



TN35- Pond 16 Pond is heavily shaded



TN37- Pond 17 is oval, deep and open. Fish were noted in it

5.2 Vegetation

5.2.1 Details of the plant species found on site in each habitat areas are included in the target notes.

5.2.2 The following table represents the habitats which were recorded at the site. It should be noted the site boundary was mapped to the inside (site side) of boundary hedges. Internal field areas were mapped to the edge of hedge canopies. Linear habitats comprising internal hedges utilise an area of 0.91ha. Bare ground has been used as a proxy for the hedge bottoms in order that areas post development are comparable pre and post development.

Table 4- Habitat areas

Habitat Type	Amount of resource in Ha
Bare Ground	2.68
Hedge Bottom	0.91
Cultivated/Disturbed Land - Ephemeral/short perennial	0.22
Improved Grassland	1.52
Neutral Grassland - Semi-improved	33.05
Marginal and inundation - Inundation vegetation	0.18
Standing Water	0.07
Tall Herb and Fern - Other Tall Ruderal	1.45
Marsh/Marshy Grassland	4.69
Scrub - Dense/continuous	2.63
Woodland - Broad-leaved Semi-Natural	0.13
Scattered Trees	No Area
Total	47.53Ha

Dry Ditch	1183
Hedge and Trees - >Native Species-rich	400
Hedge and Trees - >Species-poor	1818
Intact Hedge - >Species-poor	2269
Running Water	422
Total	6092m

Bare ground and Cultivated/Disturbed Land - Ephemeral/short perennial

5.2.3 These habitats result from past development of the site under a previous planning application. Bare compacted gravels forming access roads and earth bunds of stockpiled earth. The base of hedgerows has also been mapped as Bare ground in order to ensure post development areas match pre-development.

Improved Grassland

5.2.4 One fields within the Site had been re-sown as an improved pasture. This was a field adjacent to the A5083 in the Western part of Cuerden Strategic Site.

5.2.5 This habitat was the least botanically diverse within the entire site. The sward had clearly been re-seeded with an agricultural grass mix dominated by perennial rye-grass and Yorkshire fog, with some wet areas supporting abundant marsh fox-tail. Creeping buttercup, common mouse-ear and white clover comprised the remainder of this species-poor sward.

Neutral Grassland Semi-improved

5.2.6 Semi-improved permanent pasture used for a mixture of sheep, cattle or horse grazing or silage production was the vastly predominant land-use across the entire site.

5.2.7 The species diversity of the numerous fields was rather uniform and only moderately diverse. A variety of grasses co-dominated in the sward, with typical species encountered being: abundant Yorkshire fog, common bent, sweet vernal grass, meadow fox-tail and red fescue, with frequent perennial rye-grass and marsh fox-tail, and common and glaucous sweet-grasses in damp areas. The forbs were particularly restricted, typically with only abundant creeping buttercup, frequent meadow buttercup and a lesser amount of white clover, common sorrel and broad-leaved dock being widely encountered. The weed species ragwort was also common.

5.2.8 The Semi-improved grassland within the Site supports a limited diversity and low frequency of herbs (and very few of those which are indicative of diverse grassland), and is therefore not considered to qualify as the priority habitat. The semi-improved grasslands within the Site are not considered to meet the selection criteria described in the NERC Habitats of Principle Importance definition, or the Lancashire Biological Heritage Site Selection Guidelines.

5.2.9 The species-poor semi-improved grassland habitat and plant assemblages recorded on site are considered to be of value only at the Site level. Neither the habitat nor the plant assemblages present are limited within the wider environment and neither are they exceptional examples of their type. The nature of the grassland was classed as 'poor' semi-improved as the diversity and abundance of plant species in the sward was low. No priority species or other notable plant species were observed.

5.2.10 Part of the grassland is within the Lancashire Grassland Network 3km Corridor. This is considered to be at District level value.

Standing Water and Marginal and inundation - Inundation vegetation

- 5.2.11 Within the Site were 3 ponds. Reference to historical mapping reveals that several of the ponds have formed on the location of former sand pits dating from the 19th century.
- 5.2.12 Small areas of Inundation vegetation were associated with a pond which has dried up.
- 5.2.13 No GCN were recorded but Common Toad, Common Frog, and Smooth Newt have been recorded in the past. Common toadpoles were recorded in Pond 16 in May 2022. Common Toad is UK BAP species and as such the Ponds would be classified as a BAP habitat but are valued at the District level.

Tall Ruderal vegetation

- 5.2.14 There was only a small area of the Site supporting this habitat. The area was disturbed ground which had become dominated by false oat-grass, nettle, broad-leaved dock, ragwort and rosebay willowherb.

Marshy Grassland

- 5.2.15 The principal area of this habitat has formed on land which was formally wooded and has been felled. Species diversity is poor. Smaller areas occur within the neutral grassland as a result of impeded drainage as well as a larger area to the South of the site. The species composition lacks indicator species for the BAP habitat Purple Moorgrass and Rush Pasture. This sub-community is less well-defined and is essentially a transition between M23a and the *Holcus lanatus* - *Juncus effusus* rush-pasture (MG10). The marshy grassland present is not a UK BAP habitat but is part within the Lancashire Grassland Ecological Network. Of note the largest area of marshy grassland, in the area formally a wood, is excluded from the Lancashire Grassland Ecological Network. It is likely the mapping of the Lancashire Grassland Ecological Network pre-dated loss of the woodland.

Scrub

- 5.2.16 There was dense scrub to the sides of the M65. This is well established and dense.

Woodland - Broad-leaved Semi-Natural

- 5.2.17 A small area of woodland occurs around a pond on the boundary of the site. This is poorly fenced out from the adjacent fields and the understory is poorly developed. Trees are mature and this is a UK BAP Habitat. This woodland would be classified as a Lancashire BAP Habitat. This woodland is not within the Lancashire Woodlands Network.

Scattered Trees

- 5.2.18 The field boundaries within the Site are associated with a great many trees which are present as single standards or as a near-continuous over-storey along the hedgerows. The scattered trees are present in all parts of the Site except the north where the boundaries to the M65 and the A582 have been modified and re-planted. This pattern of mature hedge trees across most of the site was evident in mapping from 1848 and it clear evidence that hedge and scattered trees has been part of the local landscape for many

years. Over the years some additional loss of scattered trees has occurred as fields have been expanded through boundary hedge removal.

5.2.19 The most abundant tree species were pedunculate oak and sycamore, with these two species comprising virtually all trees recorded except for the occasional alder and holly. Most of the scattered trees were mature. Regular mechanical maintenance of the hedges alongside the roads has caused a lack of recruitment of new trees. Elsewhere on Site many of the hedges and scattered trees did not appear subject to regular management. This has resulted in mature tree-lines with overshot and often gappy over-mature hedges.

Running Water

5.2.20 Only one permanently flowing watercourse was present within the Site.

5.2.21 The small un-named stream flowed within a ditch which ran from East to West across the Site. The shallow stream was no more than 1m wide and 30cm deep and had sluggish flowing water. The streambed was sandy with few stones. Bankside flora comprised abundant swathes of bracken, rosebay willowherb, nettle, bramble, ragwort and creeping thistle. Wild angelica was frequent and foxglove, meadowsweet and red campion were occasional. Very little open water was visible and the overhanging vegetation was dense. In the channel was abundant reed canary grass with large stands of foals watercress and clumps of soft rush and brooklime with frequent marsh willowherb.

Hedgerows

5.2.22 Hedge reference numbers were duplicated from Simply Ecology (2012). Due to the large size of the site and its agricultural land-use, there were a considerable number of hedges forming the field boundaries on the site. Hedges were classified as "species rich" if they had five or more native woody species averaged along the 30m assessed lengths. 530m of species rich hedge were mapped.

5.2.23 Principally these hedges are to the Southern area of the site and comprise tall, gappy hedgerows with a large number of mature as well as veteran trees.

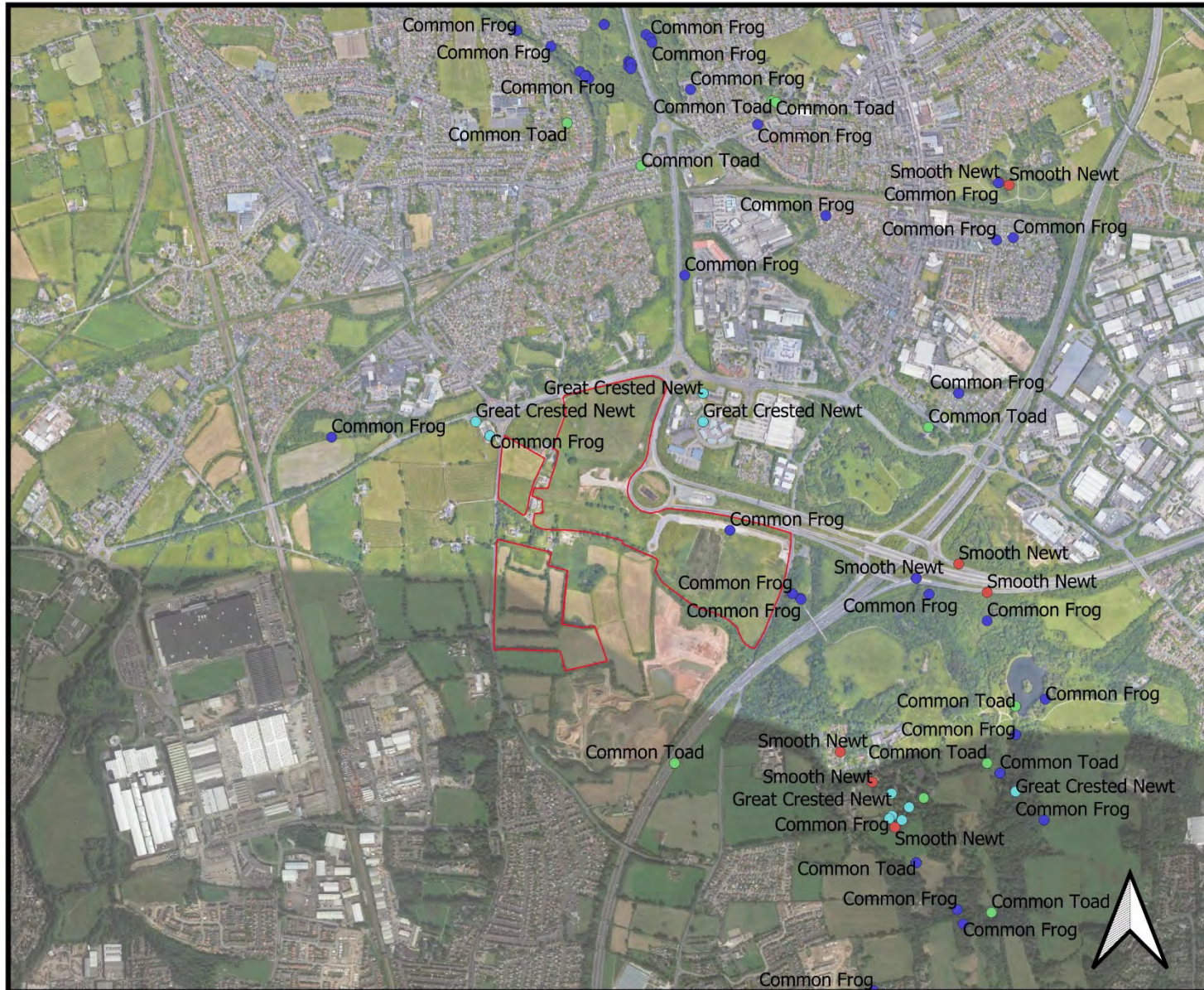
5.2.24 Hedge R was classified as important under the Hedgerow regulations and runs along Stoney Lane. The calculations for hedgerow regulations assessment as well as hedge lengths are appended.

Flora

5.2.25 No notable plant species were recorded in data search or field survey. The only protected plant species record was for bluebell, which is protected through general provisions in the WCA 1981 (as amended) which make it illegal to intentionally uproot a wild plant. Himalayan Balsam (*Impatiens glandulifer*) was noted along some of the hedgerows.

5.3 Amphibian

- 5.3.1 There are records for amphibians within 2km of the site. These include Great Crested Newt (*Triturus cristatus*) (GCN). Common Frog (*Rana temporaria*) have been recorded on site. Simply Ecology (2012) report smooth newt (*Lissotriton vulgaris*), Common Frog (*Rana temporaria*) and Common Toad (*Bufo bufo*) on site, Figure 8.
- 5.3.2 The habitat on site is excellent for amphibians in their terrestrial phase comprising a range of unmanaged, managed and marshy grassland with mature hedgerows and woodland/ scrub.
- 5.3.3 Simply Ecology (2012) report the survey area contained 22 potential newt ponds but the referenced plan shows only 21 ponds. These were all re-assessed in the spring of 2022. The majority had been lost or were dry with no indication of prolonged waterlogging. This is due to changes in site drainage, ground works undertaken under a previous planning consent and mineral extraction.
- 5.3.4 Sand extraction is ongoing to the South of the site with a number of temporary shallow pools recorded to the quarry floor. Access to survey these was not possible but given their temporary nature and the high level of disturbance associated with the quarry floor, use is unlikely.
- 5.3.5 The high quality terrestrial habitat around the ponds on site, without barriers to dispersal from the quarry, would result in the presence of this species on site should it also occur in the quarry.
- 5.3.6 eDNA testing and latterly standard presence/absence surveys by Simply Ecology (2012) and Simply Ecology (2017) resulted in NEGATIVE results for GCN.
- 5.3.7 In Spring 2022 ten ponds were located which were potentially suitable for GCN. The same numbering convention has been used as Simply Ecology (2012) and Simply Ecology (2017). Ponds are shown on Figure 9. Ponds 4 and 5 and Ponds 14 and 15 are connected and as such were treated as a single pond. All ponds were eDNA tested. Ponds 1-5 and 16 and 20 on the 15th April 2022 and Ponds 14, 15 and 17 on the 24th April 2022.
- 5.3.8 Pond 4 and 5 appear likely to dry out in summer and are heavy vegetated. Pond 16 is heavily shaded by overhanging trees and has limited aquatic vegetation associated with it. Infrequent drying out is also likely.
- 5.3.9 All ponds tested NEGATIVE for GCN eDNA. eDNA results are appended.
- 5.3.10 Simply Ecology (2012) and Simply Ecology (2017) report Smooth Newt, Common Frog and Common Toad from the ponds shown in Table 5 which are still present on or near the site.
- 5.3.11 Tadpoles were recorded in Pond 16, 17 and 20. Tadpoles in Pond 16 appeared black, and well developed, suggesting they are from Common Toad. Given the good terrestrial connectivity between ponds, it is reasonable to conclude populations of these species are still present on and around the site. Follow-up surveys to reconfirm presence were therefore not undertaken as the risk to these species from trapping and netting during the breeding season outweighs the ecological value of reconfirming presence which can be assumed.



- Boundary
- Common Frog
- Common Toad
- Great Crested Newt
- Smooth Newt

Figure 8
Amphibian Records





- Boundary
- Ponds

Figure 9
Ponds within 250m
of site boundary



Table 5- Other Amphibian records from Simply Ecology (2012)

Pond No	Smooth	Frogs	Toads
1	27 M, 49 F		Y
2	54 M, 79 F	Y	Y
3	22 M, 27 F	Y	Y
4		Y	
5	2 F	Y	
14	5 M, 8 F, 1 Juv	Y	
15	10 M, 1 F	Y	Y
16	1 F	Y	Y
17			
20	1 F	Y	Y

5.4 Badger

5.4.1 There are no records of badgers occur within 2km of the site. This species is however widespread and common.

5.4.2 Excavations which may suggest Badger activity were recorded along Stoney Lane. Close examination however indicates excavations are from Rabbit (*Oryctolagus cuniculus*) and enlarged by Fox (*Vulpes vulpes*). Badger setts do not occur on site and a lack of feeding signs or runs across the site would suggest that they do not occur within 30m of site boundaries.

5.4.3 Simply Ecology (2012) and Simply Ecology (2019) also report no badger activity on site.



Plate 1- Rabbit and Fox excavations along Stoney Lane

5.5 Bats

- 5.5.1 There are records of nine species of bat in the local area but no records for the site, Figure 10.
- 5.5.2 The foraging habitat at the site is moderate to high value for bat species being a mixture of open pasture, tree lines, scrub and woodland. The hedge and tree lines are good in terms of their structure, diversity and interconnectivity.
- 5.5.3 All trees on and around the site perimeter were also assessed in accordance with Collins ed. (2016) and assigned a risk category. The surveys undertaken by Simply Ecology (2012) and Simply Ecology (2019) were reviewed. It should be noted that trees are dynamic structures and the potential for bat roosting may change over short periods of time.
- 5.5.4 The tree surveys undertaken in 2022 for the current application were also reviewed in respect of any bat roosting features identified during these surveys.
- 5.5.5 15 trees were identified which contained potential roost features (PRF's). Those which were categorised as risk level 1 were more closely inspected to confirm the absence of roosting by aerial inspection. No bat roosts were identified and these trees and all were down graded to risk level 2. Figure 11 details the tree numbers cross referenced with the submitted tree survey report where risk level was identified as 2.
- 5.5.6 Risk categories from Hundt (2012) and the requirement for mitigation for each tree category are shown on Table 6.
- 5.5.7 Simply Ecology (2012) and Simply Ecology (2017) report regular and consistent patterns of bat activity within the site. The surveys detected bats consistently using the site all through the night. Small numbers of common pipistrelle, usually 1 or 2 bats at most, were found making prolonged use of hedgerow, pond and tree-line features on the site. Based upon the direct observational evidence of the dawn surveys it was concluded that these bats were roosting outside the site and commuting into and away from the site each evening for foraging. In particular, dawn surveys revealed a pipistrelle roost was located to the North of the site and another to the West of the site. The common pipistrelle activity accounted for virtually all bats detected.
- 5.5.8 Apart from pipistrelles, some limited activity of following bat species was also present at the site; noctule, brown long-eared and unknown *Myotis* spp.
- 5.5.9 A survey on 2nd and 25th May 2022 by Envirotech confirmed use of the South side of the site by upto 5 Soprano Pipistrelle (*Pipistrellus pygmaeus*) and Common Pipistrelle (*Pipistrellus pipistrellus*) bats. Feeding was confined to the hedgerows. Two Common Pipistrelle were recorded foraging along Stoney Lane.
- 5.5.10 An additional survey is scheduled for late June and anabat detectors were deployed in late May. Full analysis of the survey data has not yet been undertaken.
- 5.5.11 Simply Ecology (2012) concluded that the site does not support a large or diverse population of bats for feeding or roosting, this was confirmed by Simply Ecology (2017). Nonetheless, each part of the site does have value of small numbers of these bats, and overall this collectively results in such a large site supporting several tens of bats at any

one time. Initial results from the surveys in May 2022 do not contradict this assessment although the level of survey is insufficient to fully confirm it.



- Boundary
- Bats
- Brandt's Bat
- Brown Long-eared Bat
- Common Pipistrelle
- Daubenton's Bat
- Noctule Bat
- Nyctalus/Eptesicus agg.
- Pipistrelle
- Pipistrelle Bat species
- Soprano Pipistrelle
- Unidentified Bat
- Whiskered Bat

Figure10
Bat Records





- Boundary
- Trees with Bats PRF's

Figure 11
Trees with
Level 2 PRF's



Tree category and description	Stage 1 Initial survey requirements	Stage 2 Further measures to inform proposed mitigation	Stage 3 Likely mitigation
Known or confirmed roost	Follow SNCO guidance and these guidelines wherever possible, to establish the extent to which bats use the site. This is particularly important for roosts of high risk species and/or roosts of district or higher importance and above		The tree can be felled only under EPS licence following the installation of equivalent habitats as a replacement.
Category 1* Trees with multiple, highly suitable features capable of supporting larger roosts	Tree identified on a map and on the ground. Further assessment to provide a best expert judgement on the likely use of the roost, numbers and species of bat, by analysis of droppings or other field evidence. <i>A consultant ecologist is required</i>	Avoid disturbance to trees, where possible. Further dusk and pre-dawn survey to establish more accurately the presence, species, numbers of bats present and the type of roost, and to inform the requirements for mitigation if felling is required.	Felling would be undertaken taking reasonable avoidance measures' such as 'soft felling' to minimise the risk of harm to individual bats.
Category 1 Trees with definite bat potential, supporting fewer suitable features that category 1* trees or with potential for use by single bats	Tree identified on a map and on the ground. Further assessed to provide a best expert judgement on the potential use of suitable cavities, based on the habitat preferences of bats. <i>A consultant ecologist required</i>	Avoid disturbance to trees, where possible. More detailed, off the ground visual assessment. Further dusk and pre-dawn survey to establish the presence of bats, and if present, the species and numbers of bats and type of roost, to inform the requirements for mitigation if felling is required.	Trees with confirmed roosts following further survey are upgraded to Category 1* and felled under licence as above. Trees with no confirmed roosts may be downgraded to Category 2 dependent on survey findings
Category 2 Trees with no obvious potential, although the tree is of a size and age that elevated surveys may result in cracks or crevices being found; or the tree supports some features which may have limited potential to support bats.	None. <i>A consultant ecologist is unlikely to be required</i>	Avoid disturbance to trees, where possible. No further surveys.	Trees may be felled taking reasonable avoidance measures. Stop works and seek advice in the event bats are found, in order to comply with relevant legislation.
Category 3 Trees with no potential to support bats	None. <i>A consultant ecologist is not required unless new evidence is found</i>	None.	No mitigation for bats required.

Table 6 Tree risk categories from Hundt (2012).

5.7 Birds

5.7.1 There are numerous records of birds within 2km of the site.

5.7.2 Pasture fields with hedgerow and tree lined boundaries were the most widespread habitat on the site. Areas of woodland and wetter habitats adjacent such as marshy grassland and ponds add diversity. Simply Ecology (2012) report

“over of the breeding bird surveys 47 species were identified using the site. Up to 35 of these species are confirmed or possible breeders. Among this number are two species of high conservation concern: the song thrush and house sparrow.

Mature trees form a notable habitat feature of the site and are found as a component of hedgerows (or as relics of defunct hedgerows). Several bird species were found to be confirmed or probably breeding in these areas; of which song thrush is of high conservation concern and willow warbler, dunnock, whitethroat and mistle thrush are of medium conservation concern. Mature trees are also important for roosting birds both during and outside the breeding season and as perching areas for foraging predators of which a number were seen at the site including kestrel, peregrine, sparrowhawk, buzzard and barn owl.

There are a number of ponds across the site and both mallard and moorhen have been observed using these.

Of the four species of high-conservation-concern observed at the site, two are confirmed breeders: the song thrush and house sparrow. One species, the starling, is utilising the site for foraging but unlikely to be breeding, and the herring gull was observed over-flying the site and is not likely to be using the site.”

Updated bird surveys were undertaken by Simply Ecology (2017) who report

“A total of 50x breeding bird species were recorded within or near to the site during the three breeding bird walkover surveys which took place during May, June and July 2019 (see Plan 9 to Plan 11 in APPENDIX 3 for the full depiction of birds at the site). This included 17 species previously not recorded (see Table 6) and 33 species identified in 2016 (see Table 7).

In terms of nature conservation importance, the more noteworthy 2019 species were the 2x species which breed on the site and which appear on the RSPB BoCC ‘Red List’ as declining conservation status. These were: Linnets and Mistle Thrush. There was however, a lack of suitable nesting habitat present at the site for the 2 other red listed species which were observed over-flying the site (Grey Wagtail and Herring Gull; Table 9). All species have been subject to rapid breeding declines nationwide hence their designations as red listed due to decline nationally. All of the red listed species were present in low numbers (see Table 8).

A further 4x new species recorded on site appear on the ‘Amber List’. These were: oystercatcher, reed bunting, stock dove and swift. Again, by and large there was relatively low abundance of individuals on site indicating the site’s low overall value

for these species. Notable peaks included seven individual oystercatchers and seven stock doves. Reed bunting were confirmed to be breeding on site through discovery of active nests. Swift was not considered likely to be breeding on site.

The vast majority of regularly occurring species that do not qualify under any of the red or amber criteria are green listed. The 'Green List' also includes those species listed as recovering from Historical Decline in the last review that have continued to recover or do not qualify under any of the other criteria. The site had good coverage of numerous green bird species indicating that existing habitats offer a range of niches for an assemblage of common species. A notable difference from the original surveys includes the introduction of cleared land to site due to the felled woodland to the east (see Plate 3). Lapwing were noted to be present here emphasising a possible increased suitability for ground nesting birds."

- 5.7.3 Four breeding bird surveys of the site had been completed in the 2022 season by mid-June but data has not yet been fully compiled. Initial results suggest a lower number of bird species are present on the site but until the surveys are fully analysed it is not possible to draw definitive conclusions.

5.8 Brown Hare

- 5.8.1 Brown hare are a UK BAP priority species. There is one record of brown hares within 2km of the site.
- 5.8.2 The site is suitable for brown hares but no indication of brown hares was recorded on the site. Simply Ecology (2012) and Simply Ecology (2017) also do not report Brown hare on site.

5.9 Otter

- 5.9.1 There are 45 records of otters within 2km of the site.
- 5.9.2 No indication of the presence or past use of the site by otter was found. The stream is considered unlikely to support fish.
- 5.9.3 Whilst the site may provide foraging and refuge opportunities, and the hedge and tree lines may provide a commuting/ dispersal route through the local landscape, this species is considered as being absent from the site and is unlikely to be significantly impacted by site development.
- 5.9.4 Simply Ecology (2012) and Simply Ecology (2017) also do not report otter on site.

5.10 Reptiles

- 5.10.1 There are four records for reptiles within 2km of the site.
- 5.10.2 The site was also assessed for its suitability for reptiles. In particular the potential for the presence of slow worm (*Anguis fragilis*) was considered. Other Lancashire species such as common lizard, adder and grass snake were scoped as being very low likelihood

of presence due to the site's isolated location, poor suitability of the pasture habitat and the lack of previous desk study records.

5.10.3 Inspection of the site confirmed that the site had poor suitability for reptiles. Note was made of the lack of varied vegetation structure (fields either uniformly grazed or dense rush habitat) and the exceedingly limited extent of any suitable habitat areas. In addition, the topography of the site was flat and this also meant that aspect was also poor for reptiles and connectivity to other suitable habitat was exceedingly poor.

No reptiles were found on site as reported by Simply Ecology (2012) and or via surveys in 2022.

5.11 Water vole

5.11.1 There are 25 records of water voles within 2km of the site.

5.11.2 The un-named watercourse which runs through the site was considered potentially suitable for water vole, with good cover of aquatic plants and reasonable depth of water through much of the year. Field vole (*Microtus agrestis*) burrows, feeding signs and latrines were present in abundance within 3m alongside the streambanks.

No signs of water voles, such as droppings, feeding piles or footprints were present as reported by Simply Ecology (2012) and via surveys in 2022.

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7. APPENDIX A HEDGEROWS

Feature		ARCHAEOLOGY AND HISTORY			FEATURES										HEDGE CLASSIFIED AS IMPORTANT	
Hedge		Archaeological feature which is included in the schedule of monuments	Situated wholly or partly within an archaeological site	Boundary of a pre-1600 AD estate	Integral part of a field system	Protected species records	Bank or wall	Gaps less than 10%	Standard trees	Ditch	Parallel hedge	Footpath/ Bridleway	Connection points	Woody species	Average ground flora species	
A	Yes	Yes	Yes	Yes	No*	No	No	Yes	No	No	No	No	1	0	0	No
B	Yes	Yes	Yes	Yes	No*	No	No	Yes	No	No	No	No	1	0	0	No
F	Yes	No	Yes	Yes	No*	No	No	Yes	No	No	No	No	2	2	0	No
G	Yes	Yes	Yes	Yes	No*	No	No	Yes	No	No	No	No	3	1	0	No
H	Yes	Yes	Yes	Yes	No*	No	No	Yes	No	No	No	No	3	2	0	No
H1	Yes	Yes	Yes	Yes	No*	No	No	Yes	No	No	No	No	4	2	0	No
K	Yes	Yes	Yes	Yes	No*	No	Yes	Yes	No	No	No	No	1	3	0	No
L	Yes	Yes	Yes	Yes	No*	No	No	Yes	No	No	No	No	2	1	1	No
M	Yes	Yes	Yes	Yes	No*	No	No	Yes	No	No	No	No	1	2	0	No
O	Yes	Yes	Yes	Yes	No*	No	Yes	Yes	No	No	No	No	1	1.6	0	No
P	Yes	Yes	Yes	Yes	No*	No	Yes	Yes	No	No	No	No	2	1	0	No
R	Yes	Yes	Yes	Yes	No*	No	Yes	Yes	Yes	Yes	Yes	Yes	2	4	2	Yes
Y	Yes	Yes	Yes	Yes	No*	No	No	No	No	No	No	No	2	3.6	0	No
ZA	Yes	Yes	Yes	Yes	No*	No	Yes	Yes	No	No	No	No	2	3	2	No
ZB	Yes	Yes	Yes	Yes	No*	No	Yes	Yes	No	No	No	No	1	4.5	3	No
ZC	Yes	Yes	Yes	Yes	No*	No	Yes	Yes	No	No	No	No	1	6	3	No
ZD	Yes	Yes	Yes	Yes	No*	No	Yes	Yes	No	No	No	No	3	3	2	No

ZE	Yes	Yes	Yes	Yes		No*	No*	No*	No*	No		No	Yes	Yes	Yes	No	No	2	5	1	No	
ZF	Yes	Yes	Yes	Yes		No*	No*	No*	No*	No		No	No	Yes	Yes	No	No	No	2	5	2	No
ZG	Yes	No	Yes	Yes		No*	No*	No*	No*	No		No	No	Yes	Yes	No	No	No	4	3	2	No
ZH	Yes	Yes	Yes	Yes		No*	No*	No*	No*	No		No	No	Yes	Yes	No	No	No	4	4	2	No
ZK	Yes	Yes	Yes	Yes		No*	No*	No*	No*	No		No	No	Yes	Yes	No	No	No	0	4	2	No
ZL	Yes	Yes	Yes	Yes		No*	No*	No*	No*	No		No	No	Yes	Yes	No	No	No	3	4.3	2	No
ZM	Yes	Yes	Yes	Yes		No*	No*	No*	No*	No		No	No	Yes	Yes	No	No	No	1	4.3	1	No
	No = Automatic failure					Yes = Automatic pass					7 woody species or 6 woody species + 3 features or 5 woody species + 4 features or highway + 4 woody species and 2 features											

* Historic and archaeological records have not been checked for this site.



-  Boundary
-  Hedge and Trees - Species-poor
-  Intact Hedge - Species-poor
-  Hedge and Trees - Species-poor
-  Hedge and Trees - Native Species-rich

Hedges and Lengths



envirotech

8. APPENDIX B GCN eDNA RESULTS

Folio No: E12735
 Report No: 1
 Purchase Order: 7444
 Client: ENVIROTECH
 Contact: Andrew Gardner

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (TRITURUS CRISTATUS)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 20/04/2022
Date Reported: 26/04/2022
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
1328	Curden 2	SD 562 245	Pass	Pass	Pass	Negative	0
1329	Curden 415	SD 559 244	Pass	Pass	Pass	Negative	0
1333	Curden 20	SD 547 246	Pass	Pass	Pass	Negative	0
2035	Curden 3	SD 562 245	Pass	Pass	Pass	Negative	0
2036	Curden 1	SD 562 245	Pass	Pass	Pass	Negative	0

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Chris Troth

Approved by: Esther Strafford



METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

If GCN DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If GCN DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

INTERPRETATION OF RESULTS

- SIC:** **Sample Integrity Check** [Pass/Fail]
When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.
- DC:** **Degradation Check** [Pass/Fail]
Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.
- IC:** **Inhibition Check** [Pass/Fail]
The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.
- Result:** **Presence of GCN eDNA** [Positive/Negative/Inconclusive]
Positive: GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.
Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence.
Negative: GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.



Folio No: E12999
 Report No: 1
 Purchase Order: 7444
 Client: ENVIROTECH
 Contact: Andrew Gardner

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (TRITURUS CRISTATUS)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 26/04/2022
Date Reported: 05/05/2022
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
1336	Werden P16	SD552 243	Pass	Pass	Pass	Negative	0
2894	Werden Pond 14/15	SD553 245	Pass	Pass	Pass	Negative	0
2895	Werden P17	SD553 243	Pass	Pass	Pass	Negative	0

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Chris Troth

Approved by: Esther Strafford



METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

If GCN DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If GCN DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

INTERPRETATION OF RESULTS

- SIC:** **Sample Integrity Check** [Pass/Fail]
When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.
- DC:** **Degradation Check** [Pass/Fail]
Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.
- IC:** **Inhibition Check** [Pass/Fail]
The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.
- Result:** **Presence of GCN eDNA** [Positive/Negative/Inconclusive]
Positive: GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.
Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence.
Negative: GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.





Cuerden Strategic Site Extended Phase 1 Ecology Surveys

Simply Ecology Limited

December 2012

For

**Lancashire County Council
PO Box 78
County Hall
Preston
PR1 8XJ**

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This report has been prepared by Simply Ecology Limited with all reasonable skill, care and diligence, within the terms of the Contract with the Client. The actions of the surveyor on site and during the production of the report were undertaken in accordance with the Code of Professional Conduct for the Institute of Ecology and Environmental Management. (www.ieem.org.uk).

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EXECUTIVE SUMMARY

- i. Simply Ecology Limited was commissioned by Lancashire County Council in the spring of 2012 to undertake an ecological assessment of land south of Bamber Bridge around the hamlet of Cuerden Green (Ordnance Survey grid reference SD555245). The surveys described were commissioned to inform future development plans by Lancashire County Council which requires an up-to-date ecological assessment.
- ii. The large 66.5ha site and its surroundings have no designations for nature conservation.
- iii. The habitats across the site were predominantly agricultural pasture fields used for cattle and horse grazing. These were enclosed by hawthorn dominated hedges, typically with scattered mature sycamore and pedunculate oak trees. The ecological value of the fields was low due to their limited plant species diversity which is the culmination of the long history of grazing management. The fields with lowest ecological value had been re-seeded with agricultural grass mixes. There was also a single woodland on the site and scattered ponds. The habitats of greatest ecological value were (in no particular order):
 - The mature hedgerows and scattered trees around the field boundaries. The hedgerows are BAP Priority habitats and several of them had sufficient woody plant diversity to be classed under the Hedgerow Regulations as Species Rich. Any works impacting upon these hedges would require consultation with the Local Planning Authority in advance of works taking place. Retention of the hedges or adequate mitigation to preserve and strengthen their management and landscape connectivity will be beneficial at the site.
 - The variety of ponds, which individually were not rich in plants or aquatic life, but viewed collectively their overall variety in sizes, permanence and density within the area conveys reasonable biodiversity value for this BAP priority habitat. Incorporating the ponds into the site development should be encouraged in order to provide continued wildlife and amenity benefits.
 - The marshy grasslands which were the best examples of semi-natural habitats within the site and contained the greatest botanical diversity. These areas had been least impacted by agricultural land management practices. Their retention and sympathetic management within the site would help to ensure no adverse impact upon biodiversity at the site as a result of any new development.
 - The small un-named watercourse which runs through the Northern part of the site from East to West was less than a metre wide in most places and 15-20cm deep. The botanical diversity along the banks was a representative but unremarkable example of watercourses in the area. Bat flight-line activity and field voles were associated with the stream. Retention of the watercourse and the avoidance of straightening or culverting is advised to ensure this feature is maintained. Sympathetic management could readily see the nature conservation value this habitat corridor enhanced.
 - The woodland is a mixed commercial plantation and is not a woodland of antiquity and the ground flora is not diverse. However, the mature turkey oak and pedunculate oak around the perimeter do provide valuable bat foraging habitat. If the current larch are felled, opportunities to considerably enhance the biodiversity value of the woodland exist could be realised through careful re-stocking.
- iv. The protected species present at the site were relatively few. Breeding bird surveys found no ground nesting species and all nesting territories were located in the mature hedgerows and trees or the private gardens. The birds present at the site were all relatively common and geographically widespread species, although due to declines in the wider countryside, the Song Thrush, House

Sparrow, Starling and Herring Gull were the most noteworthy due to their 'Red Listing' as Birds for Conservation Concern. Any future use of the site should readily be able to address the needs of these and other bird species to ensure that their habitat is maintained or enhanced.

- v. Full surveys for great crested newts, badgers, otter and water vole were completed but no signs of any of the animals were present on or near to the site.
- vi. A comprehensive series of bat surveys were carried out at the site and sightings of common pipistrelle, noctule, brown long-eared bat and an unidentified *Myotis* species were made. The use of site by bats can be characterised as habitual and regular by low numbers of bats. Bats remained active throughout the night on the site and flight activity was concentrated upon the hedgerows and mature tree-lines. Foci of activity were centred upon Stoney Lane and the ponds within the site. Activity over the Northern part of the site was relatively low apart from the use of Old School Lane as an important flight corridor to a roost/roosts beyond the Northern boundary of the site. No bat roosts were found within the site although no access to the private dwellings within the site was possible. However, from the surveys undertaken there was no indication of any roosting, but any re-development of the site which affected these buildings would require additional internal building surveys and night-time surveys in order to comply with the nationally accepted standards for adequate survey. Some of the old trees within the site possess features which appear potentially suitable for bat roosting. Although not currently being used as roosts, prior to any works affecting these trees, they would require re-surveying at a later date.
- vii. The presence of Himalayan balsam, an invasive alien plant throughout the central part of the site around Stoney Lane is noteworthy. To ensure legal compliance this species will require a management plan and use of specialist contractors to deliver correct treatment
- viii. It is recommended that the potential for adverse impacts upon all of the ecological features present at the site are fully taken into account during the master planning process for the site. Overall, given the relatively low ecological value of many habitat features and limited protected species interest at the site, there should be good opportunities for the retention or enhancement of biodiversity in any development of the site.

1.0 INTRODUCTION

1.1 Background Information

- 1.1.1 Simply Ecology Limited was commissioned by Lancashire County Council in the spring of 2012 to undertake an ecological assessment of land south of Bamber Bridge around the hamlet of Cuerden Green (Ordnance Survey grid reference SD55245) See Plan 1: The Site Location.
- 1.1.2 The surveys described in this report were commissioned to inform future development plans by Lancashire County Council which requires an up-to-date ecological assessment.

1.2 Aims

- 1.2.1 The aims of this ecological assessment were:
- To provide clear advice to the client, the Local Planning Authority and third parties at the discretion of the client, on the nature conservation value of the site and surrounding area.
 - To confirm the presence or absence of protected species, such as badgers, bats, great crested newts, otter, etc) within the proposed development site.
 - To enable the client to comply with legislation afforded to protected sites and species.
 - To highlight the presence of any habitats or species of ecological importance, including Habitats and Species of Principal Importance (NERC Act, 2006).
 - To identify any ecological constraints on future development.
 - To establish the need for any further surveys and assessments.
 - To make nature conservation recommendations.
- 1.2.2 To achieve this, an ecological appraisal of the habitats and any protected species on the site was undertaken over several visits during the Spring and Summer months of 2012. This submission describes the survey methods and presents the results of the ecological surveys at the site.

1.3 Site description

- 1.3.1 Cuerden Strategic Site – henceforth referred to as ‘the site’ – is located in Lancashire, 2.5km south of Bamber Bridge. It comprises the hamlet of Cuerden Green and land surrounding it, covering an area of 66.5 hectares. It is bounded to the west, north and east by roads and to the south by field margins: To the west is the A5083 Stanifield Lane, to the north the A582 Lostock Lane, A6 and M65 and to the east the A49 Wigan Road. An irregular line following field boundaries, to the south of which is Lydiate Lane Sand Quarry and the A49 forms the southern site boundary. The terrain is generally flat and the land slopes gently towards the north west, being 55m above sea level at it’s highest and 35m at it’s lowest.
- 1.3.2 Two roads cross the site. The first being Stoney Lane which is a metalled, single-track road entering the site from the A5083. This road is approximately 300m long and ends at Stoney Lane Farm from where it becomes a narrow track following an older road route. The second road is Old School Lane which enters the site from the north and heads south for 450m before meeting Stoney Lane at Cuerden Green. The hamlet consists of a small number of farms and houses along these two lanes.
- 1.3.3 Land use across the site is dominated by agriculture, particularly permanent pasture for horses and cattle. Of the 35 fields on the site just one is given over to arable crops. The field margins are a mixture of hedgerows, post-and-wire fencing, a drain network and lines of trees of varying age. The majority of these trees are to be found in the southern half of the site. Additionally there is one woodland plantation known as New Plantation situated towards the west of the site; this covers approximately 2.5ha.

- 1.3.4 Other notable features of the site are seventeen ponds, some of which are large fishing ponds, and others smaller and unmanaged.



Plate 1: An aerial view of the Cuerden Strategic Site (Image courtesy of Google Earth).

- 1.3.5 This report will be used to inform a long-term planning proposal to develop the site to increase local and regional economic growth. The surveys encompassed the entire site and immediately surrounding land which could sustain any habitats or species which could fall within the influence of the site.

2.0 STATUTORY AND PLANNING CONTEXT

- 2.0.1 The client is advised that many species of British wildlife are legally protected. The following section provides a brief overview of the protection afforded to species commonly encountered during development. The Recommendations at the end of this report will advise as necessary, but it is also useful for the client to have an understanding of the legal protection as this helps to ensure that the law is complied with.

2.1 Badgers

- 2.1.1 Badgers are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (WCA), and the Protection of Badgers Act 1992. It is illegal to:
- Kill, injure, take, possess or cruelly ill-treat a badger or to attempt to do so;
 - Interfere with a badger sett by damaging or destroying it;
 - Obstruct access to or any entrance of a badger sett;
 - Disturb a badger when it is occupying a sett

- 2.1.2 A badger sett is “any structure or place that displays signs indicating current use by a badger”. Natural England, the Government’s statutory nature conservation body, classifies a sett as active if it has been occupied within the last 12 months.
- 2.1.3 Operations that might cause disturbance of an active sett entrance can be carried out under licence from Natural England. If any badgers are found during the course of the survey, this will be highlighted in this report.

2.2 Birds

- 2.2.1 All wild birds are protected against killing or injury under The WCA 1981 (as amended). This protection extends to birds nests during the breeding season, which makes it an offence to damage or destroy nests or eggs. Birds that are listed on Schedule 1 of the Act receive additional protection against intentional or reckless disturbance during the breeding season. This makes it an offence to disturb these species at or near to their nesting site.

BTO / RSPB Birds of High Conservation Concern: Red List species

- 2.2.2 Although it has no legal status the BTO/RSPB ‘Red List’ of bird species are those that are globally threatened according to the IUCN (World Conservation Union) criteria; those whose population or range has declined rapidly in recent years; and those that have declined historically and not shown a substantial recent recovery, i.e.:

- Globally threatened according to the IUCN;
- Historical population decline in UK during 1800-1995;
- Rapid (>50%) decline in UK breeding population over last 25 years; and
- Rapid (>50%) contraction of UK breeding range over last 25 years.

- 2.2.3 The ‘Red List’ is useful when interpreting the nature conservation value of a site based upon the bird species present.

BTO / RSPB Birds of Medium Conservation Concern: Amber List species

- 2.2.4 Although it has no legal status the BTO/RSPB ‘Amber List’ of bird species are those with an unfavourable conservation status in Europe; those whose population or range has declined moderately in recent years; those whose population has declined historically but made a substantial recent recovery; rare breeders; and those with internationally important or localised populations, i.e.:

- Historical population decline during 1800-1995, but recovering: population size has more than doubled over last 25 years;
- Moderate (25-49%) decline in UK breeding population over last 25 years;
- Moderate (25-49%) contraction of UK breeding range over last 25 years;
- >50% of UK breeding population in 10 or fewer sites;
- >20% of European breeding population in UK; and
- Species with unfavourable conservation status in Europe.

- 2.2.5 An updated list of ‘Red’ and ‘Amber List’ species was published in May 2009 (Eaton *et al.*, 2009). The ‘Amber List’ is useful when interpreting the nature conservation value of a site based upon the bird species present.

2.3 Protected Mammals and Protected Reptiles (includes water vole, red squirrel, slow worm, common lizard and others)

- 2.3.1 A variety of British mammals and reptiles also receive protection under The WCA 1981 (as amended). Schedule 5 of The WCA lists animals that are protected. The degree of protection varies. Water voles and red squirrel are examples of species with full protection. The Act makes it an offence to intentionally or recklessly kill, injure or take any wild animal listed on Schedule 5 or to possess or trade in any such animal. The Act also prohibits interference with places used for shelter or protection, or intentionally disturbing animals occupying such places.

- 2.3.2 All British reptiles are protected. The commoner species such as common lizard and slow worm are protected only from unlawful killing. In practice this requires a reptile protection scheme before implementing a planning permission. No specific licence is required. The rarer reptiles, including smooth snake and sand lizard are fully protected and any works affecting them can only be carried out if a Natural England licence has been issued.
- 2.3.3 If any protected species are found during the course of the survey, this will be highlighted in this report.

2.4 European Protected Species (includes, bats, great crested newts, otter and others).

- 2.4.1 The client is advised that all bats, great crested newts and otter are European Protected Species (EPS). These EPS receive the full protection of the Wildlife and Countryside Act 1981 (as amended) (Section 9, Schedule 5). In addition, these EPS are also protected under European legislation that is implemented in England via The Conservation Of Habitats And Species Regulations 2010 (Regulation 41). A full list of EPS is provided in Schedule 2 of the Regulations.
- 2.4.2 If both national and international legislation are taken together, the legislative protection afforded to the species makes it an offence to:
- Intentionally/deliberately kill, disturb, injure or capture them.
 - Intentionally or recklessly damage, destroy or obstruct access to any breeding site or resting place.
 - Possess or control any live or dead specimen or anything derived from a European Protected Species.
- 2.4.3 If an activity is likely to result in any of the above offences, derogation from the legal protection can be issued in the form of a European Protected Species licence issued by Natural England. Licences for development purposes are issued under The Conservation of Habitats And Species Regulations (2010) and only allow what is permitted within the terms and conditions of the licence. If any EPS are found during the course of the survey, this will be highlighted in this report.

2.5 Planning Considerations

- 2.5.1 When considering each planning application, the presence of protected species, such as those listed above, is a material consideration which must be fully considered by the Local Authority when granting planning permission. If a licence from Natural England is required, then prior to issuing any planning consent, the local planning authority will need to be satisfied that there is no reason why such a licence would not be issued. Therefore, in reaching the planning decision the local planning authority will need to have regard to the requirements of the Conservation of habitats and Species Regulations 2010. The three licensing tests given in the Regulations must be considered. In summary, these are that:
1. The development is required for the purpose of:
 - preserving public health or public safety,
 - for other imperative reasons of over-riding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment.
 - for preventing serious damage to property.
 2. There is no satisfactory alternative.
 3. The proposal will not be detrimental to the maintenance of the population of the species at a favourable conservation status.
- 2.5.2 All necessary information would need to be provided to the planning authority as part of the planning application in order to address the above tests.

2.5.3 The Natural Environment and Communities Act (NERC Act) 2006 extended the biodiversity duty set out in the Countryside and Rights of Way (CROW) Act to public bodies and statutory undertakers to ensure due regard to the conservation of biodiversity. The Duty is set out in Section 40 of the Act, and states that:

"Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity"

2.5.4 The Duty applies to all local authorities, community, parish and town councils, police, fire and health authorities and utility companies. Section 41 (S41) of this Act (the 'England Biodiversity List') also requires the Secretary of State to publish a list of habitats and species that are of principal importance for the conservation of biodiversity in England. This list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40(1) of the Act.

2.5.5 Also, Local Authorities must follow the National Planning Policy Framework (NPPF) which provides guidance on the interpretation of the law in relation to wildlife issues and development. For each development proposal considered by the Local Planning Authority the NPPF states that the authority must aim to conserve and enhance biodiversity. If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.

UK Biodiversity Action Plan (UK BAP)

2.5.6 The UK BAP, which was first published in 1994, was the UK government response to the 1992 Convention on Biological Diversity. It sets priorities for nationally important 'priority species' and 'priority habitats'. Each species and habitat action plan has costed actions and targets, and is used to inform the compilation of national lists such as the Section 41 List described above.

3.0 SURVEY METHODOLOGIES

3.1 Desk Study

3.1.1 For the desk study the application site and land within 1km was selected to search for any existing biological information. Consultation with the freely available datasets listed in Table 1 was undertaken to identify records of animals or plants within this search area, in particular all protected species any red list species, and locally rare or scarce species. In addition data was also obtained from the Lancashire Environment Record Network, who maintain the most comprehensive and up-to-date commercially available biological records for the county.

3.1.2 In order to identify the presence of nationally or internationally important sites receiving statutory protection, an online search of the Multi Agency Geographical Information Centre (www.magic.gov.uk) and Natural England's Nature on the Map (www.natureonthemap.org.uk) was undertaken. This included sites designated under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2010. This covers Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA) and Special Areas of Conservation (SAC) all of which have legal protection. Data on regionally important geological sites was obtained from Lancashire County Council.

Table 1: Summary of Desk Study datasets searched.

INFORMATION PROVIDER	INFORMATION SUPPLIED
Natural England Nature on the Map and Multi Agency Geographical Information Centre www.magic.gov.uk	To identify protected sites within 1km of the site: Encompassing: Sites of Special Scientific Interest, Special

	Protection Areas, Special Areas of Conservation, National Nature Reserves, Local Nature Reserves and BAP Priority Habitats within 1km of the site.
UK Biodiversity Action Plan	Listing of national priority species and habitats against which site specific findings are cross-referenced.
Local Biodiversity Action Plan http://www.lancspartners.org/lbap/biodiversity_action_plans.asp	Listing of Local priority species and habitats against which site specific findings are cross-referenced.
The Preston Society http://www.prestonsociety.co.uk/p/birds-of-preston.html	Bird records from the Preston area
NBN Gateway www.nbn.org.uk	Identification of protected species known to occur within 1km of the survey area.
Lancashire County Council (Local Environmental Records Centre)	Identification of protected sites and species known to occur within 1km of the survey area.
Lancashire Regionally Important Geological Sites www.lancashirerigs.org.uk	Information on Regionally Important Geodiversity Heritage Sites.
The Centre for Hydrology and Ecology https://gateway.ceh.ac.uk/home	A broad range of datasets

- 3.1.3 The aim of the desktop study was to collate all known background information about the site in order to assist the surveyors to understand to likely ecological value of the site when planning and undertaking field surveys.

3.2 Habitats: Extended Phase 1 Survey

- 3.2.1 The Phase 1 survey was undertaken by Jason Reynolds MSc MIEEM during the course of several visits during 2012. The survey followed the Phase 1 habitat survey methodology (JNCC, 2010) which is a standard technique for recording and mapping habitats. Additionally, full species lists were recorded within semi-natural habitats and Habitats of Principal Importance. Plant species abundances were recorded using the DAFOR rating notation, where D = Dominant, A = Abundant, F = Frequent, O = Occasional and R = Rare. During the Phase 1 survey the presence or potential for presence of protected species was recorded and assessed.
- 3.2.2 The survey involved walking the whole site, mapping and describing different habitats (for example: woodland, grassland, scrub). Evidence of fauna and faunal habitat is also recorded (for example droppings, tracks, or habitat such as ponds for breeding amphibians). The methods used for ecological survey are in accordance with those established and generally accepted methodologies for field survey, as published by the professional body, The Institute of Ecology and Environmental Management (IEEM).

3.3 Invasive Alien Plants: Field Survey

- 3.3.1 During the Phase 1 habitat survey, observations of invasive alien plants listed under Schedule 9 of The Wildlife and Countryside Act 1981 (as amended) were made. The search included species such as Giant Hogweed (*Heracleum mantegazzianum*), Australian Swamp Stonecrop (*Crassula helmsii*), Japanese knotweed (*Fallopia japonica*) and Himalayan balsam (*Impatiens glandulifera*).

3.4 Bats: Tree Inspection

3.4.1 As part of the bat survey an early season visual survey of all trees was carried out before they came fully in to leaf. Trees were categorised into high, medium or low potential for bats. The following signs which can be indicators of bat presence were used for the categorisation:

- Woodpecker holes with small cracks/crevices
- Cracks/crevices, ivy cover and flaking bark
- Loose or flaking bark deadwood in canopy or stem low/no ivy cover
- Medium to dense ivy cover
- Deadwood in canopy or stem
- Snagged branches
- Hollow stems or limbs
- Hole in buttresses/hollow core

3.4.2 The following signs were searched for in all of the above places as these would indicate bat presence:

- Staining around a hole, caused by natural oils in the bats' fur.
- Stains beneath a hole, caused by bat urine.
- Scratch marks around a hole, caused by bat claws.
- Bat droppings beneath a hole.
- Insects (especially flies) around a hole.

3.4.3 Once surveyed, each tree was categorised, using Bat Conservation Trust guidelines, according to its potential to support roosting bats into one of four categories: 1. Confirmed bat roost, 2a. High potential to support bats, 2b. Low/moderate potential to support bats, and 3. Negligible potential to support bats.

3.5 Bats: Emergence and Activity Survey

3.5.1 Surveys were undertaken in accordance with the standard methods described in the 'Bat Worker's Manual' (JNCC 2004) and 'Bat Surveys – Good Practice Guidelines' (Bat Conservation Trust 2012). All surveys were led by Jason Reynolds MSc MIEEM, a bat surveyor with over 10 years of experience and an MSc from Aberdeen University in the foraging behaviour of Pipistrelle bats. Additional field workers were Colin Barnes, Jack Sykes, Kate Statham and Andrew Gardner, all of whom are bat survey licence holders or have a minimum of three years of relevant bat survey experience. Andrew and Jack hold Natural England All Species and All Counties bat Licenses. In accordance with best practice, the survey comprised the following elements:

- Emergence Survey: Night-time visits were undertaken to determine if bats were emerging from any trees roosts and to assess levels of bat activity. Activity during the hours immediately prior to sunset through to one hour after sunset was detected using Wildlife Acoustics EM3 time expansion bat detectors and also using Bat Box Duets frequency division detectors with simultaneous recording of frequency division audio.
- Activity Survey: Night-time visits were undertaken to determine general levels of bat activity. Activity was detected along a walked transect which criss-crossed the site making sure all habitats were recorded.
- During the activity survey the observers walked across all parts of the site and stopped every 100m to record the number of bat passes within a 5 minute period. This would give

the best record of bat activity at the site and the observer would be expected to hear and also see any bats flying across the site.

- During all surveys the observers stood at locations, which were judged to provide the best coverage of the site and any potential trees roosts (See Map 1). From these locations, observers would be expected to hear and also see any bats emerging/returning to roosts.
- Bat recordings were analysed using Bat Sound computer software to detect any species (such as *Plecotus* and *Myotis*) which may not have been apparent from heterodyning alone. Analysis of recordings involved measurement of various parameters to determine the species of bat (call frequency, shape of call, call duration, maximum energy and inter pulse interval). These parameters were compared against reference calls and tabulated reference data to enable species identification.
- In addition an Anabat bat detector was left at two different locations around the site in order to collect remote recordings of bat activity throughout the night over a period of several days. The Anabat was set to operate each night for 9 nights in the plantation woodland from ½ hour before sunset to ½ after dawn. This data was collected between 22/8/12 and 30/8/12 and was used to provide additional contextual information about bat activity in order to compliment the emergence and dawn surveys.

3.6 Great crested newts: Field Survey

3.6.1 Surveys were undertaken in accordance with the standard methods described in the 'Great Crested Newt Mitigation Guidelines' (English Nature 2001). Natural England great crested newt survey license holders, Jason Reynolds, Richard Lowe and Liz Greenwood led the surveys, each working with a field assistant. In accordance with best practice, the surveys comprised the following elements:

- A daylight walkover was undertaken to establish the location of all waterbodies within the survey area.
- Four subsequent evening survey visits were carried out to identify the presence/absence of great crested newts on site. The following survey techniques were implemented in each waterbody where possible 1) Torchlight surveys 2) Bottle trapping 3) Egg-searches.

Habitat Suitability Index

3.6.2 Part of the survey involved assessing the value of the ponds using a technique known as the Habitat Suitability Index (HSI). The HSI was developed as a tool to aid fieldworkers to give ponds and their surrounding habitat a numerical score in terms of their suitability for great crested newts. HSI involves taking measurements and estimates of ten parameters for each pond visited. These parameters include factors such as water quality, shading, presence of fish, amount of vegetation, all of which are known to have a role in affecting habitat suitability for newts. A mathematical formula is then applied to all 10 scores to give a final suitability score of between 0 and 1. The higher the score, the greater the pond suitability for great crested newts. The technique used was in accordance with the nationally adopted guidelines for this method, after Oldham *et al* (2000), and subsequently modified by Brady.

Torchlight Survey

3.6.3 Waterbodies were surveyed by walking the perimeter of the waterbodies after dusk and searching the water with a powerful torch (Cluson Clulite CB2, 50W Xenon spot bulb). All newts observed were recorded according to species, sex and life stage where possible.

Bottle Trap Survey

- 3.6.4 Plastic bottle traps (standard 2L pop bottle design) were set at an average spacing of 2m along accessible pond perimeters. Traps were set using the surveyor's preferred technique of securing the bottle with an air pocket above the waterline rather than the fully submerged option.
- 3.6.5 In accordance with best practice, traps were set in the evening, left overnight and emptied early the following morning. Where it was not possible to trap an entire shoreline, sample sections were trapped (with bottles at 2 m spacing) in locations deemed most likely to yield newts e.g. amongst egg-laying vegetation for females and in open water for displaying males.

Egg Search

- 3.6.6 During the course of walking the pond perimeter to collect in the bottle traps during daylight, any accessible aquatic vegetation was searched for newt eggs.

3.7 Breeding Birds: Field Survey

- 3.7.1 The Common Bird Census (CBC) methodology was employed to monitor the populations of common breeding birds on site (Bibby *et al.*, 2000; Gilbert *et al.*, 1998; Marchant, 1983). This involves the production of bird species maps that can be used to indicate the density and distribution of territorial breeding birds. It is based on a British Trust for Ornithology (BTO) survey method known as 'territory mapping', which identifies the number and distribution of breeding territories (for individual bird species) in a specified census area. That is, adult males singing (proclaiming a territory), adult males fighting (defending a territory), adult birds carrying food or nesting material, juveniles calling for food or being fed, or adult birds displaying alarm calls. Additional activities of territorial significance, such as displaying and mating were noted, when appropriate.
- 3.7.2 Observations of bird species (by sight or sound) were noted on the survey map using BTO standard species and activity recording codes. This information was then transferred to a summary map to highlight the breeding bird species that are of conservation significance.
- 3.7.3 Observations of any other birds made during the course of other surveys which had not been previously detected were also incorporated into the tables.

3.8 Water vole: Field Survey

- 3.8.1 A 500m stretch of both banks of the un-named stream and all other un-named small watercourses which flow through the site were walked by the surveyor on 07/06/2012. 250m sections both upstream and downstream of the site were searched. The banks of the ditches and watercourses were assessed for their potential to support water vole. The survey methods were implemented in accordance with those described in the Water Vole Conservation Handbook, (Strachan and Moorhouse, 2006).
- 3.8.2 A detailed examination of the watercourses was carried out to search for evidence of water vole such as;
- Feeding signs, including feeding stations;
 - Latrines and individual droppings;
 - Burrows, nests and feeding lawns (areas of shortly-grazed grassland at the entrance to a burrow);
 - Footprints and obvious runways in vegetation; and
 - Distinctive 'plop' sound of water voles entering the water.
- 3.8.3 The survey was undertaken on 14/10/2012 which is at the end of the optimal period (between April and early-October) for identifying breeding territories (Strachan & Moorhouse 2006). In addition, the survey was carried out during dry weather and the water levels were suitably low allowing

good visibility of the banks. Surveys were conducted from both banks to maximise views of the banks.

- 3.8.4 Any evidence of water vole was to be recorded on a map and accompanied by photographs. Fig 1 presents a map of the survey area.

3.9 Badger

Habitat Suitability

- 3.9.1 The site and the 50m surrounding the site perimeter was searched in its entirety to identify any potential habitat suitable for foraging and commuting badgers.
- 3.9.2 Badgers require suitable ground conditions for sett creation (e.g. soil that is free draining and can easily be excavated). Continuous well connected linear vegetation, such as tree lines and hedgerows, provide good foraging, sheltering and commuting habitats for badgers and native berry producing trees and shrub species offer a seasonal food resource for badgers.

Sett Survey

- 3.9.3 A badger sett is any structure or place which displays signs indicating current use by badger/located within an active badger territory. Setts comprise a series of underground tunnels and chambers which form the home of a badger social group (clan). Although normally recorded in sloped, sandy soil in woodland habitats, it should be noted that badgers will excavate setts in a wide range of environs including urban settings.
- 3.9.4 Setts can be located anywhere within the territory of the clan and more than one sett can often be in use. Within one territory badgers may maintain a main sett with several annexe or outlier setts within the territory. Setts are identified by a number of characteristic features. These features include:
- A network of broad, concave entrances;
 - Well-worn paths between entrances and foraging areas;
 - Piles of excavated soil beside entrances (spoil heaps); and
 - Piles of bedding materials beside entrances.
 - Footprints and hair found around a sett can often confirm the presence of badgers and provide evidence of recent use.
 - Fresh soil on spoil heaps can indicate recent use.

Field Signs

- 3.9.5 Badger field signs not only provide evidence of the species, but also give an indication of badger movements and how they utilise their territory. The following field signs were searched for:
- Badger guard hair;
 - Footprints;
 - Snuffling (badgers use their snout to turn over vegetation or soft soil to forage for bulbs and invertebrates);
 - Scratching posts (marks on tree trunks/ fallen trees where badgers have left claw marks);
 - Breach points (gaps in fences or crossing points over roads);
 - Dung pit (single faeces deposit placed in a small excavation); and
 - Latrines (collection of faecal deposits often used by badger clans to mark home range boundaries).

3.10 Reptiles (common lizard and slow worm)

3.10.1 The habitat within the working area and up to 10m either side of the site was assessed in terms of its suitability for reptiles. Based upon the broad distribution of Britain's 6 native reptiles and the habitats encountered at the site the suitability of the site for the following three species was assessed: adder (*Vipera berus*), slow worm (*Anguis fragilis*) and common lizard (*Zootoca vivipera*). The assessment was conducted in accordance with standard reptile survey methods detailed in the National Amphibian and Reptile Survey (NARRS). The key elements which were assessed in undertaking the habitat assessment were as follows:

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

3.11 Otter

3.11.1 Otter surveys were undertaken to record all field signs along the stream within the site to determine activity levels and patterns of behaviour over a predetermined area of suitable habitat. This methodology complies with the survey requirements as set out in the Design Manual for Roads and Bridges (DMRB).

3.11.2 Otter surveying records locations of otter activity i.e. footprints, spraints (otter droppings), feeding remains, footprints, slides (where otters pass back and forth to the waters edge), lying-up areas and holts to determine otter usage of particular stretches of a river and its tributaries. The otter survey was undertaken along the entire length of the un-named stream within the site and consisted of survey of both banks (where accessible).

3.11.3 There are a number of different resting places used by otters. Below is a brief description of the terminology used in this report.

Holts

3.11.4 Otter holts are places/structures used by otters for shelter on a 'permanent' basis. Holts are covered structures, usually a hole or burrow along the river bank amongst riparian vegetation and the roost system of river side trees, or behind boulders set in to the bank. Usually a holt will also have other associated otter field signs such as footprints or an accumulation of spraint. Holts may also be connected to lying-up areas and have more than one entrance as with badger setts.

Lying-up areas/couches

3.11.5 Lying-up areas or couches are 'temporary' areas used by otters for resting, grooming or feeding whilst on the move. Lying-up areas usually do not form a full covered structure, rather they are partially hidden bankside shelves amongst riparian vegetation, or 'nest-like' structures amongst

reeds and grasses. As with holts, lying up areas usually have other field signs to demonstrate use by otters.

Natal Dens

3.11.6 Natal dens are holts which are used by otters to give birth and rear their young natal dens usually have inconspicuous entrances and have little or no evidence of otter activity around the entrance. Natal dens can be located some distance from the watercourse, sometimes being set back in woodland amongst log piles, tree roots, rubble or even amongst reed beds. The banks of the ditches and watercourses within the site and a 500m radius of the site were assessed for their potential to support otter in line with methods given in Chanin (2003). Any field signs of otter activity, including footprints, spraints, lying-up sites and holts were noted. All fieldwork is carried out in accordance with current best practice guidelines with reference to Chanin (2003) and The Highways Agency (2001).

3.12 Pond Survey

3.12.1 Pond surveys were carried out in accordance with the Lancashire Pond Survey Methodology. This involved full sampling and recording of numerous key parameters from each pond within the site (See Appendix 5). Some of the surveys within the Pond Survey Methodology were replicated elsewhere in the overall suite of surveys at the site. Full reproduction of the results in strict accordance with the Pond Survey methodology would have resulted in considerable repetition within the report. For ease of presentation the results are therefore found in several areas of the report, such as the amphibian survey, aquatic invertebrate survey and pond descriptions within the Phase 1 results.

3.13 Personnel

3.13.1 The overall package of surveys was organised by Jason Reynolds MSc MIEEM, who conducted his MSc thesis at the University of Aberdeen on the foraging preferences of the *Pipistrelle* and who worked as an advisor during 1997-8 on the negotiations with the BCT over the NMBP. Jason has been undertaking bat surveys since 1995 and is a member of the Furness and Westmorland Bat Group and the North Lancashire Bat Group. Jason runs Simply Ecology Limited and is an experienced botanist with a broad range of ecological and conservation knowledge gained over 15 years working as a Conservation Officer for both statutory and charitable conservation bodies, including English Nature, Cumbria Wildlife Trust and the Environment Agency. Jason holds protected species survey licences for white-clawed crayfish and great crested newt.

3.13.2 Bat surveys were conducted by Andrew Gardner MSc MIEEM. Andrew studied at Newton Rigg College, Penrith for a Higher National Diploma in Environmental Land Management before continuing his studies at the University of Hertfordshire where he obtained a Degree in Environmental Studies (conservation and Recreational Management). He then gained a Postgraduate Masters Degree in Rural Estate Management at the Royal Agricultural College, Cirencester. He has worked as a Rural Development consultant for the European Union and United Nations. Andrew has been an ecological consultant since 2004 when he started his own business Envirotech Ltd and holds a number of Bat Protected Species survey and development licences.

3.13.3 Bat surveys were also undertaken by Jack Sykes BSc (hons) MIEEM. Jack studied Environmental Management and Forestry at the University of Cumbria's Newton Rigg campus before entering the field of ecology consultancy. Jack holds a Natural England bat license and is a full member of the Institute of Ecology and Environmental Management. As an active member of the local bat group and a National Trust volunteer, Jack likes to spend the majority of his time out in the field. His experience has allowed him to get involved with projects which have included rare British species such as Lesser Horseshoe bats and Natterjack toads.

3.13.4 Bat surveys were undertaken by Kate Statham BSc (hons). Kate has a specialism in reptiles and newts and has a Bachelor of Science Degree in Zoology from Swansea University. Before joining

Envirotech Kate worked for British Waterways and in addition to being a full time member of staff Kate is currently studying part-time for a post graduate Masters in Conservation Management at Edge Hill University. Kate holds a Natural England Great Crested Newt Licence and is currently working towards her Natural England Bat Licence.

- 3.13.5 Great crested newt surveys field assistance was provided by Colin Barnes. Colin gained a FDS in Ecology & Conservation Management at the University of Central Lancashire in 2009. Colin has a range of ecological experience, principally gained over the last 4 years. He worked as an Assistant Reserve Manager Gait Barrows NNR, Natural England 2009-2010 and has been a regular sub-contractor for Simply Ecology since 2010 where he assists with Phase 1 surveys, bat surveys and great crested newt surveys. Colin has a personal interest in invertebrates and is currently involved in honing his microscopy and key identification skills.
- 3.13.6 Chris Swindells BSc (hons) carried out the breeding bird surveys. Chris has been a keen amateur naturalist for many years and specialises in birds and rare plants. He has worked as an ecological consultant since 1999. The majority of this time has been as a sub-contractor to ERAP but since 2011 he has worked with other consultancies including Simply Ecology. Vegetation surveys and mapping to NVC level are amongst Chris' skills, which also include protected species surveys, such as bats, amphibians, butterflies, badgers and crayfish. Chris pursues his enthusiasm for ornithology whenever possible and ornithology trips abroad have included Portugal, Spain, France, Greece and New Zealand. Closer to home, Chris records rare bryophytes and ferns within Lancashire, with a special interest in the Killarney Fern.
- 3.13.7 Great crested newt surveys were undertaken by Richard Lowe BSc (hons). PGCE. Richard studied Environmental Management at The University of Central Lancashire and graduated in 1996. He has worked as an ecologist since that time in a variety of consultant roles, including as a Senior Ecologist at ERAP and latterly as a freelance contractor. Richard holds a great crested newt science and education licence. He has a broad range of experience of ecological survey and reporting knowledge, covering habitat mapping, protected species surveys and Environmental Impact Assessments. Richard is also an enthusiastic environmental educator, and regularly takes out school groups in Lancashire for the RSPB in his role as a Field Teacher.
- 3.13.8 Pond surveys were undertaken by Jeff Robinson BSc (hons) Jeff graduated from Sunderland Polytechnic in 1990 with a BSc (hons) in Applied Ecology and Medical Microbiology. He has worked as a self employed invertebrate biologist for past 22 years, carrying out species level identification.
- 3.13.9 Jeff joined the NRA in 1999, originally to carry out Pond Surveys and then carrying out macro invert surveys in response to Consents to discharge. Jeff became self employed in 1993 and his first project was invertebrate survey for David Bellamy Associates on the Cardiff Bay Barrage. He has worked on a number of high profile projects including: Abingdon Reservoir for Thames Water, M6 Toll road for Cresswell Associates/Hyder Consulting and the Stonehenge Bypass EIA for Nicholas Pearsons Associates. His expertise includes surveys of winterbourne rivers in Southern England. And he contributed to JNCC's A review of the scarce and threatened Coleoptera of Great Britain. Jeff's private interests at the present involve water beetle surveys around Northumberland and he has a passion for the invertebrates of ephemeral habitats. Jeff regularly contributes to various invertebrate recording schemes.

4.0 SURVEY TIMING AND CONSTRAINTS

- 4.0.1 The Phase 1 habitats and invasive plant surveys were undertaken during the course of numerous visits during the summer months, with habitats being recorded between May and July 2012. The main dates for survey were 13/04/12, 08/06/12 and 29/06/12. These visits were undertaken at the ideal time to record habitats as many plants are in flower and ecological value/quality of a site determined according to the species encountered. Similarly, the extended timing allowed for

appropriate timing of surveys and no problems for the protected species assessment were encountered.

4.1 Bats: Emergence/Activity/Dawn Survey Timing and Constraints

4.1.1 The emergence/activity survey visits were carried out across the site on 11 occasions between 30th June and 27th August 2012. This was during the summer when bats are active and are expected to be found foraging every evening given favourable weather conditions. This was an ideal time to survey for all bats and the weather was good on each of the survey evenings. Conditions encountered are shown in Table 2.

Table 2: Weather during the bat surveys

Survey Date	Temperature	Sunset/Sunrise	Weather
21 st May 2012 (Transects)	12°C	21:15	Dry. Light breeze from the SW. 60% cloud.
30 th June 2012 (Transects)	15°C	21:45	Dry after rain. Fair breeze from S. 90% cloud cover.
4 th July 2012	16°C	21:47	Dry after earlier rain. Light southerly breeze. 100% cloud cover.
21 st July 2012	7°C	04:45	Dry, still air with 0% cloud cover.
23 rd July 2012	15°C	04:43	Dry, fair breeze with 80% cloud cover.
27 th July 2012	11°C	04:43	Dry, still air with 10% cloud cover.
2 nd August 2012	10°C	05:23	Dry, still air with 50% cloud cover.
6 th August 2012	14 °C	20:57	Dry, still air with 100% cloud cover.
15 th August 2012	17°C	05:50	Dry, light breeze with 0% cloud cover.
16 th August 2012	14°C	05:50	Dry after heavy rain the day before. Brisk SE breeze with 20% cloud cover.
21 st August 2012	17°C	05:10	Dry, still air with 100% cloud cover.
27 th August 2012	13 °C	06:10	Dry, slight SW breeze with 80% cloud cover.

4.1.2 The emergence and activity surveys were conducted from approximately 30 minutes prior to sunset through to at least one hour after sunset. Due to the varied nature of the habitats on the site, surveyors had to vary their position relative to the darkening sky in order to increase their chances of observing, as well as detecting the bats.

4.1.3 The dawn surveys were carried out from approximately 1 hour before dawn through to 15 minutes after last bat detection. In the pre-dawn light, surveyors holding detectors could identify bats, and as the light increased, bats could also be seen against the sky and observed returning to roosts. There were no constraints to carrying out a comprehensive survey. Excellent opportunities for silhouette observation and detection of any bats flying were possible. It was not considered that

there were any constraints that would have affected the detection of bat emerging or returning to roosts.

- 4.1.4 The only constraint encountered related to the lack of access to carry out any building inspections to search for roosting bats. However, given that building inspections and specific building emergence surveys will only be required if any of the buildings are directly affected by the proposed development, this is not a constraint if the proposals solely affect the non-residential areas of the site.

4.2 Great crested newts: Survey Timing and Constraints

- 4.2.1 All newt surveys were carried out between 19th April and 24th May 2012. Natural England's guidelines for presence/absence surveys recommend that at least two surveys are carried out between mid-April and mid-May in each of the ponds surveyed (English Nature, 2001).
- 4.2.2 The weather conditions were checked before commencing each survey. No surveys were undertaken when evening temperature was predicted to be below 5°C or when heavy rainfall or strong wind was predicted. This is because these weather conditions would significantly reduce the activity of newts or ability of the surveyor to see newts through the water's surface during torchlight searches.
- 4.2.3 As the season progressed and nights became warmer, traps were set later in the evening in order to ensure the welfare of newts was not compromised as a result of high ambient temperatures causing low oxygen conditions in the bottles, which could compromise newt welfare. Also, torchlight surveys commenced later as the survey period progressed as this maximises chances of observing newts during the night-time activity period.
- 4.2.4 Surveys were carried out at the most suitable time of year and using the appropriate variety of newt survey techniques. The perimeters of all ponds, bar Ponds 8, 10 and 15, were readily accessible for bottle trapping, torching and egg searching. Only two of the usual standard survey techniques (torch and egg search) could be used at Pond 8 due to the shallow nature of the mud around the edges of the pond. Therefore the third acceptable survey technique used at this pond was netting.
- 4.2.5 Due to the steep sides of Pond 10 only 60% of the perimeter could be safely bottle trapped (also see 4.2.6 below) and only 50% of the perimeter of Pond 15 could be bottle trapped. The presence of a chicken run and discarded materials adjacent to Pond 15 meant that although bottle trapping was compromised, we were able to carry out terrestrial searches under the nearby discarded materials. This adequately compensated for the bottle trapping constraint, and given the presence of fish in the pond, it is considered that reliable results were obtained.
- 4.2.6 Also, at Pond 10 for the final two surveys it was not possible to bottle trap and the main two survey techniques were torch survey and egg search. At this pond bottle trapping was suspended when a water shrew was captured on 24/04/12. Prior survey around the pond had not found any evidence of water shrew burrows or activity to suspect their presence. To offset the lack of bottle trapping, standardized netting survey was carried out as the third acceptable survey technique. Finally, 80% of the perimeter of Pond 19 was surveyed using bottle trapping and although not 100% this was not seen as a constraint to effective survey as the majority of the pond was accessed (details of all standard and non-standard surveys are also reproduced in the Pond survey tables in Appendix 1).
- 4.2.7 Weather conditions during the survey period were good for surveying newts. There was no significant rain to affect surveying. Temperatures ranged between 6.5°C to 21.5°C during the surveys (see Table3).

Table 3: Weather Conditions for Survey

Date	Temp pm	Temp am	Rain	Wind
19/4/12	6.5°C	7.5°C	0	1
25/4/12	8.0°C	9.5°C	2	3
10/5/12	13.0°C	11.5°C	2	1
24/5/12	20.0°C	21.5°C	0	0

4.3 Breeding Birds: Survey timing and Constraints

- 4.3.1 Four visits were made between April and July, commencing in the early morning; birds are generally most active at this time of day, and most inactive in the early afternoon. The survey route was walked at a slow walking pace with frequent pauses, so that all birds detected could be identified. The route was designed such that any point within 50m of the survey route was visible.

Table 4: Details of bird survey visits.

Visit	Date	Time	Weather Conditions
1	29th April 2012	06.00-12.00 (sunrise 05.38)	5°C- 8°C. Wind: NE 15-14kmh. Cloud cover: 95%, dry at first, rain later
2	27th May 2012	06.00-12.00 (sunrise 04.50)	13°C. Wind: E 8-15kmh. Cloud cover: 0%
3	21st June 2012	06.00-12.00 (sunrise 04.38)	18°C. Wind: SW 16kmh. Cloud cover: 50%
4	15th July 2012	06.00-12.00 (sunrise 04.58)	11°C Wind: 8-15kmh. Cloud cover: 20%

Pond Survey Limitations

- 4.3.2 All pond surveys were undertaken in accordance with the Lancashire Pond Survey Methodology. Access to 2 of the ponds on the site in third party ownership was denied between completion of the great crested newt surveys but prior to completion of the Pond Biodiversity Survey.

5.0 DESK STUDY RESULTS

5.1 Statutory sites

- 5.1.1 The desk study of the MAGIC and Natural England data sets revealed that there were no statutory designated nature conservation sites within 1km of the application site. The search included both local nature reserves, national (Sites of Special Scientific Interest) and internationally important sites (Natura 2000 and Ramsar sites).

- 5.1.2 There is one non-statutory site within 1km. This is the Cuerden Valley Park and River Lostock Biological Heritage Site (BHS). This BHS lies, at its closest, approximately 500m to the north and west of the site (see Appendix 1 for details of this BHS).

5.2 Protected Species

- 5.2.1 The desk study of the Lancashire Environmental Records Centre, The NBN and the RSPB returned a number of protected species from within 1km of the site. These are listed in Tables 5, 6 and 7. It is noted that the absence of records of other flora and fauna does not necessarily discount the possibility of protected species being on the site or in the vicinity.
- 5.2.2 The presence or absence within the site of any protected species was taken into account when carrying out the detailed site-specific searches as part of the extended Phase 1 survey. In addition, any habitat which had clear potential for any protected species, or protected species groups was also taken into account when undertaking the site survey.
- 5.2.3 Additionally, records of Lancashire BAP species were identified within the search area. These are shown in Annex B.

Table 5: Protected species identified within 1km of the site from LERN records

Latin Name	Common Name	Taxon Group
<i>Hyacinthoides non-scripta</i>	Bluebell	flowering plant
<i>Rana temporaria</i>	Common Frog	amphibian
<i>Triturus cristatus</i>	Great Crested Newt	amphibian
<i>Tyria jacobaeae</i>	Cinnabar	terrestrial invertebrate
<i>Hydraecia micacea</i>	Rosy rustic	terrestrial invertebrate
<i>Xanthia icteritia</i>	Sallow	terrestrial invertebrate
<i>Emberiza citrinella</i>	Yellowhammer	bird
<i>Larus argentatus</i>	Herring Gull	bird
<i>Muscicapa striata</i>	Spotted Flycatcher	bird
<i>Passer domesticus</i>	House Sparrow	bird
<i>Sturnus vulgaris</i>	Starling	bird
<i>Turdus philomelos</i>	Song Thrush	bird
<i>Anguis fragilis</i>	Slow-worm	reptile
<i>Arvicola terrestris</i>	Water Vole	terrestrial mammal
<i>Erinaceus europaeus</i>	Hedgehog	terrestrial mammal
<i>Lutra lutra</i>	Otter	terrestrial mammal
<i>Pipistrellus pipistrellus</i>	Common Pipistrelle	terrestrial mammal
<i>Myotis daubentonii</i>	Daubenton's Bat	terrestrial mammal
<i>Nyctalus noctula</i>	Noctule Bat	terrestrial mammal

Table 6: Bird records identified from the local area from The Preston Naturalists Union.

Latin Name	Common Name	Observations
<i>Anser anser</i>	Greylag Goose	Cuerden Valley Lake. Odd sightings through 1980s. 1997 flock of 50+
<i>Branta canadensis</i>	Canada Goose	Cuerden Valley Lake. Small numbers increasing. Peak 1994 & 1998 when flocks of 150 were seen
<i>Anas penelope</i>	Wigeon	Cuerden Valley Lake. One pair in 1987

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<i>Anas crecca</i>	Teal	Cuerden Valley Lake. One record of 4 birds in 1987
<i>Anas platyrhynchos</i>	Mallard	Cuerden Valley Lake. Regular & Common
<i>Anas clypeata</i>	Northern Shoveller	Cuerden. 3 seen flying in 1982
<i>Aythya ferina</i>	Common Pochard	Cuerden Valley Lake. Regular
<i>Anas fuligula</i>	Tufted Duck	Cuerden Valley. Regular low numbers
<i>Aythya marila</i>	Greater Scaup	Cuerden Valley Lake. v. rare
<i>Mergus merganser</i>	Goosander	Cuerden Valley Lake. 2 records from 1990s
<i>Oxyura jamaicensis</i>	Ruddy Duck	Cuerden Valley Lake. 1 record 1990
<i>Perdix perdix</i>	Grey Partridge	Cuerden Valley. recorded <10 throughout 1980s & 90s
<i>Tachybaptus ruficollis</i>	Little Grebe	Cuerden Valley Lake. Regular low numbers
<i>Podiceps cristatus</i>	Great Crested Grebe	Cuerden Valley Lake. Regular
<i>Ardea cineria</i>	Grey Heron	Cuerden Valley Lake. Regular
<i>Rallus aquaticus</i>	Water Rail	Cuerden Valley Park. Occasional
<i>Gallinula chloropus</i>	Moorhen	Cuerden Valley Lake. Regular
<i>Fulica atra</i>	Coot	Cuerden Valley Lake. Regular
<i>Larus cachinnans</i>	Yellow-legged Gull	Cuerden Valley. 1 record 1998
<i>Sterna hirundo</i>	Common Tern	Cuerden. A few records from 1980s
<i>Uria aalge</i>	Guillemot	Cuerden Valley. 1 record 1993
<i>Columba palumbus</i>	Woodpigeon	Cuerden Valley Park. Regular & Common
<i>Cuculus canorus</i>	Cuckoo	Cuerden Valley Park. Records up to mid 1980s. Occasionally heard.
<i>Strix aluco</i>	Tawny Owl	Cuerden Valley Park. Regular. Last record 2004
<i>Alcedo atthis</i>	Kingfisher	Cuerden Hall & R. Lostock. Regular low numbers
<i>Picus viridis</i>	Green Woodpecker	Cuerden Valley. Regular
<i>Dendrocopos major</i>	Great Spotted Woodpecker	Cuerden Valley. Regular & Common