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Llay Industrial Estate & Former Sharp Site

Ecological Survey & Report
November 2015

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1. Introduction

1.1 Summary of previous reports

1.1.1 An initial Phase 1 (Extended) survey of the Llay Industrial Site was undertaken by a Capita Ecologist on 6th June 2013 and the findings of this survey are included in the report titled '*New Police Facility, Llay Industrial Site: Phase 1 Ecological Survey*' (**Capita Symonds**) 17th June 2013.

1.1.2 The conclusion of this report was that the site was of significant biodiversity interest, with habitats and species listed on the Local Biodiversity Action Plan (LBAP) specifically for the counties of Denbighshire and Flintshire. These include:

- Grassland equivalent to hay-meadow (National Vegetation Classification of Mesotrophic Grassland MG5[1]);
- Dry calcareous grassland (National Vegetation Classification of Calcareous Grassland CG2);
- Ponds and temporary pools;
- Hedgerows.

1.1.3 Other habitats and species also subject to Biodiversity Action Plan (but not included in the Denbighshire & Flintshire LBAP) and which were also observed during this survey included:

- Open Mosaic Habitats on Previously Developed Land;
- Dingy Skipper butterfly (42% decline since 1970);
- Small Heath butterfly (62% decline since 1970);
- Reed Bunting;
- Orchids (Northern Marsh, Common Spotted & Bee Orchids).

1.1.4 The potential of the habitat to support species protected by National legislation (listed in the schedules of the Wildlife & Countryside Act 1981 as amended) and International legislation (listed on Annex I/II of the EU Habitats Directive) was also assessed. These include:

- Great crested newt;
- Reptiles (the four so-called 'common species');
- Bats;
- Badgers;
- Breeding birds (including Barn owl)

1.1.5 The report makes recommendations for species surveys based on this assessment. The results of these surveys form the basis of this report.

[1] MG is a classification for Mesotrophic (neutral) Grassland. MG5 is a community dominated by clovers and other herbs constituting a haymeadow flora

1.2 Scope of current survey

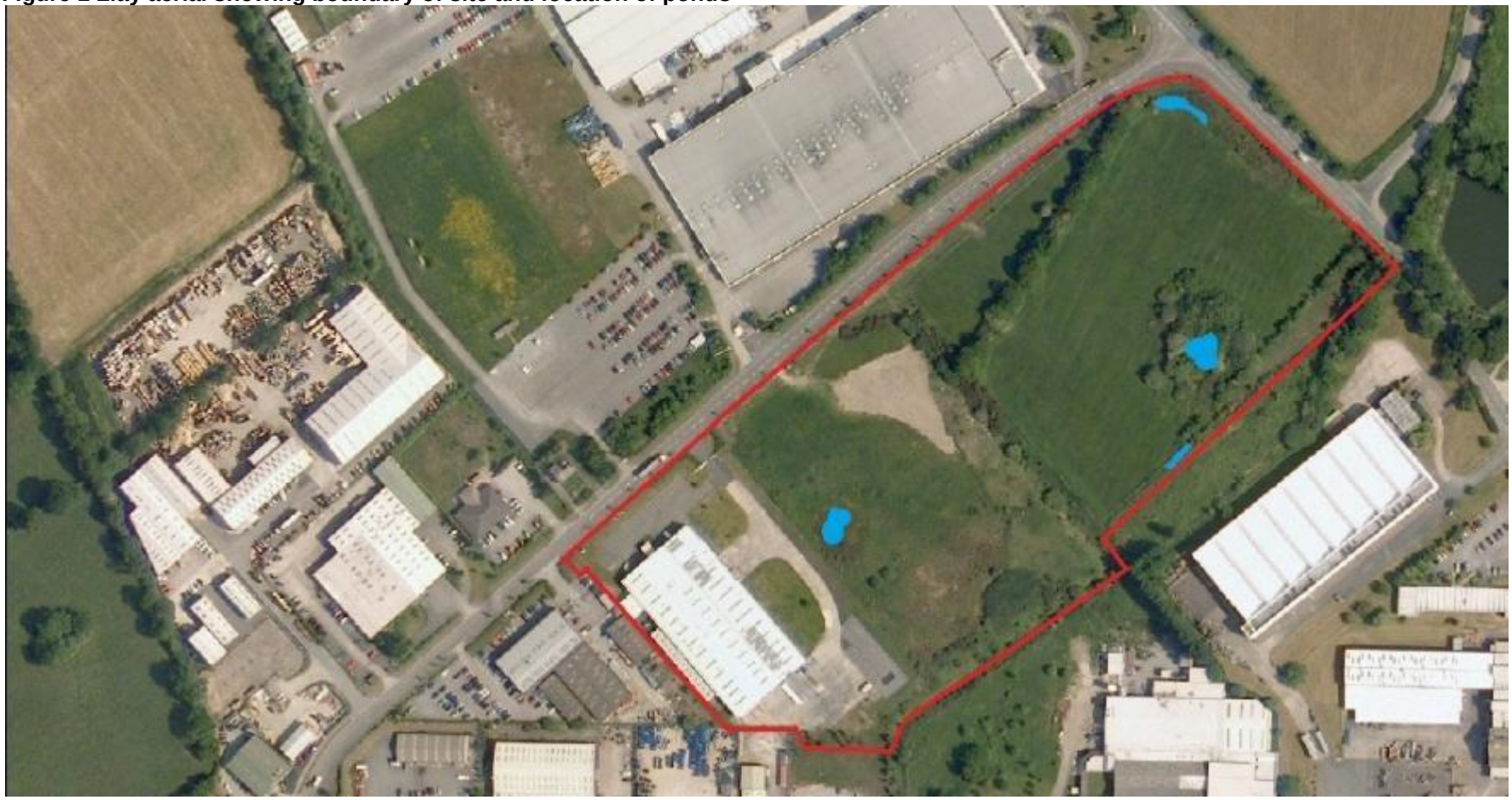
1.2.1 The surveys to be undertaken in 2015 are summarised in Table 1:

Table 1 Recommendations for Protected Species Survey (from Phase 1 Report 2013)

SPECIES	SURVEY REQUIREMENTS
Great Crested Newt (recorded from Cofnod data)	Survey of ponds between March and late May, to involve four visits by ecologists using bottle-trap, torch survey, egg-search or netting at each visit.
Badger (recorded from Cofnod data)	Survey of hedges and scrub to locate presence of setts or foraging activity.
Bats (recorded from Cofnod data)	Walkover survey between April and September to determine level of bat activity;
	Survey of trees to identify potential roost sites.
Breeding Birds (recorded from Cofnod data)	Two dawn visits, two weeks apart, between April and June to record territorial and singing birds.
Reptiles	Refugia survey - placing of 100+ reptile refugia in strategic habitats;
	Checking refugia a minimum of 7 times between April and June and again in September-early October for the presence of reptiles.
Invertebrates (recorded from Cofnod data)	Survey of butterflies (and moths) requiring 3 visits between April and September and the use of moth traps or sugar-baiting as required;
	Other methods including pitfall traps or netting may be used

1.2.2 An aerial view of the site is shown in Figure 1:

Figure 1 Llay aerial showing boundary of site and location of ponds

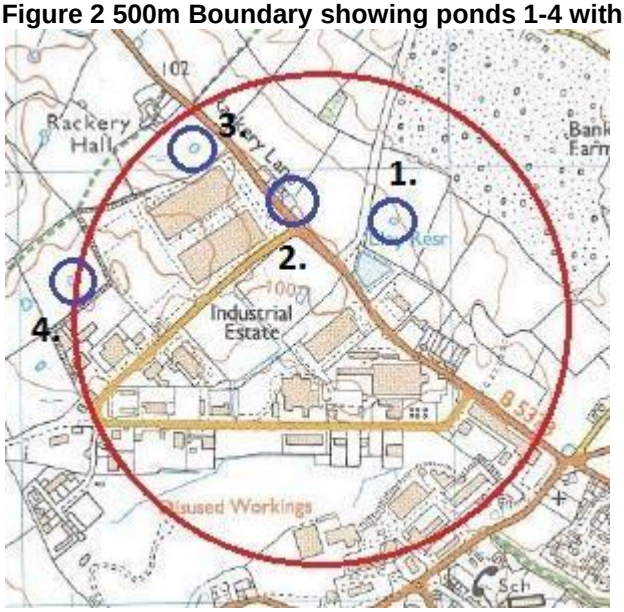


2. Survey Method

2.1 Great crested newt survey

2.1.1 The 500m amphibian survey boundary is shown in Figure 2:

Figure 2 500m Boundary showing ponds 1-4 within the perimeter



2.1.2 Access to survey surrounding ponds was not granted to the consultancy Environment Resources Management Ltd (ERM) who were also conducting separate surveys for newts. However, water sampling for eDNA was permitted and the results shared.

2.1.3 Amphibian survey followed the standard procedures outlined in the great crested newt mitigation guidelines (2001) involving five survey visits:

2.1.4 On **18th March 2015**,

- Undertaking scrub clearance to enable access to ponds;
- Bottle-trapping ponds;
- Torch search of ponds after dark.

2.1.5 On **30th March** a 2nd amphibian survey involved:

- Habitat Suitability Index (HSI) for two ponds on site;
- Bottle trapping of two ponds;
- Torch search of two ponds.

2.1.6 On **13th April**, the 3rd amphibian survey involved:

- Bottle trapping of two ponds;
- Torch search of two ponds.

2.1.7 On **29th April**, the 4th newt survey involved:

- Bottle trapping one pond;
- Torch searching one pond.

2.1.8 A 5th visit was undertaken on **18th May 2015**, concentrating on bottle-trapping the remaining pond.

2.2 Reptile survey

2.2.1 On 24th March 2015, a Capita ecologist attended site between 12:30 and 15:30. As a preliminary to survey reptile refugia which provide cover for reptiles, are positioned in likely areas. These can be made from many different materials, but in this instance, squares of roofing felt approximately 40cm^2 were used.

2.2.2 46 'Refugia' were positioned as indicated:

- 10 refugia at SJ 32411.56670 (close-spaced in south-west corner by corner of fence Figure 6a);
- 10 refugia at SJ 32481.56719 (along the east edge of a projecting patch of gorse scrub);
- 10 refugia at SJ 32510.56707 (south side of hedgerow just east of location 2);
- 10 refugia at SJ 32494.56686 (centre of site south of prominent gorse shrub);
- 6 refugia at SJ 32532.56662 (south-facing bank).

2.2.3 Follow up visits are undertaken when weather conditions were warm and sunny, affording opportunities for reptiles to sun themselves as well as basking beneath refugia. The technique is to traverse the site with the sun on the surveyors back, visually searching likely-looking reptile basking spots. This is done in addition to checking refugia.

2.2.4 A minimum of seven visits were undertaken in order to determine the status of reptiles on site.

2.3 Bat survey

2.3.1 Bat survey was split into two separate procedures:

- Survey of Sharp Industrial Unit to assess its suitability for bats (comprising internal inspection and 2 survey visits);
- Two visits by two surveyors to include inspection of suitable trees and dusk transect surveys. Surveys must be undertaken between April and September.

2.3.2 Inspections of the Sharp industrial building were undertaken on **18th March 2015** (internal survey) **13th April 2015** (emergence survey) and **8th June 2015** (emergence survey).

2.3.3 Transect surveys were undertaken on **13th April** and **8th June 2015**.

2.3.4 Statric detectors were placed within the building on **18th April 2015.**

2.4 Badger survey

2.4.1 A Badger survey was undertaken on **24th March 2015**. It involved coverage of the area in search of:

- Setts;
- Mammal runs (used by badgers);
- Dung pits;
- Excavations

2.4.2 Places where mammal runs cross beneath fences or through dense bramble scrub afford the opportunity to determine which species are using them. This is achieved by examining hairs caught on thorns or projections. Mammals moult their winter coats in March, and badgers have very distinctive bi-coloured hairs

2.4.3 Additional survey was undertaken on **22nd April 2015**.

2.5 Breeding bird survey

2.5.1 The method of survey for birds was modified from the British Trust for Ornithology (BTO) breeding bird survey. Standard methodology involves walking a linear transect at dawn during the breeding season, recording bird activity (including territorial display and singing birds). The survey is repeated, with the two surveys being a fortnight apart and taking place between late April and early June.

2.5.2 The modification of the BTO methodology for the current site does not involve linear transects. Instead, birds were recorded in the locations where they were observed or singing on more than one visit. The amalgamation of data from regular visits during the breeding season indicates the number of breeding territories.

2.5.3 Surveys were undertaken on **23rd April** and **12th May 2015**.

2.6 Phase II survey

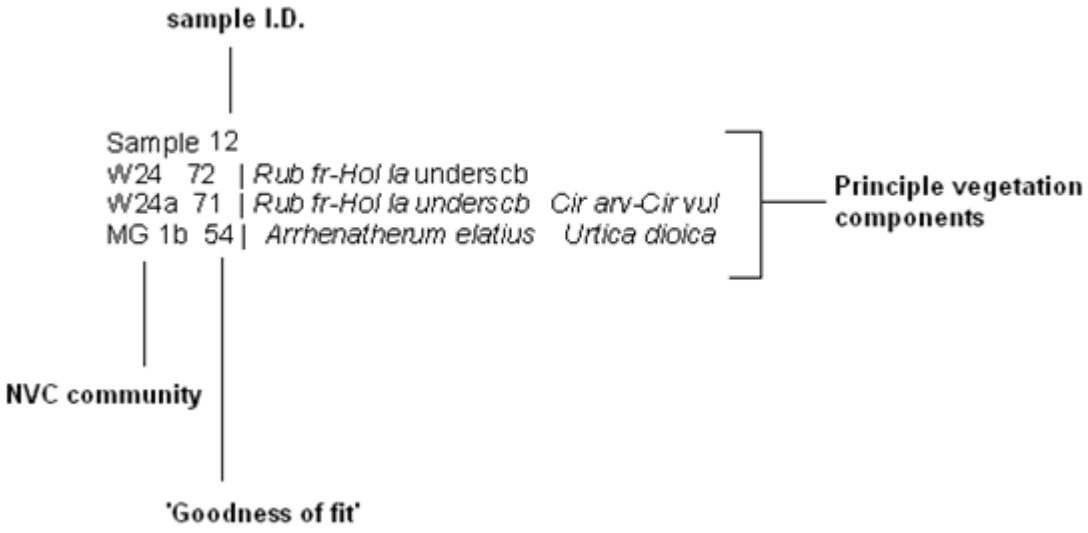
2.6.1 For the purposes to which the data is put, the vegetation survey is a species list for the entire site footprint – a requirement for BREEAM LE4 and LE5 in order to calculate enhancement.

2.6.2 Phase II plots were selected in order to define specific vegetation communities. Three datasets were made from two locations in the grounds of the Sharp building and one in the adjacent plot, corresponding to the locations where Dingy Skipper butterfly had been observed in 2014.

2.6.3 The data was analysed using the programme TableFit© which returns a classification based on the National Vegetation Classification (NVC) and a goodness-of-fit for that community.

2.6.4 The analysis is explained in Figure 3:

Figure 3 TableFit Output Explained



2.6.5 In addition to vegetation, the Phase II survey included recording the population of two UK BAP invertebrate species, Dingy Skipper (*Erynnis tages*) and Small Heath (*Coenonympha pamphilus*) butterflies.

3. Survey Results

3.1 Great crested newt survey

3.1.1 On **18th March** (survey 1), 2 Capita ecologists attended site between 2:00 and 20:30.

3.1.2 Prior to survey, some scrub clearance around the main pond on site (see Figure 1 Llay aerial showing boundary of site and location of pond) was undertaken in order to ensure safe night-time access (Figure 4a):

Figure 4 Ponds at Llay

a) Vegetation clearance to ensure night-time access to pond margin of main pond.

b) Temporary pond on northern boundary of site showing marshy nature with tussocks of *Deschampsia cespitosa* and willow carr

c) Bottle traps at 1m intervals in main pond

d) Positioning bottle traps in temporary pond

3.1.3 Habitat Suitability Indices were calculated for the large pond (Pond#1) and the small linear pond alongside the road on the northern boundary (Pond#2). The responses are entered into an Excel programme which calculates the HSI. The results are shown in Table 2:

Table 2 Habitat Suitability Indices

Pond number	**1**	**2**
LOCATION	C	C
Pond shape	Circle	Irregular
Long axis diameter	40	60
Short axis diameter	40	10
Irregular pond area	200	80
Pond area (m2)	1256.64	80.00
Pond drying	Never dries	Dries annually
Water quality	Moderate	Poor
Shade (%)	100	60
Fowl	Minor	Absent
Fish	Absent	Absent
No. Ponds in 500 m	6	6
Terrestrial habitat	Good	Good
Barriers	None	None
Macrophytes (%)	10	25
HSI	**0.43**	**0.34**

3.1.4 Torch survey commenced in Pond#1 at 19:00 and finished at 19:30. Three newts were observed. These were believed to be smooth newt (*Lissotriton vulgaris*).Torch survey commenced in Pond#2 at 19:35 and finished at 20:00. Ten newts were observed. Two, captured and observed in the hand, were confirmed as male smooth newt. One seen close to in the water appeared to be a male palmate newt (*Lissotriton helveticus*), but only smooth newt was confirmed.

3.1.5 On **30th March** (survey 2), Weather conditions were stormy, wet but very mild, with a temperature of 13°C at dusk, dropping to a low of 10°C by 22:30.

3.1.6 35 bottle traps were set in place along the accessible margin of Pond#1. An additional 12 bottle traps were positioned in pond#2 on the NW boundary. Ecologists returned to site after dark to undertake a torch search of the ponds.

3.1.7 Bottle traps were examined and emptied at 09:00 on **31st March**.

3.1.8 No newts were observed in pond#1 as a result of torch searching. Four newts (Smooth or Palmate) were observed in pond#2 on the NW boundary.

3.1.9 No newts were captured in bottle traps in pond#1, but a common toad was present. One male & one female smooth newt were present in bottle traps in pond#2.

3.1.10 On **13th April**, A total of 60 bottle traps were set (including 5 in a wet ditch observed on the east end of the site, close to pond#1). Bottle traps were set in place (as shown in Figure 5d) between 18:00 and 19:30. The spread of traps was:

- Pond#1 25 on west bank (Figure 5c), 15 on east bank;
- Pond #2 15 traps in line at 1m intervals;
- Wet ditch (#3) 5 traps in only accessible point

3.1.11 Torch searching took place from 21:00 to 21:30 at the accessible points where the bottle traps had been set.

3.1.12 Torch searching identified 3 newts in pond #2 (1 male and 2 female smooth newts) and 1 male/1 female smooth newt already entered in traps in the wet ditch#3.

3.1.13 Bottle traps were emptied between 07:00 and 08:00 the following day, with the following results:

- Pond#1 2 male smooth newt;
- Pond#2 3 male smooth newt (see Figure 5);
- Wet ditch#3 1 male / 1 female smooth newt

Figure 5 Amphibians at Llay

a) Male smooth newt in bottle traps from pond#1 on 13th April 2015

b) Female great crested newt from pond#1 on 30th April 2015

3.1.14 A 4th survey was undertaken **on 29th April 2015**. A total of 55 bottle traps were placed in Pond#1 between 18:10 and 19:30 on 29th. All other ponds had dried up over the month and were no longer suitable for newts.

3.1.15 Torch searching was undertaken using Eagletac SX25L3 LED torches between 21:15 and 21:55. Six newts were observed: 4 male smooth newts, 1 female smooth newt and 1 undetermined.

3.1.16 Bottle traps were collected between 09:10 and 10:25 (during a heavy shower). Four newts were captured. 3 female smooth newts and 1 female great crested newt.

3.1.17 A 5th survey was undertaken on **18th May 2015**. Conditions were excellent for amphibian survey: humid and still after heavy rain, with a temperature of 9°C.

3.1.18 Fifty-five bottle traps were set in pond #1 between 18:30 and 20:00.

3.1.19 Torch search commenced 21:00. Five newts were observed during the torch search.

3.1.20 Bottle traps were emptied the following day (19th) at 09:10. The results for this and all former surveys are aggregated in Table 3.

3.1.21 An egg search was undertaken on 19th May. Newt eggs were observed on the leaves of Dog rose (*Rosa canina*) growing out from the bank and into the water, but all these belonged to smooth newt.

3.1.22 The results are summarised in Table 3:

Table 3 Summary of Newt Survey Results

	SITE VISIT				
	18.03.2015	30/31.03.2015	13/14.04.2015	29/30.04.2015	18/19.05.2015
TORCH	3 smooth newt in pond#1 10 newts observed in pond#2 (inc. poss. palmate)	4 newts in pond#2	3 newts in pond#2	6 smooth newt in pond#1	3 F & 2 M smooth newt in pond#1 Poss Palmate newt (F) in Pond#2 after heavy rain.
BOTTLE	NA	1 toad in pond#1 2 (M) smooth newt in pond#2	2 smooth newt in pond#1 (M) 3 smooth newt in pond#2 (M) 2 smooth newt in pond#3 (M/F)	2 smooth newt (F) in pond#1 1 great crested newt (F) in pond#1	5 F smooth newt & 1 F great crested newt in Pond#1
EGG	NA	NA	NA	NA	Smooth newt eggs on *Rosa canina* leaves in pond#1

3.1.23 eDNA data on neighbouring ponds was supplied by ERM in Bristol, but the results were inconclusive as the ponds had dried up.

3.2 Reptile survey

3.2.1 Reptile survey results are shown in Table 4:

Table 4 Summary of Reptile Survey Results (where × represents negative and ✓ is positive)

	13.04.2015	23.04.2015	12.05.2015	09.06.2015	16.06.2015	22.06.2015	14.07.2015
Conditions	Evening survey; sunny 15°C	Survey between 9:30-11:00. 15°C	10°C; cloudy. Sub-optimal for visual survey	12°C, sunny. Perfect conditions. 42 refugia	19°C, sunny with a cool breeze. 46 refugia	18°C warm and sunny. 47 refugia checked	17°C, 100% cloud cover & intermittent rain 47 refugia checked & collected
Common lizard	×	×	×	×	×	×	×
Slow worm	×	×	×	×	×	×	×
Grass snake	×	×	×	×	×	×	×
Adder	×	×	×	×	×	×	×

3.2.2 In addition to refugia checks, suitable basking places were surveyed when conditions were appropriate for common lizard and grass snake; two species which can as likely be sought in warm sunny places as beneath refuges.

3.2.3 No reptiles were seen or captured anywhere within the survey area.

3.3 Bat survey: Sharp Industrial Unit

3.3.1 **18th March** (**1st survey visit**). The former Sharp Industrial Unit (SIU) is a typical, robust industrial construction comprising fluted metal sheet over metal joists and supports. The integral office units on the front of the building have access via roof and ventilation ducts, which allow insects to enter (Figure 6a/b) but no bat droppings were observed.

Figure 6 Preliminary Survey of Sharp Industrial Unit

a) Front entrance with office units to the fore and industrial floor behind.

b) Access to the internal office space is through ventilation shafts. Dead flies on the windowsill indicate access is possible, but no bat droppings were recorded.

c) Internal of factory floor with suspended ceiling. All joists and ceilings are metal with little purchase for bats.

d) Above suspended ceiling, light spill from factory lights illuminates the void. No droppings observed on floor lagging.

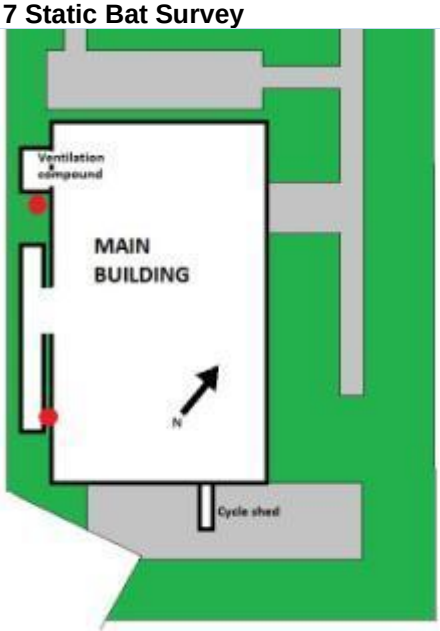
3.3.2 The industrial floor and warehouse comprises several large, open areas (Figure 6c) which are accessible through many gaps above warehouse doors and lintels, but all the internal supports are metal, which would prevent crevice-dwelling bats from getting a grip on the surface.

3.3.3 Externally, the building is lit by security lighting (not in operation during the current visit) and there are few flight-lines to any of the observed access points.

3.3.4 A walkover bat survey of the external part of the building was undertaken between 18:30 and 19:00. No bats were observed, likely to be due to the low temperatures (the temperature at the start of the survey was recorded as 8°C, dropping to 6°C by the end).

3.3.5 Static bat recorders were placed as shown in Figure 7a/b on **13th April 2015**:

Figure 7 Static Bat Survey



a) Position of external bat detectors on 13.04.2015

b) Bat detector set up on 13.04.2015

3.3.6 Only one bat was detected in the external survey: a Soprano pipistrelle (*Pipistrellus pygmaeus*) single pass some distance from the microphone.

3.3.7 Two static detectors were placed inside the Sharp building at 18:00 on **29th April 2015** and collected at 08:40 on **30th April**. No bats were detected.

3.3.8 An emergence survey was undertaken on **8th June 2015**. Surveyors were positioned at the NE & SW corners giving full coverage of all the visible exits.

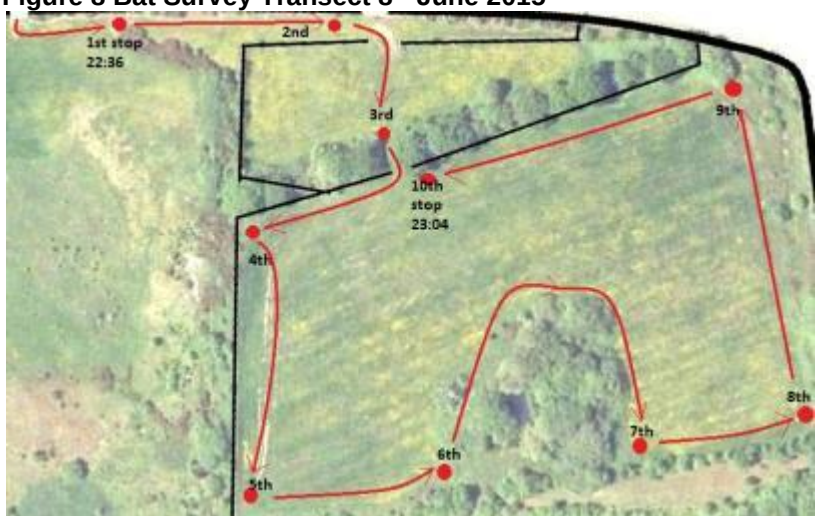
3.3.9 Survey commenced at 21:10 and finished at 22:30, when it was too dark to see emergence points. Despite perfect conditions (12°C, cloudy and still), neither surveyor recorded any bats.

3.4 Bat activity survey

3.4.1 On a walkover survey undertaken on **13th April**, a single Soprano pipistrelle (*Pipistrellus pygmaeus*) was recorded flying along the hedge-line at 21:45 (single pass).

3.4.2 A second walkover survey using Anabat recorders was undertaken on **8th June 2015**, commencing at 22:36 and finishing at 23:04. It involved a circuit of the adjacent field, concentrating on the hedgerows (see Figure 8 and reference Figure 1 for location).

Figure 8 Bat Survey Transect 8th June 2015



3.4.3 Analysis of data showed Soprano pipistrelle at the 3rd (single pass) and 9th stop (multiple passes) locations.

3.5 Badger survey

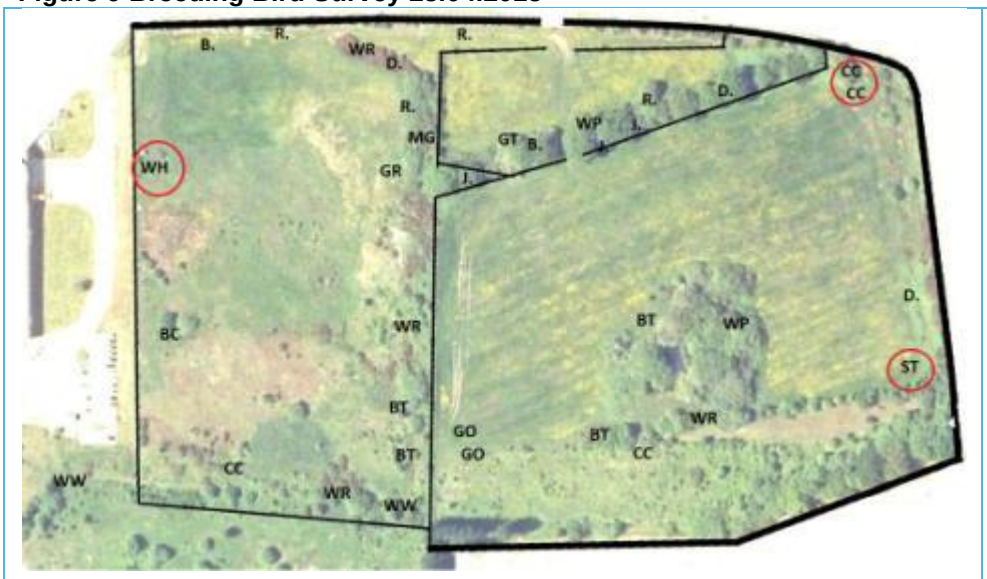
3.5.1 The majority of activity on site is the result of rabbits. However, a single hair identified as badger was found attached to a bramble thorn in the NW end of the site on 23rd April.

3.5.2 Badger may forage on site, as indicated by occasional evidence of badger, but no sett has been confirmed.

3.6 Breeding bird survey

3.6.1 Woodcock & grasshopper warbler have previously been recorded while undertaking newt surveys in March and in the previous year reed bunting was resident. However, the breeding bird survey (early) undertaken on **23rd April** is summarised in Figure 9:

Figure 9 Breeding Bird Survey 23.04.2015



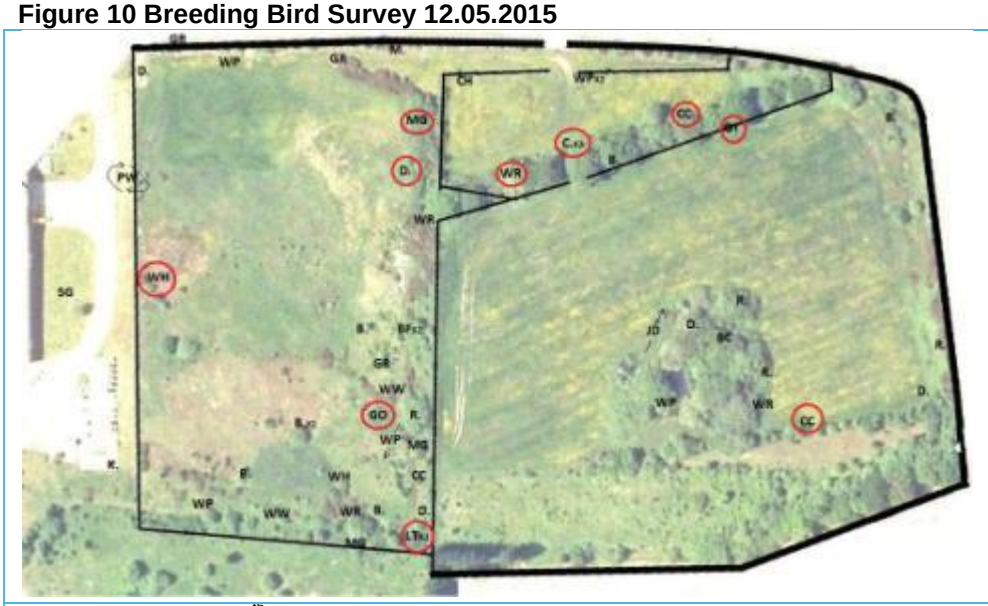
SPECIES CODES

WH = whitethroat
D. = dunnock
GR = greenfinch
WR = wren
R. = robin
MG = magpie
BC = blackcap
WW = willow warbler
CC = chiff-chaff
B. = blackbird
GO = goldfinch
BT = blue tit
ST = song thrush
J. = Jay
GT = great tit

Bird survey result on 23rd April (early survey). Birds highlighted on map are those likely or confirmed as nesting

3.6.2 A second breeding bird survey (late) was undertaken between 05:00am and 06:25am on 12th May. The results are shown in Figure 10:

Figure 10 Breeding Bird Survey 12.05.2015



SPECIES CODES

M.= mistle thrush
JD = jackdaw
C. = carrion crow
BF = bullfinch
LT = long tailed tit
CH = chaffinch
WP = wood pigeon
K. = kestrel
PW = pied wagtail

Bird survey results on 12th May (late survey) with likely or confirmed nesting species circled.

3.6.3 The combined results are shown in Table 5, where ✓ refers to confirmed breeding (i.e. birds found at nest, carrying food or singing in the same area on both visits), and (□) refers to birds where breeding is not confirmed, but extremely likely given the seasonal presence or the ubiquitous nature of the species.

Table 5 Breeding Bird Survey Results Summary

SPECIES	1st VISIT	2nd VISIT	BREEDING	SPECIES	1st VISIT	2nd VISIT	BREEDING
Wood pigeon	2	5	✓	Wren	4	4	✓
Kestrel (A)	0	1	×	Great tit	1	1	✓
Magpie	1	3	✓	Blue tit	3	0	×
Jay	3	0	×	Long tailed tit	0	2	✓
Carrion crow	0	2	✓	Blackcap	1	1	(✓)
Jackdaw	0	1	×	Common whitethroat (A)	1	2	✓
Starling (R)	0	1	(✓)	Willow warbler (A)	1	2	(✓)
Blackbird	2	7	✓	Chiff-chaff	4	3	✓
Song thrush (R)	1	0	✓	Pied wagtail	0	1	(✓)
Mistle thrush (A)	0	1	(✓)	Greenfinch	1	3	(✓)
Robin	4	4	✓	Goldfinch	2	1	(✓)
Dunnock	3	4	✓	Bullfinch (A)	0	2	✓

3.6.4 Those species highlighted in Table 5 are listed on either the **R=Red** or **A=Amber** list of the British Trust for Ornithology Birds of Conservation Concern.

3.7 Phase II survey

3.7.1 The broad habitat types, and the percent of the total site (which includes the adjacent fields, hedgerows and ponds outside the proposed construction zone) is shown in Table 6:

Table 6 Habitat Types & Area

HABITAT	AREA (M^2)	%
Species-rich neutral grassland	19,712.80	55.70
marshy grassland	2,440.70	6.90
Species-rich (calcareous) grassland	192.00	0.54
tall herb vegetation	1,992.00	5.63
woodland	2,274.70	6.43
dense scrub	5,121.80	14.47
scattered scrub	2,322.30	6.56
Fen	996.40	2.82
open water	339.00	0.96
TOTALS	**35,391.70**	**100.00**

3.7.2 The majority of the site is occupied by species rich neutral & calcareous grassland corresponding to the following vegetation communities:

MG5: Crested Dog's-tail grass and Black Knapweed-dominated dry grassland (equivalent to UK BAP for Lowland Haymeadow);
MG11: Red Fescue-Creeping Bent grass-dominated grassland with Silverweed;
MG1: False Oat grass-Red Fescue grassland;
CG4: Heath False Brome grass (not present)-Glaucous Sedge sward

3.7.3 With the addition of:

OV26: Great Willowherb open ground

3.7.4 Vegetation plots analysed using TableFit© (see Figure 3 TableFit Output Explained) return the following communities and sub-communities, all of which are present to a greater or lesser degree within the mosaic of grassland types:

Plot 1 SJ 32432.56626
MG11a 67 | *Festuca rubra-Agrostis stolonifera* with-*Potentilla anserina* & *Lolium perenne*
MG 7b 57 | *Lolium perenne* ley
MG10a 55 | *Holcus lanatus-Juncus effusus* Typical

Plot 2 SJ 32386.
MG 1a 52 | *Arrhenatherum elatius-Festuca rubra*
MG 6a 51 | *Lolium perenne-Cynosurus cristatus* Typical
MG 7e 49 | *Lolium perene* verges & lawns

Plot 3 SJ 32516.56594
CG 4c 36 | *Brachypodium pinnatum-Holcus lanatus*
SD17b 36 | *Potentilla anserina-Carex nigra / Carex flacca*
MG 5 33 | *Cynosurus cristatus-Centaurea nigra*

3.7.5 A walkover count of species was also undertaken. A total of 103 vascular plant species were recorded during the Phase II survey.

3.7.6 A vascular plant species list of all plants recorded on the site (within the proposed construction zone only) is included in Table 7:

Table 7 Species List

LATIN NAME	COMMON NAME	LATIN NAME	COMMON NAME
Acer campestris	Field maple	*Juncus inflexus*	Hard rush
Agrostis canina	Velvet bent	*Lathyrus pratensis*	Meadow vetchling
Agrostis stolonifera	Creeping bent	*Lemna minor*	Common duckweed
Alchemilla vestita	Lady's mantle	*Leucanthemum vulgare*	Ox eye daisy
Alopecurus pratensis	Meadow foxtail	*Linum catharticum*	Purging flax
Alopecurus pratensis	Common foxtail	*Listera ovata*	Twayblade
Anthoxanthum odoratum	Sweet vernal grass	*Lolium perenne*	Perennial ryegrass
Anthriscus sylvestris	Cow parsley	*Lotus corniculatus*	Birds-foot trefoil
Arrhenatherum elatius	False oat grass	*Luzula campestre*	Field woodrush
Bellis perensis	Daisy	*Mentha arvensis*	Corn mint
Blackstonia perfoliata	Yellow-wort	*Myosotis tricolor*	Changing forget-me-not
Cardamine pratensis	Ladies' smock	*Orphrys apifera*	Bee orchid
Cardamine pratensis	Ladies smock	*Phalaris arundinacea*	Reed canary grass
Carex ?acuta	Slender tufted sedge	*Plantago lanceolata*	Ribwort plantain
Carex ?pseudocyperus	Cyperus sedge	*Poa trivialis*	Rough meadow grass
Carex flacca	Glaucous sedge	*Polygonum amphibia*	Amphibious bistort
Carex otrubae	False fox sedge	*Potentilla anserina*	Silverweed
Carex ovalis	Oval sedge	*Potentilla reptans*	Creeping cinquefoil
Carex panicea	Carnation sedge	*Primula veris*	Cowslip
Carex pseudocyperus	Cyperus sedge	*Prunella vulgaris*	Self-heal

LATIN NAME	COMMON NAME	LATIN NAME	COMMON NAME
Centaurea nigra	Black knapweed	*Prunus spinosa*	Blackthorn
Centaurium erthyrea	Common centaury	*Pulicaria dysentaria*	Fleabanet
Cerastium fontanum	Common mouse-ear	*Quercus petraea*	Sessile oak
Cirsium arvensis	Creeping thistle	*Ranunculus acris*	Meadow buttercup
Cirsium vulgaris	Spear thistle	*Ranunculus repens*	Creeping buttercup
Conyza canadensis	Canadian fleabane	*Rumex acetosa*	Sorrel
Crepis capillaris	Smooth hawksbeard	*Rumex conglomeratus*	Clustered dock
Cynosurus cristatus	Crested dogstail	*Rumex crispus*	Curled dock
Dactylis glomerata	Cocks' foot	*Rumex obtusifolius*	Broad leaved dock
Dactylorhiza fuchsi	Common spotted orchid	*Rumex sanguineus*	Wood dock
Dactylorhiza purpurella	Northern marsh orchid	*Salix cinerea*	Grey willow
Daucus carota	Wild carrot	*salix purpurea*	Purple willow
Descamphsia cespitosa	Tufted hair grass	*Senecio eruscifolius*	Marsh ragwort
Dryopteris felix-mas	Male fern	*Senecio eruscifolius*	Hoary ragwort
Epilobium ciliatum	American willowherb	*Silene dioica*	Red campion
Epilobium hirsutum	Great willowherb	*Sonchus asper*	Prickly sow thistle
Epilobium montanum	Broad leaved willowherb	*Stachys palustre*	Marsh woundwort
Epilobium palustre	Marsh willowherb	*Stachys sylvatica*	Woundwort
Epilobium parviflorum	Hoary willowherb	*Taraxicum officinalis*	Dandelion
Festuca rubra	Red fescue	*Trifolium dubium*	Lesser trefoil
Filipendula ulmaria	Meadowsweet	*Trifolium pratense*	Red clover
Galium aparine	Cleavers	*Trifolium repens*	White clover
Glyceria declinata	Small sweet grass	*Tussilago farfara*	Coltsfoot
Glyceria fluitans	Floating sweet grass	*Typha latifolia*	Reedmace
Heracleum sphondylum	Hogweed	*Ulex europea*	Gorse
Hieracium rubrum	Fox and cubs	*Urtica dioica*	Nettle
Holcus lanatus	Yorkshire fog	*Veronica chamaedrys*	Germander speedwell
Hypericum maculatum	Imperforate St John's wort	*Veronica serpyllifolius*	Thyme leaved speedwell
Hypochaeris radicata	Common cat's ear	*Viburnum opulus*	Guelder rose
juncus acutiflorus	Sharp-flowered rush	*Viccia cracca*	Tufted vetch
Juncus conglomeratus	Compact rush	*Vicia sativa*	Common vetch

LATIN NAME	COMMON NAME	LATIN NAME	COMMON NAME
Juncus effusus	Soft rush		

3.7.7 Some of the species recorded are locally significant (see Figure 11). Orchids occur at a density that is of regional significance.

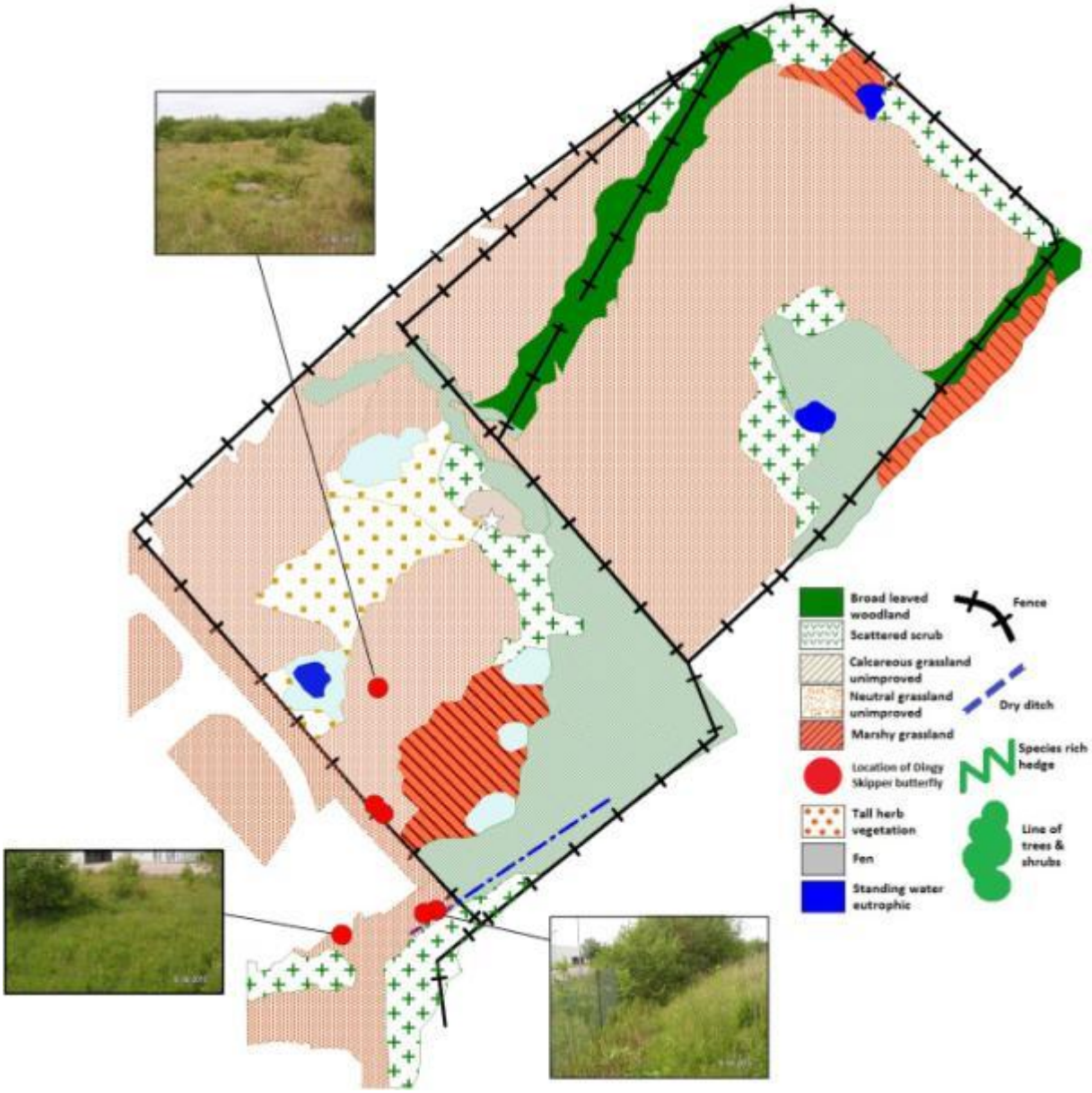
Figure 11 Uncommon Plants at Llay

a) Bee orchid (*Orphrys apifera*) occurs in large numbers on mown grassland within the Industrial estate grounds

b) Cyperus sedge (*Carex pseudocyperus*) is an uncommon but widespread species

3.7.8 In addition to vegetation, observations of visible day-flying invertebrates were made. These included Dingy Skipper butterfly (*Erynnis tages*), first recorded in 2014. Sightings of butterflies holding territories were mapped and correspond to areas of short dry grassland or south-facing banks These are illustrated in Figure 12:

Figure 12 Distribution of Dingy Skipper (*Erynnis tages*) and appropriate habitat



3.7.9 The maximum count on any visit was three individuals and it is to be concluded that the population is **small**.

It is localised within the construction site to eastern end of the industrial unit land, adjacent dry grassland within the vacant plot to the north, and extending into industrial land to the east (not included in the survey). Although suitable short dry grassland exists elsewhere in the plot, Dingy Skipper was not observed outside the area shown in Figure 12. (cross reference with Figure 1 and

In addition to Dingy Skipper, the site supports a good population of Small Heath butterfly (*Coenonympha pamphilus*). This is more widespread throughout the site but also corresponds to areas of species-rich neutral and calcareous grassland.

4. Conclusions

As a result of the surveys, the following conclusions can be drawn:

Great Crested Newt

Present at **low density** in Pond#1, the only permanent pond within 120m of the proposed construction zone.

Great crested newt is included in Annex II & IV of the EC Habitats Directive 1992 and Schedule 5 of the Wildlife & Countryside Act 1981 (as amended). It is afforded the highest protection status. Mitigating for the impact of development on land where great crested newt is present is a legal requirement and a European Protected Species Licence (EPSL) will be required.

Reptiles

No reptiles were recorded on site and the conclusion is that if present, species such as grass snake, slow worm and common lizard are at **very low density**. Specific mitigation for reptiles is not considered in the mitigation proposals.

Bats

No bats were recorded inside the Sharp building or emerging from it. The external crevices are unsuitable for bats, being made of sheet metal which would not allow them to grip. Static detectors recorded a very limited number of passes around the building.

Bats were recorded foraging along tree lines in the adjacent field and these hedges provide flight lines across the site. However, since no development is currently anticipated which will affect trees in the area, **no negative impacts** on bats are predicted and no specific mitigation for bats will be considered.

Badger

Badger are present in the area as indicated by the discovery of a single hair on a fence at the west boundary, but no further evidence of badger was located and no sett was discovered. The impact of the current proposals on badgers is therefore **minimal** and no specific mitigation will be considered.

Breeding birds

The following red- or amber-listed species were recorded as breeding within the site boundary:

- Starling (nest in roof of Sharp building)
- Song Thrush
- Whitethroat (nest in scrub on boundary of Sharp industrial unit and adjacent land)
- Willow warbler
- Bullfinch

The following red- or amber-listed species were recorded as possibly breeding, breeding in adjacent land or breeding in previous years:

- Mistle Thrush
- Kestrel
- Reed Bunting

All wild birds, their nests and eggs are protected by law in Part 1 of the Wildlife & Countryside Act 1981 (as amended). Significant impacts on breeding birds are perceived as a loss of nesting habitat and short-term disturbance as a result of development, and breeding birds will be considered in the mitigation proposals.

Invertebrates

Two UK BAP butterfly species have been recorded on site. Dingy Skipper has a small and vulnerable population localised to the east of the Sharp Industrial Unit and extending northwards into the adjacent land. Small Heath is more widespread on site, occupying similar habitat but is present across more of it.

Both species can be regarded as **significant** at a **regional level** and there is a duty under Section 40 of the NERC Act (2006) where [sic] "*Every public authority must have regard, so far as is consistent with the proper exercise of its functions, to the purpose of conserving biodiversity.*" Consideration for conserving & enhancing the population of both species will be considered in the mitigation proposals.

Vegetation

The vacant industrial land to the north of the Sharp Industrial Unit is a mosaic of BAP communities which will be considered under the umbrella of **MG5 Lowland Meadow**, with **significant** populations of orchids and plants of local interest.

Mitigation will be considered to ensure the creation of new and the management of existing species-rich grassland, to maintain the density of orchids and the mosaic of habitat that provides major biodiversity potential on site.

5. Recommendations

5.1 Great Crested Newt

5.1.1 Prior to any works on site, a great crested newt (European Protected Species) mitigation licence (EPSL) will be required.

5.1.2 The information collected on survey (and through the Biodiversity Records Centre) will provide evidence on which to base suitable protective measures and mitigation for a European Protected Species License (EPSL). The basis of the measures (in consultation with the Statutory Conservation Authority) will be:

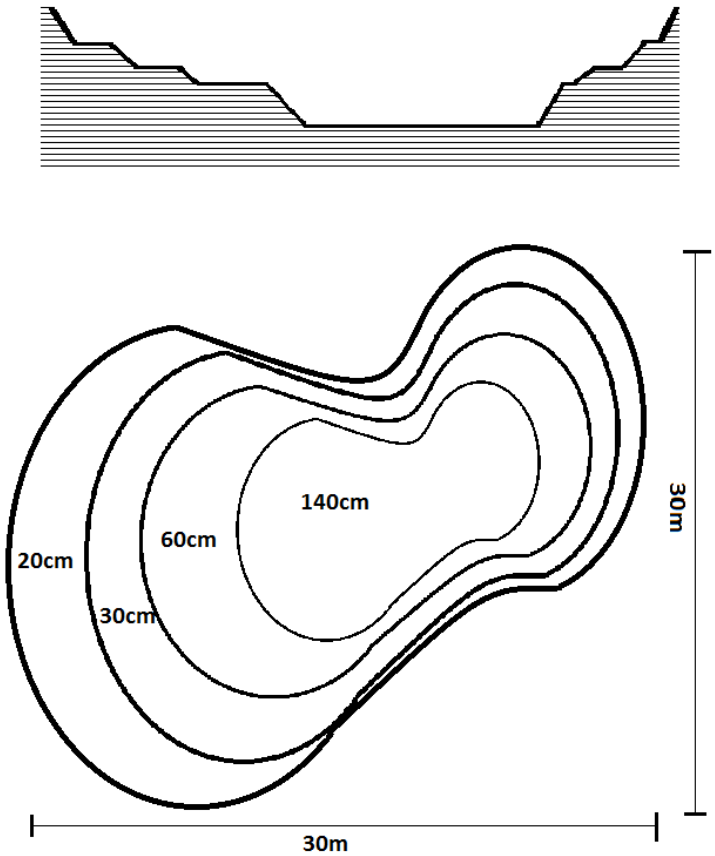
- Exclusion barrier delineating the boundary of works, to be in place before site clearance;
- A minimum requirement of physical search during site clearance by an appointed ecologist. Any amphibians encountered during site clearance will be removed to safety beyond the exclusion fence.
- Creation of breeding pond(s) and wetland areas as a habitat succession, to replace the loss of the existing large pond#1 over time.
- Pond(s) to be landscaped and planted with plant species shown in Table 8:

Table 8 Pond planting

MARGINAL SPECIES	AQUATIC SPECIES
5x 5litre Marsh marigold (*Caltha palustris*);	Broad-leaved pondweed (*Potamogeton natans*);
5x 5 litre Greater spearwort (*Ranunculus lingua*);	Curled Pondweed (*P. crispus*);
5x 5 litre Water mint (*Mentha aquatica*);	Spiked water milfoil (*Myriophyllum spicatum*);
5x 5 litre Skullcap (*Scutellaria galericulata*);	Water lily (*Nymphaea* sp.)
5x 5 litre Flowering rush (*Butomus umbellatus*)	

5.1.3 Pond design and planting will correspond to the profile as shown in Figure 13.

Figure 13 Pond profile (Modified from 'The Amphibian Management handbook Baker et al 2011)



5.1.4 A landscape design (Appendix A.4 Landscape design) shows the pond design split to accommodate an attenuation pond for overflow from the car park drainage. This pond is separated from the larger mitigation pond by an impermeable bund to prevent pollution.

5.2 Wild Birds

5.2.1 The range of wild birds potentially affected will require individual mitigation comprising:

- 2x hole-type nest-boxes with an entrance of 45mm (to accommodate starling);
- 2x hole-type nest-box with an entrance of 28mm (to accommodate blue & great tit);
- 1x kestrel / owl nest-box;
- Natural & ornamental tree and shrub planting to provide suitable nesting habitat for thrushes, warblers and finches;
- Water planting to provide habitat for reed bunting and grasshopper warbler

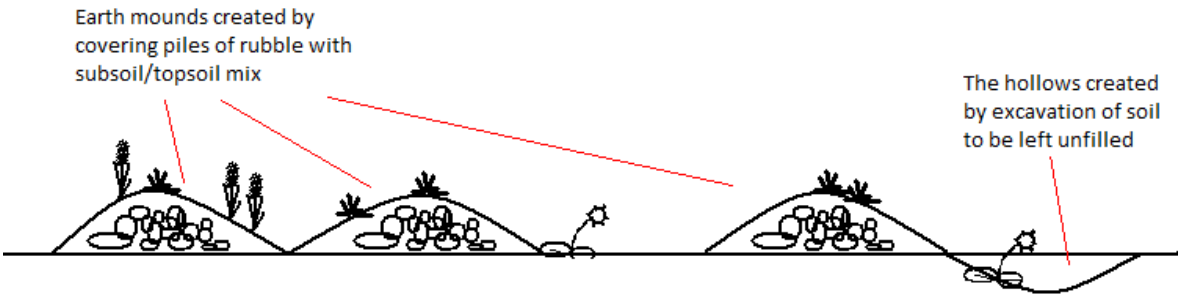
5.2.2 The proposed mitigation for birds will also form part of the Ecology & Landscape BREEAM credit scheme and details will be included in the BREEAM report.

5.3 Dingy Skipper Butterfly

5.3.1 Mitigation for impacts affecting Dingy Skipper butterfly will include:

- Avoidance of direct impacts on areas of raised banks and short vegetation dominated by bird's foot trefoil (*Lotus corniculatus*) and surrounding scrub which form the known range of the species as shown in Figure 12 Distribution of Dingy Skipper (*Erynnis tages*). This should be correlated with the Phase 1 map reproduced in Figure 15 in Appendix A, A.1.
- Creation of additional habitat suitable for colonisation by Dingy Skipper as illustrated in Figure 14:

Figure 14 Habitat Creation for Dingy Skipper



- The area for bund creation is illustrated in Figure 16, Appendix A

5.4 Habitat Creation

5.4.1 Landscaping must include the sowing of native seed mixtures to create a National Vegetation Community (NVC) of MG5 grassland. The following mixture is available in the trade (note that the minimum specification for provenance must be West of England or Western Britain):

RE1 traditional Hay Meadow (MG5 Grassland)	
Festuca rubra litoralis Slender Creeping Red Fescue	30%
Cynosurus cristatus Crested Dog's tail	25%
Festuca ovina Sheeps Fescue	6.5%
Festuca pratensis Meadow Fescue	5%
Phleum bertolonii Small Leaved Timothy	5%
Trisetum flavescens Golden Oat-Grass	5%
Plantago lanceolata Ribwort Plantain	3%
Agrostis capillaris Browntop Bent	2.5%
Centaurea nigra Common Knapweed	2%
Trifolium pratense Red Clover	2%
Trifolium repens White Clover	2%
Leucanthemum vulgare Ox-eye Daisy	1.6%

Filipendula ulmaria Meadow Sweet	1.5%
Ranunculus acris Meadow Buttercup	1.5%
Achillea millefolium Yarrow	1%
Anthoxanthum odoratum Sweet Vernal Grass	1%
Galium verum Lady's Bedstraw	1%
Prunella vulgaris Self Heal	1%
***Sanguisorba minor* Salad Burnet**	**1%**
Agrimonia eupatorium Agrimony	0.5%
Lotus corniculatus Birdsfoot Trefoil	0.5%
Ranunculus bulbosus Bulbous Buttercup	0.5%
Rhinanthus minor Yellow Rattle	0.5%
Leontodon autumnalis Autumn Hawkbit	0.2%
Leontodon hispidus Rough Hawkbit	0.2%

5.4.2 The seed list given above will require the replacement of 1% Salad burnet with an additional 1% Bird’s-foot trefoil (total 1.5% Bird’s foot trefoil).

5.4.3 In addition, species rich turf from on-site locations will be used to provide a native seed bank in landscaping.

5.5 Habitat Management

5.5.1 A five-year habitat management plan, produced to support the requirement for BREEAM, is included in Table 9, Appendix A

Appendix A

Appendix A

A.1 Phase 1 map

Figure 15 Phase 1 base (reproduced from '*Phase 1 Ecological Survey*' 17th June 2013).

A.2 Mitigation protection areas

Figure 16 Protected habitat and habitat creation areas

A.3 Management Plan

Table 9 Five year management plan (from BREEAM report[2])

Completion & Year 1	
	1. Compliance audit of all mitigation and enhancement features (including EPS audit and close-out) 2. Issue of BREEAM Appendix F 3. Mowing of raised earth banks to be undertaken only between July and March, not exceeding fortnightly and with mower blades above 100mm 4. All thinning removed from site or composted in a purpose-built facility (left). 5. Mitigation success monitored against PI's. Ecological consultant required to undertake water quality and habitat assessment as detailed in GCN EPSL method statement[3]
Year 2	
	1. Site visit by SQE to undertake Phase II of created habitat where seed mix RE1 was used to determine evolution to Mesotrophic Grassland 5a ('Hay meadow') 2. Mitigation success monitored against PI's. Ecological consultant required to undertake water quality and habitat assessment for great crested newt. 3. Walkover by SQE in May-June to assess population of Dingy skipper and effectiveness of management of existing and recreated habitats
Year 3	
	1. SQE to check all bird and bat boxes from October to February for evidence of use 2. Walkover by SQE in May-June to assess population of Dingy Skipper and effectiveness of management of existing and recreated habitats. Amend as required to ensure the minimum standard of no 'net loss'
Year 4	
	1. Mitigation success monitored against PI's. 2. Generic pond management in October to clear excessive weed growth and prevent encroachment. Use

[2] '*Llay Industrial Estate & Former Sharp Site: Ecological assessment for BREEAM'* **Capita** 2015

[3] '*Llay Industrial Site Method Statement to accompany a Great Crested Newt Licence'* **Capita** 11 November 2015

	rake to remove excessive aquatic growth. Leave thinning on dry bank to enable aquatic species (including larvae of great crested & other newt species) to return to water 3. Audit of planting, including repeat of Phase II and checking/replacement of planted trees and shrubs
Year 5	
	1. Mitigation success monitored against PI's 2. Bat & breeding bird survey against baseline from 'Llay Industrial Estate & Former Sharp Site: *Ecological Survey & Report'* (**July 2015** Capita) 3. Check all bird and bat boxes from October to February for evidence of use

A.4 Landscape design

Drawing Number / Rev
B1305210/AR/050.001-PL2

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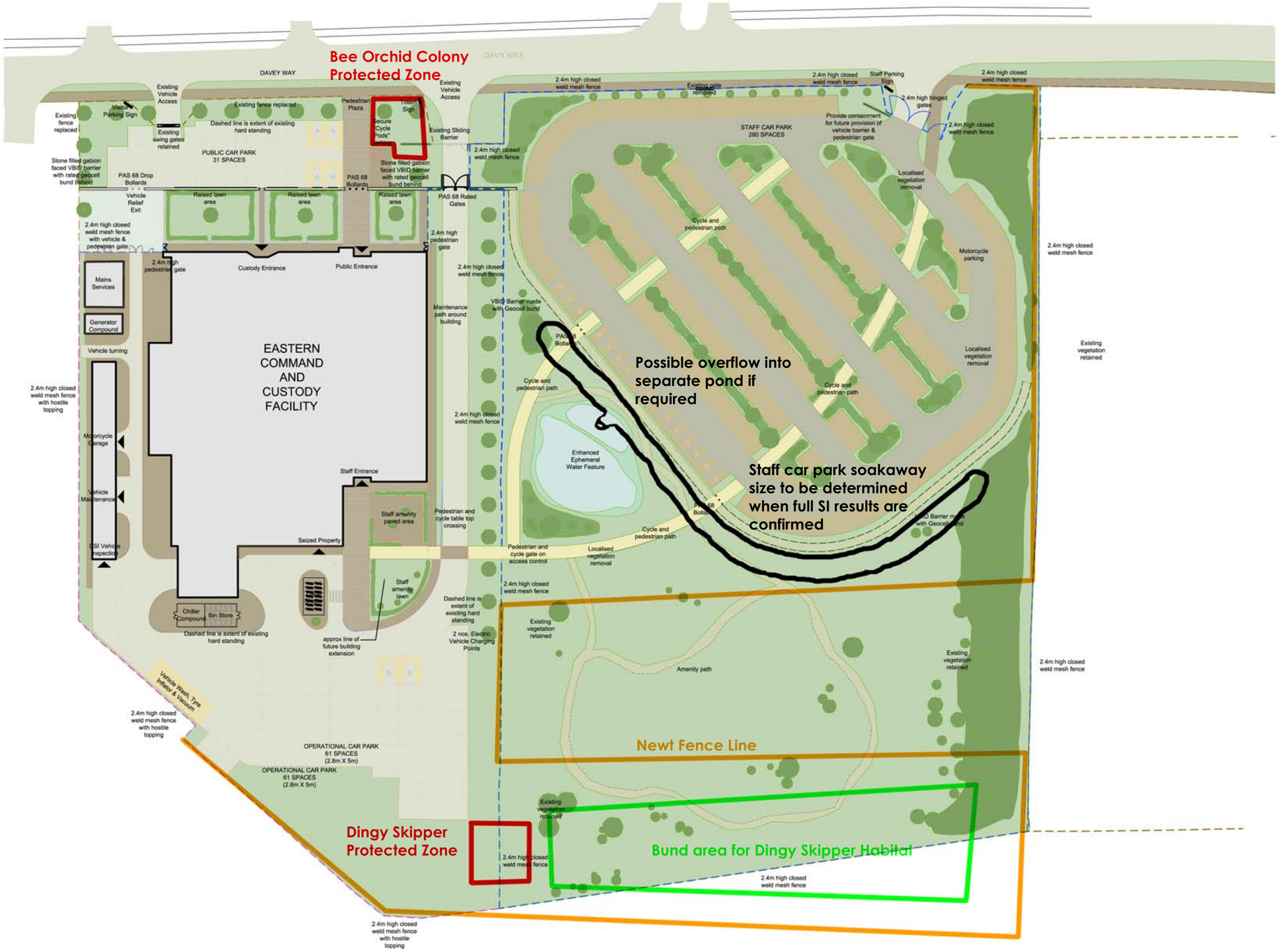
NOTES:
1. All dimensions are to be checked on site prior to preparing any working or shop drawings or commencing work on site.

2. This drawing is to be read in conjunction with all relevant Architect's, M&E and Structural Engineers' drawings and specifications.



1 **Proposed Site Plan**
1 : 500

1 **Full Site Key Plan**
NTS

scale 1:500

Rev	Rev Date	Purpose of revision	Drawn	Check'd	Review	Apprv'd
PL2	18.11.2015	Ecology mitigation measures added	ST	JW	DH	DH
PL1	24.07.2014	Issue for Planning	RB	JW	ST	DH

JACOBS

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POLICE AND CRIME COMISSIONER OF NORTH WALES

Project
EASTERN COMMAND AND CUSTODY FACILITY

Drawing title
PROPOSED SITE PLAN

Drawing Status
PLANNING

Scale	1 : 500 @ A1	DO NOT SCALE
Jacobs No.	B1305210	
JPI No.		

Drawing Number: B1305210/AR/050.001
Sheet No.
Rev: PL2

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