2019a) were reviewed for background information. The PWD / EWLR scheme is located adjacent to the Cottam Parkway site; therefore, there was a significant overlap in the survey areas for this scheme and the PWD / EWLR scheme.
- The findings of the Extended Phase 1 Habitat Survey data (Jacobs, 2020a) and the Great Crested Newt Survey Report (Jacobs, 2020b) were reviewed to identify the presence of waterbodies and suitable migration routes within a 500m radius of the scheme boundary.

2.1.3 Common Toad Risk Assessment and Survey Scope

A common toad risk assessment was undertaken for the scheme in accordance with good practice guidance (Amphibian and Reptile Conservation (ARC), 2011). The risk assessment accounted for the following factors which influenced the scope of the common toad field surveys:

- Desk study records (from the sources listed above);
- The extent of suitable migration habitats and suitable breeding ponds which may be impacted by the scheme via severance, loss or damage; and
- The potential barriers to dispersal for toads to / from the land within the scheme which included:
  - The PWD scheme (under construction) to the direct west;
  - The Cottam Link Road (under construction) to the direct north;
  - The Blackpool to Preston rail line to the direct south; and
  - Lea Road to the direct east.

Given that the scheme includes the construction of a road, train station and car park, the potential for impacts to toads was considered to be of a medium to high risk for a total of six ponds (referenced as P9, P11, P12, P21, P23, and P24). Descriptions of the surveyed ponds, including photographs, are provided in Appendix B. The risk to toads potentially present in the wider area was considered to be low given the above listed barriers to dispersal and limited extent of potential migration route passageways. The survey area subject to field surveys was therefore defined as all land which incorporated these ponds and any potential migration routes. This survey area is shown on Figure 1.

2.2 Field Survey

Common toad surveys were conducted in February, March and April 2021 following the methods informed by current good practice guidelines (ARC, 2011) and the Design Manual for Roads and Bridges (Highways Agency, 2001) as detailed below.

The local weather conditions and information resources (including social media) were monitored for recent local amphibian movements and arrival to ponds to help inform the start of surveys.

2.2.1 Migration Route and Initial Torch Surveys

Nocturnal visual surveys were undertaken on 24th February and 23rd March 2021 to identify potential migration routes across the survey area. No specific potential migration routes were identified from the desk study; however, the entire survey area was systematically searched for migrating toads during these two visits.

Migration route surveys involved surveyors using high-powered torches to search the ground for common toads over the course of two evenings, beginning at sunset and lasting for up to three hours. The surveyors closely monitored local weather conditions in February and March, and aimed to undertake surveys on the first sustained overnight temperatures of >5°C. As no common toads were recorded during the first visit (see Section 3) and the overnight temperatures were consistently below 5°C (with ground frosts) following the first visit, the second visit was delayed until 23rd March and information resources (including social media) were frequently monitored for recent local amphibian movements and arrival to ponds to assist with the timing of the second visit.

Initial torch surveys to identify if the first paired common toads had arrived at pre-identified ponds were combined with the migration route surveys as common toad migration timing is dependent on a number of factors. All six ponds were subject to initial torch surveys.

Initial torch surveys involved surveyors walking the perimeter of each waterbody at least one hour after sunset, using torches of one million candlepower (Clulite CB2, or similar) to search the margins for amphibians. Surveyors recorded the number and sex of common toads, where possible, and noted the presence of any spawn strings if present. Observations of other amphibians were also recorded.

2.2.2 Breeding Pond Surveys

Breeding pond surveys included four visits over a 14-day period following the first identification of paired toads from the initial torch surveys. The aim of these surveys was to provide an estimate of the breeding population size class.

Following the second visit of initial torch surveys on 23rd March 2021, breeding pond surveys were undertaken at all six ponds between 25th March and 6th April 2021. As with the initial torch surveys, surveyors walked the perimeter of each waterbody at least one hour after sunset and used torches of one million candlepower (Clulite CB2, or similar) to search the margins for amphibians. Surveyors recorded the number and sex of common toads, where possible, and noted the presence of any spawn strings if present. Observations of other amphibians were also recorded.

2.2.3 Population Size Class Estimate

Data obtained during the initial torch surveys and breeding pond surveys was analysed to inform an estimate of the population size class of toads relating to the surveyed ponds. The assessment criteria used is based upon the Herpetofauna Workers' Manual (Gent and Gibson, 2003, p97) which gives a score for the number of adult animals counted (or estimated) at breeding sites during the breeding season, as defined in Table 2.1.

Table 2.1: Criteria for Population Size Class Estimate for the Common Toad.

Population Size Class	Low	Good	Exceptional
Estimated	<500	500–5000	>5000
Counted	<100	100–1000	>1000

2.2.4 Evaluation

Ecological Impact Assessment uses a hierarchical geographic framework to assign importance to ecological features. This is based on an understanding of how the ecological feature may contribute to the conservation status or distribution of the species or habitat at a particular geographic scale. It involves an assessment of the biodiversity importance of ecological features and also involves consideration of other factors that can be attached to ecological features including ecosystem services and natural capital (CIEEM, 2018). The evaluation is based on professional judgement, local knowledge and available data sources. The Lancashire Biological Heritage Site (BHS) selection criteria (Lancashire County Planning Department, 1998) provides criteria to indicate habitats (and some species populations) of County importance for biodiversity and this document has been used to inform the evaluation process. Opinions may differ slightly between professionals as to the value of ecological features / biodiversity resources; therefore, a clear explanation is provided to justify how the evaluation category has been assigned.

The Design Manual for Roads and Bridges (DMRB) LA 108 Biodiversity guidance (Highways England *et al.*, 2020) and the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland; Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018) recommends that the value / importance of a biodiversity resource / ecological feature be considered within a defined geographical context. The geographic categories stated in the two sets of guidance differ slightly but are largely comparable (see below).

Therefore, the value / importance of biodiversity resources within the survey area was assessed according to the following defined geographical framework as per current CIEEM and Highways England guidance[2]:

- International and European (International or European).
- National (UK or National).
- Regional (Regional) e.g. North-West England.
- Metropolitan, County, Vice County or other local authority-wide area (County or equivalent authority) e.g. Lancashire.
- River Basin District (CIEEM only). District is used herein as a geographic frame of reference e.g. Preston.
- Estuary System / Coastal cell (CIEEM only).
- Local (Local) (e.g., within 2km of the scheme).
- Less than local.

2.3 Limitations

P21 and P23 were very turbid during all surveys which may have limited surveyors' ability to observe amphibians deeper in the ponds. No common toads were recorded on any survey at P21. Common toads were present in this pond in 2015 (Jacobs, 2016); however, no common toads were recorded in 2019 (Jacobs, 2019a). The two most recent findings from 2019 and 2021 suggest that it is highly unlikely that any more than a very small number of common toads would use this waterbody, if any.

[2] The CIEEM (2018) value is given first with the corresponding Highways England *et al.* (2020) value given in brackets where applicable.

In addition, as a peak count of adult common toads at P23 constituted a good population, the small number of individuals potentially not counted are not likely to have altered the population size class (see Section 3). Therefore, there are no implications on the results presented in this report from this survey limitation.

The findings of this report represent the professional opinion of qualified ecologists and do not constitute professional legal advice. The client may wish to seek professional legal interpretation of the relevant wildlife legislation cited in this document.

3. Results

3.1 Desk Study

3.1.1 Non-Statutory Sites

There is one BHS located just over 1km west of the scheme which is of relevance to common toads: **British Nuclear Fuels Limited Springfields Works Ponds BHS.** This BHS comprises an area of undeveloped land, the main feature is a narrow 'L-shaped' water-filled trench that supports a large number of common toads, common frogs (*Rana temporaria)*, smooth newts (*Lissotriton vulgaris)* and great crested newts (GCN) (*Triturus cristatus*). The site is also of botanical interest.

3.1.2 LERN Records

Table 3.1: LERN Records for Common Toad

Details	Distance From The Scheme
137 records for common toad were provided by LERN.	Numerous records for common toad fall within the western extent of the 1km search radius with several records located adjacent to the railway line (central grid reference SD 48461 31371) and Lancaster Canal (central grid reference SD 48561 31550). These locations are in proximity (within 160m) to P23.

3.1.3 PWD / EWLR Records

Common toads were recorded in a total of 34 ponds across the entire PWD / EWLR study area in 2015 (Jacobs, 2016). This included records for both adult toads as well as larvae. From the 34 ponds surveyed in 2015, 22 ponds were confirmed to be used by common toad in 2019 (Jacob, 2019a).

One pond (PWD P81) is included in the scope of surveys within this report and numbered as P21 (Figure 1). Common toads were present in this pond in 2015; however, no common toads were recorded in 2019. All other ponds confirmed to have breeding common toad populations during the surveys for the PWD / EWLR scheme are located over 1km from the scheme.

Cottam Link Road is to incorporate two underpasses / culverts referred to as the Cattle Creep and Culvert 19. These structures are located to the direct north-west (Cattle Creep) and the direct north-east (Culvert 19) of the scheme and are to form part of the amphibian monitoring strategy for the PWD / EWLR scheme (Jacobs, 2019b).

3.2 Field Survey

3.2.1 Migration Route and Initial Pond Surveys

No common toads were identified during the first visit on 24th February along any potential migration routes or within any of the six ponds. One dead common frog was recorded on the edge of P24.

During the second visit on 23rd March, there were no common toads identified along any potential migration routes; however, common toads were recorded in P23 and P24. A total of 57 common toads (26 adult males and 31 unsexed adults) were recorded in Pond 23 and four common toads (a male and female mating pair, and two unsexed adults) were recorded in Pond 24. A summary of the survey results is presented in Table 3.2 and full survey results including survey times and weather conditions, are presented in Table C.1 in Appendix C.

3.2.2 Breeding Pond Surveys

Common toads were recorded in two of the six ponds: P23 and P24. In total, 266 adult common toads were recorded during the breeding pond surveys (246 in P23 and 20 in P24), with common toads recorded during three of the four visits. Toad spawn strings were also observed in Pond 23 on 6th April 2021. A summary of the survey results is presented in Table 3.2 and full survey results, including survey times and weather conditions, are presented in Table C.2 in Appendix C.

3.2.3 Population Size Class Estimate

Common toad counts recorded during both the initial torch surveys and the breeding pond surveys were used to inform the population size class assessment. A total peak count of 159 adult common toads was recorded within the ponds (144 adults in P23 and 15 in P24) with all peak count records obtained from one survey visit on 29th March 2021. With reference to good practice guidance (Gent and Gibson, 2003) and treating the recorded common toads in all ponds as one local population, this equates to a 'good' (100-1000) population size class.

3.2.4 Other Amphibians

Common frogs were recorded during the first migration route survey and confirmed present in all six ponds.

Table 3.2: Summary of Field Survey Results

Reference ID	Common Toads Present / Absent	Peak Count of Adult Common Toad	Other Amphibians
Migration Route Surveys			
Entire survey area (Figure 1)	Absent	0	Common frog
Pond Surveys (Initial Torch Surveys and Breeding Pond Surveys)			
Pond 9	Absent	0	Common frog
Pond 11	Absent	0	Common frog
Pond 12	Absent	0	Common frog
Pond 21	Absent	0	Common frog
Pond 23	Present	144	Common frog
Pond 24	Present	15	Common frog

4. Evaluation

Common toads were recorded in numbers constituting a good population in P23 and a low population in P24. P23 is located approximately 340m west of P24 with no significant barriers to dispersal in-between and it is likely that there is regular interchange of toads between these ponds. The local population of common toad within the study area was therefore assessed as being a good population size class.

P23 is located on a field boundary approximately 340m to the west of the scheme (including temporary and permanent construction areas). To the direct north of the pond is a small area of willow (*Salix* sp.) dominated woodland which is also adjacent to small areas of rough grassland and reedbed along the Lancaster Canal. Such habitats are likely to provide suitable refuge areas and may form part of a migration route. Several common toad records provided by LERN also originated from within the locality of P23.

P24 is located within the centre of an improved pasture field to the immediate south of a potential temporary working area and approximately 80m west of the proposed location for the access road. There are no distinct migration routes leading to / from this pond.

Within the guidelines for BHS selection (Lancashire County Planning Department, 1998), under criteria Am2, any site which regularly supports an 'exceptional' population of any amphibian species (as derived from a specific scoring system within Table 7 of the guidance) should be selected as a BHS. In addition, under Am3a, any sites regularly supporting all three newt species, common frog and common toad should be selected as a BHS. Under Am3b, any site with an amphibian species assemblage score of 7 or more (using the same scoring system) should be selected as a BHS. With regards to Ponds 23 and Pond 24, due to the population size and the absence of great crested newts (Jacobs, 2020b), the ponds would not qualify as a BHS under criteria Am2 or Am3a. In addition, due to these same factors, it is also considered unlikely that the ponds would qualify under criteria Am3b.

In consideration of the desk study and field survey results, alongside the conservation value of common toad, the common toad population associated with the survey area was therefore considered to be of **District importance.**

It should also be noted that as both P23 and P24 support common toad, both ponds qualify as a habitat of principal importance (BRIG (ed. Ant Maddock) 2008). Therefore, both ponds are considered to be of **County importance.**

5. Conclusions and Recommendations

A data search and field surveys for common toad, including migration route, initial pond surveys and breeding pond surveys were undertaken for the scheme.

The desk study revealed numerous records for common toad within the search area. Many of the records relate to common toad surveys associated within the PWD / EWLR scheme.

Barriers to the dispersal of common toads surround the scheme and include the PWD / EWLR scheme (currently under construction), the Preston the Blackpool rail line and Lea Road. The PWD / EWLR scheme including Cottam Link Road is to provide culverts / underpasses which will allow passage for toads upon construction. Two such culverts are to the direct north of the scheme.

A total of six field ponds were identified as requiring survey as common toads potentially migrating to and breeding within these ponds were considered to be of medium to high risk of impacts from the scheme.

Field surveys confirmed the presence of common toad in two ponds; P23 and P24. The local population of common toad within the study area was assessed as being a good population size class. P23 is located 340m to the west of the scheme and P24 is located immediate south of a potential temporary working area and approximately 80m west of the proposed location for the access road. Neither pond is to be lost as a result of the scheme.

A robust assessment of the potential effects on common toad associated with the scheme is to be detailed within the Ecology Chapter (Chapter 6) of the ES, along with any prescribed avoidance, mitigation and compensation measures, opportunities for enhancement, requirements for pre and / or post construction monitoring and an assessment of residual impacts (where appropriate).

6. References

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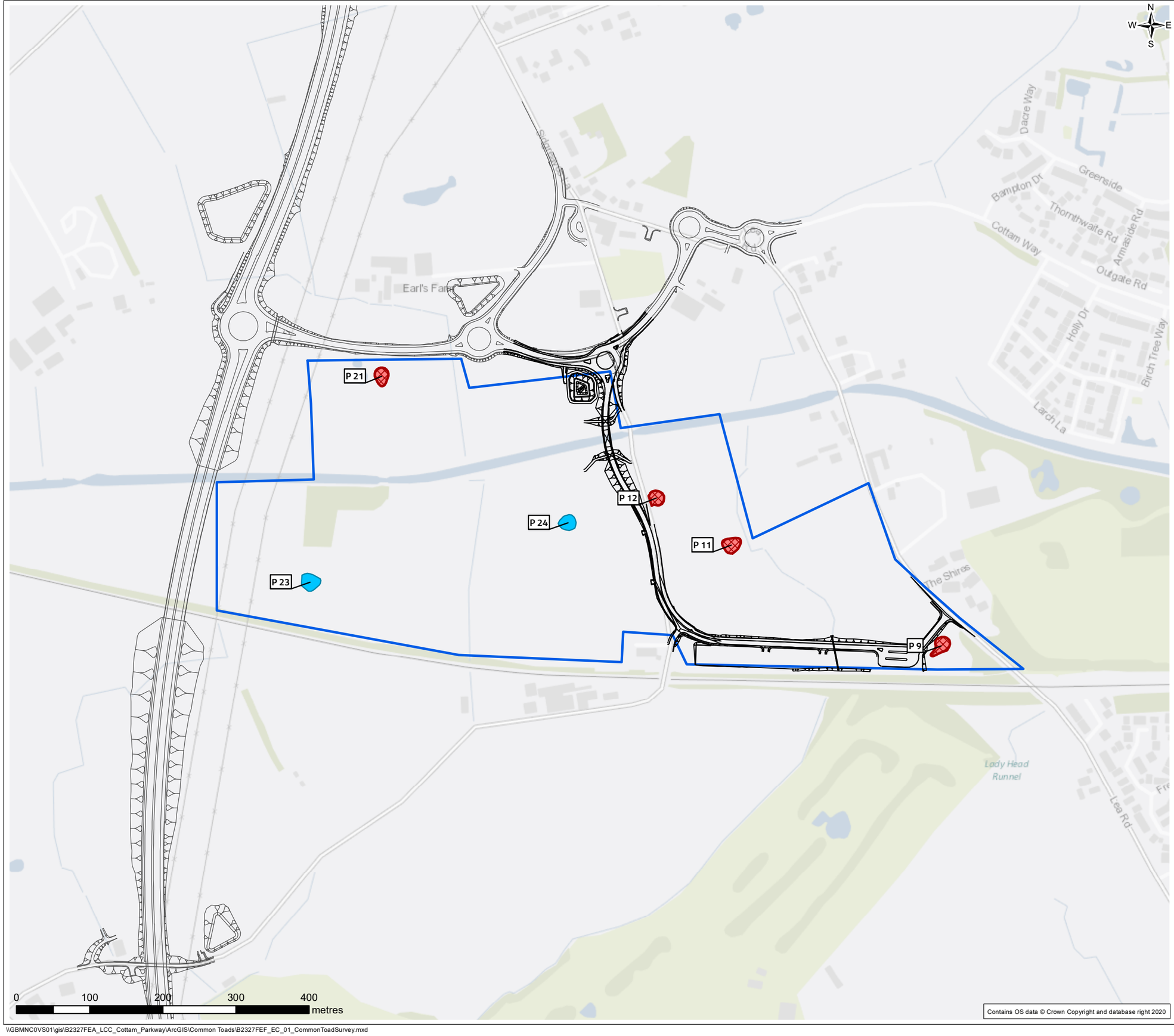
Appendix A. Figures

Figure 1 – Common Toad Survey Areas and Results

FIGURE 1



Legend

- Scheme Design (01/12/2020)
- PWD Route
- Migration route survey area

Common toad survey results

- Common toad absent
- Common toad present

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
0	11/05/2021	Initial Issue	MS	RK	KL	PH

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Client: Lancashire County Council

Project: Cottam Parkway Railway Station

Drawing Title: COMMON TOAD SURVEY AREA AND RESULTS

FINAL

Scale @ A3	1:5,000	DO NOT SCALE
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Appendix B. Pond Descriptions and Photographs

Table B.1: Pond Descriptions and Photographs

Pond Reference	Description	Photograph
P9	Small pond within shallow depression in improved grassland field. Water was shallow with no aquatic or semi-aquatic vegetation and is likely to dry out during prolonged dry weather. Clear water. Dense rush (*Juncus* sp.) around half of the pond.	
P11	Small pond within improved grassland field. Pond edges were poached (horses). Common reedmace (*Typha latifolia*) and rushes make up roughly 50% of the pond. Clear water. Duckweed (*Lemna minor*) present.	
P12	Small, shallow pond on edge of improved grassland field, adjacent to road. Mature overhanging oak (*Quercus* sp.) tree covers majority of the pond. Relatively clear water. Some starwort (*Callitriche stagnalis*) present.	
P21	Large field pond. Very turbid water and heavily poached banksides (cattle). No aquatic vegetation.	

Pond Reference	Description	Photograph
P23	Field pond along a field boundary. Very turbid water and cattle poached. Soft rush (*Juncus effusus*), bramble (*Rubus fruticosus* agg.), and hawthorn (*Crataegus monogyna*) present along the margins. Stickleback (*Gasterosteus aculeatus*) also present.	
P24	Large field pond very turbid at time of survey. Dead adult gravid female frog found on margin. Some small stands of soft rush along the margins.	

Appendix C. Survey Results

Table C.1: Migration Route and Initial Torch Survey Results.

Visit 1
Date: 24/02/2021 **Sunset Time:** 17:39 **Start Time:** 17:39 **End Time:** 20:39 **Start Temperature:** 11°C **End Temperature:** 8°C **Weather:** Intermittent rain, 100% cloud cover.
Windspeed: Light breeze (Beaufort Scale Force 2). **Surveyors:** Catrin Scott and Eve Loxham

Reference ID	Common Toad Counts						Common Frog Counts						Notes
	M	F	U	Pairs	Tadpoles	Spawn Strings	M	F	U	Pairs	Tadpoles	Spawn	
Migration Route Surveys													
All Areas	0	0	0	0	0	0	0	1	0	0	0	0	Dead adult frog on margin of P24.
Initial Torch Surveys													
Pond 9	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 11	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 12	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 21	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 23	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 24	0	0	0	0	0	0	0	1	0	0	0	0	-

Visit 2
Date: 23/03/2021 **Sunset Time:** 18:30 **Start Time:** 18:30 **End Time:** 21:30 **Start Temperature:** 9°C **End Temperature:** 7°C **Weather:** Dry, 50% cloud cover.
Windspeed: Light breeze (Beaufort Scale Force 2). **Surveyors:** Catrin Scott and Julie Prendergast

Reference ID	Common Toad Counts						Common Frog Counts						Notes
	M	F	U	Pairs	Tadpoles	Spawn Strings	M	F	U	Pairs	Tadpoles	Spawn	
Migration Route Surveys													
All Areas	0	0	0	0	0	0	0	0	0	0	0	0	-
Initial Torch Surveys													
Pond 9	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 11	0	0	0	0	0	0	0	0	1	0	0	1	-
Pond 12	0	0	0	0	0	0	0	0	0	0	0	1	-
Pond 21	0	0	0	0	0	0	0	0	0	0	0	1	Common frog spawn on surrounding grass, suggesting water level dropped by 20cm.
Pond 23	26	0	31	0	0	0	1	1	2	0	0	0	-

Visit 2 **Date:** 23/03/2021 **Sunset Time:** 18:30 **Start Time:** 18:30 **End Time:** 21:30 **Start Temperature:** 9°C **End Temperature:** 7°C **Weather:** Dry, 50% cloud cover. **Windspeed:** Light breeze (Beaufort Scale Force 2). **Surveyors:** Catrin Scott and Julie Prendergast													
Reference ID	**Common Toad Counts**						**Common Frog Counts**						**Notes**
	M	**F**	**U**	**Pairs**	**Tadpoles**	**Spawn Strings**	**M**	**F**	**U**	**Pairs**	**Tadpoles**	**Spawn**	
Pond 24	1	1	2	0	0	0	0	0	0	0	0	1	-

*M = adult male, F = adult female, U = unsexed adult, Pairs = counts of pairs not in addition to those capture under M/F/U counts.

Table C.2: Breeding Pond Survey Results (common toad peak counts highlighted in green).

Visit 1 **Date:** 25/03/2021 **Sunset Time:** 18:34 **Start Time:** 19:34 **End Time:** 21:00 **Start Temperature:** 10.5°C **End Temperature:** 7°C **Weather:** Dry, 100% cloud cover. **Windspeed:** Still (Beaufort Scale Force 0). **Surveyors:** Lee Moat and Jack Taylor													
Reference ID	**Common Toad Counts**						**Common Frog Counts**						**Notes**
	M	**F**	**U**	**Pairs**	**Tadpoles**	**Spawn Strings**	**M**	**F**	**U**	**Pairs**	**Tadpoles**	**Spawn**	
Pond 9	0	0	0	0	0	0	0	0	0	0	0	1	-
Pond 11	0	0	0	0	0	0	0	0	1	0	0	5	-
Pond 12	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 21	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 23	84	6	0	3	0	0	0	0	0	0	0	0	-
Pond 24	3	0	0	0	0	0	0	0	0	0	0	0	-
Visit 2 **Date:** 29/03/2021 **Sunset Time:** 20:38 **Start Time:** 21:38 **End Time:** 22:50 **Start Temperature:** 11°C **End Temperature:** 9°C **Weather:** Dry, 50% cloud cover. **Windspeed:** Light breeze (Beaufort Scale Force 2). **Surveyors:** Catrin Scott and Helena Davies													
Reference ID	**Common Toad Counts**						**Common Frog Counts**						**Notes**
	M	**F**	**U**	**Pairs**	**Tadpoles**	**Spawn Strings**	**M**	**F**	**U**	**Pairs**	**Tadpoles**	**Spawn**	
Pond 9	0	0	0	0	0	0	0	0	0	0	0	1	-
Pond 11	0	0	0	0	0	0	0	0	0	0	0	5	-
Pond 12	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 21	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 23	76	16	52	12	0	0	0	0	0	0	0	1	-
Pond 24	12	3	0	0	0	0	0	0	0	0	0	0	-

Visit 3
Date: 01/04/2021 **Sunset Time:** 19:46 **Start Time:** 20:46 **End Time:** 22:10 **Start Temperature:** 7°C **End Temperature:** 5°C **Weather:** Dry, 0% cloud cover.
Windspeed: Light breeze (Beaufort Scale Force 2). **Surveyors:** Lee Moat and Sam Robinson

Reference ID	Common Toad Counts						Common Frog Counts						Notes
	M	F	U	Pairs	Tadpoles	Spawn Strings	M	F	U	Pairs	Tadpoles	Spawn	
Pond 9	0	0	0	0	0	0	0	0	0	0	1	0	-
Pond 11	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 12	0	0	0	0	0	0	0	0	0	0	0	1	-
Pond 21	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 23	0	12	0	0	0	0	25	0	0	0	0	1	-
Pond 24	2	0	0	0	0	0	0	0	0	0	0	0	-

Visit 4
Date: 06/04/2021 **Sunset Time:** 19:56 **Start Time:** 20:56 **End Time:** 22:10 **Start Temperature:** 1°C **End Temperature:** 0°C **Weather:** Dry, 100% cloud cover.
Windspeed: Light breeze (Beaufort Scale Force 2). **Surveyors:** Lee Moat and Jack Taylor

Reference ID	Common Toad Counts						Common Frog Counts						Notes
	M	F	U	Pairs	Tadpoles	Spawn Strings	M	F	U	Pairs	Tadpoles	Spawn	
Pond 9	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 11	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 12	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 21	0	0	0	0	0	0	0	0	0	0	0	0	-
Pond 23	0	0	0	0	0	2	0	0	0	0	0	0	Common toad spawn string recorded.
Pond 24	0	0	0	0	0	0	0	0	0	0	0	0	-

*M = adult male, F = adult female, U = unsexed adult, Pairs = counts of pairs not in addition to those capture under M/F/U counts.