

# Extended Phase 1 Habitat Survey Report

Proposed development of a solar array at  
Williams Farm, Wrexham, Wales.

Prepared for: Solar Ventures Limited

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## Abstract

The Magnificent Science Company Limited were instructed by Solar Ventures Limited to carry out a statutory Phase 1 and protected species survey and risk assessment in support of a planning application for the development of a solar array at Williams Farm, Wrexham, Wrexham County, Wales. The assessment is based on the assumption that the site will be used for a solar farm.

A literature review/desk study was carried out based on North Wales Environmental Information Service (cofnod) reports, the Institute of Environmental Assessment report guidelines and current land cover map extracts, followed by a site survey by an ecological surveyor on 24<sup>th</sup> September 02014 to assess the probability of the site being a significant habitat for protected species.

The site at Williams Farm, Wrexham, North Wales is approximately 4.75km to the south-east of the centre of the town of Wrexham, and 2.65km from the outskirts of the urban boundary, at national grid reference SJ 38041 48342. It is situated within an industrial estate area, to the south of the main Wrexham Industrial Estate. Industrial units flank an approximate 180 degree circumference of the site from the north-north-east to the west-south-west; with a smaller industrial unit to the south of the site. The surrounding landscape is low-lying/flat grazed grassland of improved and semi-improved character, with some arable fields and woodlands.

The site itself is approximately 33.8 hectares in area and comprises predominate sheep-grazed improved and semi-improved neutral grasslands, with semi-natural broadleaved woodland and large standard trees. The Afon Clywedog (River Clywedog) runs west to east through the north-western area of the site and is a tributary of the Afon Dyfrdwy (River Dee). The boundaries of the site comprise post-and-wire fencing, with some intact native species-rich hedgerows along the north-eastern perimeter, as well as a section of the southern boundary and species-poor hedgerows on the remaining boundaries; both hedgerow types contain large trees. Within the site the hedgerows are defunct and species-poor.

Williams Farm does not lie within any statutory nor non-statutory designated wildlife or earth science sites, notified at the international, national or local scale. There are two non-statutory wildlife sites within a one kilometre radius of the proposed development site; both of these lie over 500 metres from the site itself. Neither of these will be directly affected by the proposed development.

The river and associated riparian habitats, including the semi-improved neutral grassland within the floodplain, are diverse and collectively form the richest area for biodiversity on site. This whole area should not be developed as part

of the solar array. According to the current plan seen, this area is excluded from development.

One of the hedgerows on site is classified as an "important" native species-rich hedgerow under The Hedgerow Regulations 1997 (HMSO, 1997), as it contains ten woody species. This hedgerow forms the central section of the north-eastern boundary of the site. Anyone wishing to remove all or part of a hedgerow covered by the Regulations needs to apply to the local planning authority.

One plant species that is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) were recorded on site during the extended Phase 1 survey: Himalayan Balsam (*Impatiens glandulifera*). All plants of this species should be removed so as to control its spread.

Regarding protected species, the survey, desk study and subsequent risk assessment identified that for this site, the significant species for which survey evidence or records were found are for breeding birds, bats, European Otter (*Lutra lutra*), Water Vole (*Arvicola amphibius*) and amphibians, and possibly Common Dormouse (*Muscardinus avellanarius*), reptiles, West European Hedgehog (*Erinaceus europaeus*) and invertebrates.

Detailed recommendations for mitigation and habitat enhancement within the completed development are provided at the end of this report which should be conditioned to ensure they are carried out. There is opportunity to improve the biodiversity of the area as a direct result of the development if this advice is conditioned and put into practice.

Summary of mitigation measures to be conditioned:

1. No development must take place within the floodplain area - the river and associated riparian habitats, including the semi-improved neutral grassland within the floodplain, collectively form the richest area for biodiversity on site. Phase 2 surveys, undertaken by suitably qualified ecologists, for European Otter, Water Vole, Great Crested Newt (*Triturus cristatus*), bat species, Common Dormouse and flora would be required if the development of the solar array were to extend into the floodplain area.
2. None of the buildings, mature standard trees, hedgerows or earth banks on site should be removed. Phase 2 surveys, undertaken by a suitably qualified ecologist, would be required for bats (both activity and roost surveys) if any of the buildings, mature standard trees or hedgerows are to be removed, along with Phase 2 surveys for reptiles if the earth banks are to be removed.

3. The hedgerow forming the central section of the north-eastern boundary of the site is classified as an "important" native species-rich hedgerow under The Hedgerow Regulations 1997 (HMSO, 1997), as it contains ten woody species. Anyone wishing to remove all or part of a hedgerow covered by the Regulations needs to apply to the local planning authority. Phase 2 surveys, undertaken by suitably qualified ecologists, for bats and Common Dormouse would be required if this hedgerow is to be considered for removal.
4. A re-survey of Badger activity should be undertaken on the site immediately prior to development work commencing.
5. The construction phase of this development should take place during May and June, when newts, particularly Great Crested Newts, are at their breeding ponds/locations. This would ensure minimum disturbance to any animals that move through the site to get to their breeding areas. It is unlikely that they will travel across the majority of the development site, as it comprises sheep-grazed poor semi-improved grassland. They are more likely to utilise the boundary hedgerows. Clearance of vegetation and soil for the construction of access roads, transformer stations etc. should be carried out under a method statement and an ecological watching brief to ensure the conservation of Great Crested Newts.
6. During the construction phase of this development all hedgerows and mature standard trees should be protected, with no work being undertaken within at least 10 metres. This buffer should be increased to 15 metres around the mature standard trees and along part of the western and southern boundaries where woodland lies adjacent to the site. Temporary fencing should be utilised to enforce a construction exclusion zone. The floodplain area, with river, associated riparian habitats and semi-improved neutral grassland should also be protected by fencing it off from the development site and making it a construction exclusion zone.
7. All fencing should allow mammals to pass through and particular attention should be paid to maintaining the Badger pathway which leads on to the site through the hedgerow forming the north-east boundary of the site from a Badger sett on adjacent land.
8. A silt fence should be erected along the break of slope forming the northern edge of the development area, with the aim of minimising runoff from the land into the river.
9. Vehicles/machinery should keep to the existing tracks through the site as far as possible, to minimise plant and soil disturbance.

10. Any clearance of vegetation, including the removal of trees and the cutting back of woody species, should not be undertaken during the bird breeding season, which extends from April to September, inclusive.
11. An ecological clerk of works should oversee the construction exclusion zones during the construction phase of the development, as well as all these mitigation measures, as appropriate.
12. All plants of Himalayan Balsam, a non-native invasive plant species, should be removed so as to control its spread.
13. All lighting to be kept to a minimum and be directional, away from vegetation, particularly the hedges.
14. No trenches should be left open at night.

Summary of possible habitat enhancements applicable for biodiversity gain:

1. The riparian zone and semi-improved neutral grassland would benefit from the removal of sheep grazing by fencing from the adjacent poor semi-improved grassland.
2. All areas of grassland on site, as well as the buffer strips left along all hedgerows and around the mature standard trees (within the construction exclusion zones), should be managed for wildlife. No artificial inputs, such as artificial pesticides and fertilisers, should be applied on site. This helps to maintain and improve the floristic diversity.
3. The existing native hedgerows should not be trimmed more frequently than once every three years and ideally should be kept at least 1.2 metres high. Dead wood should not be removed as this is beneficial for many species groups, particularly invertebrates and fungi.
4. Any trees to be planted as part of the development should be native and of local provenance. Ash (*Fraxinus excelsior*), Pedunculate Oak (*Quercus robur*), Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Dog-rose (*Rosa canina* agg.), Hazel (*Corylus avellana*), Holly (*Ilex aquifolium*), Field Maple (*Acer campestre*), Alder (*Alnus glutinosa*) and Elder (*Sambucus nigra*) could all be used (they all occur in the hedgerows in this area). These species could be used to create new hedgerows, linking in with the existing hedgerow network and for gapping up existing hedges (particularly those that are currently defunct).
5. The brick and stone piles should be retained on site as these provide refugia and hibernacula for reptiles and amphibians. Further hibernacula could be created if any vegetation or soil is being removed.

6. Some of the existing buildings on site could be improved to provide ideal conditions for hibernating bats.
7. Permanent provision for the Barn Owl (*Tyto alba* subsp. *alba*) should be created in the form of erecting nest boxes in one or two of the buildings or on a tree or pole, along with the provision of foraging habitat by management of the grassland.
8. A pond or series of ponds should be created, to benefit a number of species, particularly the Great Crested Newt.

## **Instruction and limitations**

The Magnificent Science Company Limited were instructed by Solar Ventures Limited to carry out a statutory Phase 1 and protected species survey and risk assessment in support of a planning application for the development of a solar array at Williams Farm, Wrexham, Wrexham County, Wales. The assessment is based on the assumption that the site will be used for a solar farm.

This report is a response to a specific instruction for a specific end use, specific site layout with regard to habitat as present at the time of the site visit and proposed development. It is prepared for the sole use of Solar Ventures Limited and their planning consultant, XL Planning Limited.

For the avoidance of doubt, any duty of care to any other end users or third parties is specifically excluded. If a period of one year passes prior to commencing site operations, a further survey will be required to ensure compliance with the statutory legal responsibility of the developers. The findings will require a re-assessment in the case of any change of boundaries, plans, location of amenity areas or buildings, planting schemes, changes of use of the wider area or buildings and/or end use to ensure its fitness for purpose. The assessment is based on the development plans presented at the time of the assessment.

The plan submitted to us by the client that was used for the ecological assessment was entitled 'Williams Farm' [file name 'FOOTPRINT WILLIAMS', 03/09/2014]'.

Assignment of this report without the written consent of The Magnificent Science Company Limited is forbidden. An assignment can be easily arranged but will require a re-assessment in the case of any change of boundaries, plans, location of amenity areas or buildings, changes of use of the wider area or buildings and/or end use to ensure its fitness for purpose, for which a small fee is levied. Please contact The Magnificent Science Company Limited for assignments at [projectmanager@magnificentscience.com](mailto:projectmanager@magnificentscience.com).

## **Introduction and site description**

The site at Williams Farm, Wrexham, North Wales is approximately 4.75km to the south-east of the centre of the town of Wrexham, and 2.65km from the outskirts of the urban boundary, at national grid reference SJ 38041 48342. It is situated within an industrial estate area, to the south of the main Wrexham Industrial Estate. Industrial units flank an approximate 180 degree circumference of the site from the north-north-east to the west-south-west; with a smaller industrial unit to the south of the site. The surrounding landscape is low-lying/flat grazed grassland of improved and semi-improved character, with some arable fields and woodlands.

The site itself is approximately 33.8 hectares in area and comprises predominate sheep-grazed improved and semi-improved neutral grasslands, with semi-natural broadleaved woodland and large standard trees. The River Clywedog runs west to east through the north-western area of the site and is a tributary of the River Dee. The boundaries of the site comprise post-and-wire fencing, with some intact native species-rich hedgerows along the north-eastern perimeter, as well as a section of the southern boundary and species-poor hedgerows on the remaining boundaries; both hedgerow types contain large trees. Within the site the hedgerows are defunct and species-poor.

The topography of the site slopes down to the River Clywedog with the lower fields acting as a floodplain. There is good connectivity from the site to patches of local ancient semi-natural broadleaved woodland, as well as a conifer plantation. Connectivity to the wider landscape is mainly via the river, fringed with mature broadleaved woodland along sections of its bank, running west to east on site. The river on the site follows a natural meandering course only channelled through a small section under a bridge at the far eastern end of site. The site has large standard trees in the fields, as well as in the hedgerows and boundaries which connect to the adjacent land (including woodland and scrub).

A site location plan is presented in the appendices as Figure One and a Phase 1 habitat survey plan with boundaries is presented in the appendices as Figure Two. Photographic plates 1 and 2 (Figure Three in the appendices) give an overview of the site.

## **Accessibility statement**

This report is available in alternative formats on request including electronic PDF formatted for screen readers, large print and audio MP3.

## **Field survey and desk study**

An ecological surveyor visited the site on 24<sup>th</sup> September 02014 and undertook the field survey in accordance with the guidelines presented in the Handbook for Phase 1 Habitat Survey (JNCC, 2003). The extent of each habitat type was mapped and details of relative plant species abundance within homogeneous areas were recorded.

A North Wales Environmental Information Service (cofnod) data report was ordered comprising all designated site and protected species information given as a radius of one kilometre from British National Grid reference SJ382484. All the data were analysed for evidence of protected species past or present that may be affected by the proposed development on the site. Their known preferred habitat was compared to the possible habitat risk assessment for the proposed development presented above.

An extended Phase 1 survey was undertaken which means that the standard survey methodology is extended to include a search for animal species of nature conservation importance such as those that are afforded legal protection or are otherwise notable at a county or UK Biodiversity Action Plan (BAP) level.

The survey was conducted in autumn when some species are not flowering so it is possible that some plant species were not recorded because they were not evident. It is also worth remembering that any single survey gives a snapshot of species and habitats present on site on a particular day.

Target note descriptions were also recorded for key habitats and features, including sites of potential notable animal habitat.

## **Designated site information**

The site does not lie within any statutory or non-statutory designated wildlife or earth science sites, notified at the international, national or local scale (as indicated in the data provided by the North Wales Environmental Information Service (cofnod)), nor does not lie within a Site of Special Scientific Interest (SSSI) Impact Risk Zone.

The Afon Clywedog (River Clywedog) flows west to east through the north-west of the site. This is a tributary of the Afon Dyfrdwy (River Dee), joining it approximately five kilometres downstream, which is a Special Area of Conservation (SAC).

There are two local wildlife sites (non-statutory) within a one kilometre radius of the site. These are:

1. Wrexham Industrial Site (Wrexham W337), at a distance of 721 metres from the site to the north-east. This comprises unmanaged grassland and ancient broadleaved woodland, as well as a mosaic of scrub, grassland and tall herbs.
2. Peter's Dingle (Wrexham W319), semi-natural broadleaved woodland 523 metres to the south-east of the site.

Non-statutory wildlife sites contain features that are of substantive nature conservation value at a local level of significance.

## **Conclusions of the designated site assessment**

Williams Farm does not lie within any statutory nor non-statutory designated wildlife or earth science sites, notified at the international, national or local scale (as indicated in the data provided by the North Wales Environmental Information Service (cofnod)).

There are two non-statutory wildlife sites within a one kilometre radius of the proposed development site; both of these lie over 500 metres from the site itself. Neither of these will be directly affected by the proposed development.

## Habitat description

The following habitat types were recorded on site during the Phase 1 survey (see Figure Two for location of habitats and target notes):

- ◆ Semi-natural broadleaved woodland
- ◆ Semi-improved neutral grassland
- ◆ Poor semi-improved grassland
- ◆ Marshy grassland
- ◆ Tall ruderal
- ◆ Running water (oligotrophic river) with marginal and inundation vegetation
- ◆ Basic flush
- ◆ Dry ditch
- ◆ Buildings

The boundaries recorded were:

- ◆ Native species-rich hedgerow and trees
- ◆ Native species-rich hedgerow
- ◆ Native species-rich defunct hedgerow
- ◆ Native species-poor hedgerow and trees
- ◆ Native species-poor defunct hedgerow
- ◆ Earth bank
- ◆ Fence

### Semi-natural broadleaved woodland

There are small blocks of semi-natural broadleaved woodland along the river in the northern section of the site, along with a small patch in the southern section, close to the southern boundary.

The woodland areas dotted along the river are dominated by Crack Willow (*Salix fragilis*) and Alder (*Alnus glutinosa*) with Dog-rose (*Rosa canina* agg.), Ash (*Fraxinus excelsior*) and Elder (*Sambucus nigra*). The ground flora includes

Creeping Cinquefoil (*Potentilla reptans*), Hoary Willow-herb (*Epilobium parviflorum*) and Common Nettle (*Urtica dioica*). See target notes 18, 25, 34, 40, 41, 42 and 46.

The small patch of woodland in the southern area of the site (target note 63) comprises Silver Birch (*Betula pendula*).

### **Parkland and scattered trees**

Large mature trees are scattered over a large area of the site, particularly within the poor semi-improved grassland habitat (see '*Poor semi-improved grassland*' section below). These large mature trees are dominated by Pedunculate Oak (*Quercus robur*).

See target notes 4, 6, 7, 8, 9, 13, 14, 16, 20, 59 and 68 and photographic plates 1 and 2 (Figure Three in the appendices).

### **Semi-improved neutral grassland**

The floodplain area either side of the river on the north-western area of the site comprises semi-improved neutral grassland. Species recorded here include Common Bent (*Agrostis capillaris*), Wavy hair-grass (*Deschampsia flexuosa*), Rough Meadow-grass (*Poa trivialis*), Meadow Fescue (*Festuca pratensis*) and a Feather-moss.

There is a richer area of semi-improved neutral grassland adjacent to the river at the eastern end of the site. Additional species recorded here include Crested Dog's-tail (*Cynosurus cristatus*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Red Fescue (*Festuca rubra* agg.), Red Campion (*Silene dioica*) and Long-headed Poppy (*Papaver dubium*).

See target notes 22 and 23.

### **Poor semi-improved grassland**

Poor semi-improved grassland dominates the southern and south-eastern areas of the site and is currently grazed by sheep. Dominant species recorded include: Common Bent, Rough Meadow-grass, Creeping Thistle (*Cirsium arvense*), Common Sedge (*Carex nigra*), Common Nettle, White Clover (*Trifolium repens*) and Common Chickweed (*Stellaria media*).

A large proportion of this habitat is covered by scattered trees (see *Parkland and scattered trees* section above).

See target notes 62 and 64, and photographic plate 1 (Figure Three in the appendices).

### **Marshy grassland**

A small area of marshy grassland is to be found adjacent to a central section of

the western boundary, to the south of the river. Species recorded here include: Common Bent, Wavy Hair-grass, Rough Meadow-grass, Meadow Fescue, Common Bird's-foot-trefoil (*Lotus corniculatus*), Spear Thistle (*Cirsium vulgare*), Tormentil (*Potentilla erecta*), Creeping Cinquefoil, Creeping Buttercup (*Ranunculus repens*), White Clover (*Trifolium repens*), Water Chickweed (*Myosoton aquaticum*), Water Mint (*Mentha aquatica*), Common Sorrel (*Rumex acetosa*), Common Mallow (*Malva sylvestris*) and Common Selfheal (*Prunella vulgaris*). A number of mosses were also noted including a Feather-moss and Fern-leaved Hook-moss (*Cratoneuron filicinum*).

See target note 31.

### **Tall ruderal**

There are two significant patches of tall ruderal vegetation along the river, within the floodplain grassland. Species recorded include Common Nettle, Spear Thistle and Musk Thistle (*Carduus nutans*).

See target notes 37 and 44 and photographic plate 3 (Figure Three in the appendices).

### **Running water (oligotrophic river) with marginal and inundation vegetation**

The river (running water) follows a natural meandering route west to east within the northern section of the site. The river varies in width, depth and speed throughout its course, with the river bed and banks comprising sand and mud, with gravel beaches in the slow-flowing areas. There are a number of islands within the river that are vegetated.

See target notes 19, 21, 43, 48, 51, 52 and 53.

The marginal vegetation includes Common Reed (*Phragmites australis*), Soft Rush (*Juncus effusus*), Yellow Iris (*Iris pseudacorus*), Fern-leaved Hook-moss and a Feather-moss.

The inundation vegetation is found predominately at the eastern end of the river, with species including Common Sorrel, Common Mallow (*Malva sylvestris*), Common Nettle, White Dead-nettle (*Lamium album*) and Himalayan Balsam (*Impatiens glandulifera*). See section on *Non-native invasive plant species* for more details concerning Himalayan Balsam.

See target notes 17, 50 and 55.

See photographic plates 4 and 5 (Figure Three in the appendices).

### **Basic flush**

The basic flush habitat is located along the steep slopes down to the floodplain,

predominantly in the southern section of the site. Species recorded include Common Sedge (*Carex nigra*), Marsh Horsetail (*Equisetum palustre*) and Fern-leaved Hook-moss (*Cratoneuron filicinum*).

See target note 57 and photographic plate 6 (Figure Three in the appendices).

### **Dry ditch**

There is a large, non-vegetated dry ditch alongside the river bank at the eastern end of the site.

See target note 24.

### **Buildings**

There are 15 buildings scattered throughout the south-eastern area of the site. The 'hanger' type buildings were a Second World War factory and are constructed of brick with pre-cast concrete block (rendered with cement) flat roofs and concrete floors. They are dark and damp inside with large open spaces that appear to have, at times, housed cattle and sheep. The buildings do vary with their original functions as bathrooms, offices and sleeping areas. Some have open-ended tunnel areas attached and others are very open as they have un-paned windows. Wildlife can access these buildings via open doorways, open windows and some holes in the walls. Some of the buildings have trees, scrub and vegetation growing on them, as well as in the doorways. Tree species include Hawthorn (*Crataegus monogyna*) and Holly (*Ilex aquifolium*), often with Ivy (*Hedera helix*).

See target notes 3 and 10 and photographic plates 2 and 7 (Figure Three in the appendices).

## **Boundary descriptions**

### **Native species-rich hedgerow and trees**

There is a section of native species-rich hedgerow and trees along a section of north-eastern boundary of the site. Ten woody species were recorded: Field maple (*Acer campestre*), Pedunculate Oak (*Quercus robur*), Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Sycamore (*Acer pseudoplatanus*), Elder (*Sambucus nigra*), Dog-rose (*Rosa canina* agg.), Ash (*Fraxinus excelsior*), Apple species (*Malus* sp.) and Holly (*Ilex aquifolium*). There is a large mature Ash tree in the northern half of this hedgerow and a mature Pedunculate Oak in the south-eastern corner. Other species recorded include Bramble (*Rubus fruticosus* agg.), Common Bent (*Agrostis capillaris*), Rough Meadow-grass (*Poa trivialis*) Creeping Thistle (*Cirsium arvense*), Common Sedge (*Carex nigra*), Common Nettle (*Urtica dioica*) and Common Chickweed (*Stellaria media*).

See target notes 27, 28 and 29 and photographic plate 8 (Figure Three in the appendices).

### **Native species-rich hedgerow**

There is a section of native species-rich hedgerow along the southern boundary of the site, which turns into a defunct hedgerow at its eastern end. This hedgerow has four woody species: Blackthorn, Elder, Hawthorn and Dog-rose (*Rosa canina* agg.). Other species recorded here include Common Bent, Rough Meadow-grass, Common Sedge, Common Nettle (*Urtica dioica*) and Creeping Thistle.

See target note 5.

### **Native species-rich defunct hedgerow**

There is a section of native species-rich defunct hedgerow along the southern boundary of the site. It continues westwards as a native species-rich hedgerow.

See target note 5.

### **Native species-poor hedgerow and trees**

There is one section of native species-poor hedgerow and trees, forming the western end of the north-western boundary, to the north of the river. Woody species recorded include Alder, Hawthorn, Crack Willow, Ash and Pedunculate Oak.

See target note 49.

### **Native species-poor hedgerow**

There is one section of native species-poor hedgerow forming part of the western site boundary, just south of the river. This comprises young Blackthorn with a ground flora dominated by Common Nettle.

See target note 32.

### **Native species-poor defunct hedgerow**

There are four sections of native species-poor defunct hedgerow on site; three form sections of the site boundary, with the fourth following a track to create an internal boundary within the poor semi-improved grassland. Woody species recorded in these defunct hedgerows include Pedunculate Oak, Ash, Hawthorn, Blackthorn, Dog-rose and Elder. The internal boundary comprised purely of Hawthorn.

See target notes 11, 30, 33 and 56 and photographic plate 9 (Figure Three in the appendices).

## Earth bank

Earth banks are found around the edge of the southern-most area of semi-improved grassland, as well as forming the site boundary along the north-eastern end of the north-western boundary, north of the river. These banks are comprised of improved grassland communities with species such as Common Bent, Rough Meadow-grass, Creeping Thistle, Common Sedge, Common Nettle and Common Chickweed.

See target notes 24, 45 and 60 and photographic plate 10 (Figure Three in the appendices).

## Fence

Post-and-wire fences form sections of the site boundary, as well as a couple of internal boundaries.

## Invasive non-native plant species

Himalayan Balsam (*Impatiens glandulifera*) is found along both banks of the River Clywedog throughout its course within the site boundary. This plant species is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). Section 14 of the Act prohibits the introduction into the wild of certain plant or animal species which may cause ecological or environmental harm; these species are those listed in Schedule 9. The legislation aims to prevent the planting of Schedule 9 listed plant material in the wild where it poses a threat to the native habitats and species.

See target notes 17 and 50, and photographic plates 4 and 5 (Figure Three in the appendices).

## Conclusions of the habitat survey

No records of flowering plants of national conservation significance were recorded on site during the survey, nor listed in the data provided by the North Wales Environmental Information Service (cofnod). However three plant species of national conservation significance were listed as being recorded after 01999 within a one kilometre radius of the site. These were Rough Hawk's-beard (*Crepis biennis*), a Welsh Vascular Plant Red Data List (WVPRDL) species; Narrow-leaved Vetch (*Vicia sativa* subsp. *nigra*), also a WVPRDL species; and Jacob's-ladder (*Polemonium caeruleum*) a UK Red Data Book species.

One plant species that is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) were recorded on site during the extended Phase 1 survey: Himalayan Balsam (*Impatiens glandulifera*). All plants of this species should be removed so as to control its spread.

One of the hedgerows on site is classified as an “important” native species-rich hedgerow under The Hedgerow Regulations 1997 (HMSO, 1997), as it contains ten woody species. This hedgerow forms the central section of the north-eastern boundary of the site. Anyone wishing to remove all or part of a hedgerow covered by the Regulations needs to apply to the local planning authority.

The river and associated riparian habitats, including the semi-improved neutral grassland within the floodplain, are diverse and collectively form the richest area for biodiversity on site.

## Results of protected species surveying

The field survey and desk study found evidence of the following protected animal species within the site:

### Breeding birds

It is likely that breeding and wintering birds will be present within the site due to the riparian habitats, hedgerows, semi-natural broadleaved woodland and scattered trees. The floodplain semi-improved neutral grassland will be of particular importance for wintering birds, with the river being an important habitat for wintering wildfowl. All wild birds are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended), from being killed, injured or captured, while their nests and eggs are protected from being damaged, destroyed or taken. The birds listed under Schedule 1 of the Wildlife and Countryside Act are afforded additional protection against disturbance.

Bird species recorded on site during the phase 1 were: Buzzard (*Buteo buteo*), Rook (*Corvus frugilegus*), Meadow Pipit (*Anthus pratensis*), Collared Dove (*Streptopelia decaocto*), Wood Pigeon (*Columba palumbus*), Mallard (*Anas platyrhynchos*), Moorhen (*Gallinula chloropus*), Great Tit (*Parus major*), Long-tailed Tit (*Aegithalos caudatus*), Pied Wagtail (*Motacilla alba*) and Herring Gull (*Larus argentatus*).

No information regarding breeding birds on the site was received from the North Wales Environmental Information Service (cofnod). However the data did list a number of bird records within a one kilometre radius of the site, recorded since 01999. These included Skylark (*Alauda arvensis*), Linnet (*Linaria cannabina*), Grasshopper Warbler (*Locustella naevia*), House Sparrow (*Passer domesticus*), Dunnock (*Prunella modularis*), Bullfinch (*Pyrrhula pyrrhula*), Starling (*Sturnus vulgaris*), Song Thrush (*Turdus philomelos*), Mistle Thrush (*T. viscivorus*), Grey Wagtail (*Motacilla cinerea*), Whitethroat (*Sylvia communis*) and Snipe (*Gallinago gallinago*).

## Barn Owl

The decline and vulnerability of the Barn Owl (*Tyto alba* ssp. *alba*) have led to its inclusion on Schedule 1 of the Wildlife and Countryside Act 1981 and the RSPB's Amber list of Birds of Conservation Concern (RSPB *et al*, 2009). Under Schedule 1 of the Wildlife and Countryside Act 1981 the Barn Owl is afforded special legal protection against wilful or reckless disturbance whilst nesting and this includes whilst the nest is being 'built' (Barn Owls do not in fact 'build' a nest but make a nest scrape) or whilst in, on, or near a nest containing eggs or young. It is therefore illegal to undertake any building work (or other activity) which could cause disturbance to breeding Barn Owls at or near the nest site. Although Barn Owls can breed throughout the year the main breeding season is from early March until the end of August.

Further legislation relates to the restoration and enhancement of habitat for the purposes of enhancing biodiversity. This includes the Natural Environment and Rural Communities Act (NERC, 2006) which states that the planning authority has a duty to ensure that planning applications conserve biodiversity by restoring or enhancing a population or its habitat.

No evidence of Barn Owl was recorded on site during this survey – the buildings were checked for signs. However the grassland adjacent to the river is suitable as foraging habitat for the Barn Owl as it is likely to support populations of its prey item of small mammals.

The data from cofnod listed a Barn Owl record from 2005 for the ten kilometre grid square SJ34.

## Mammals

### Badger

Badgers (*Meles meles*) and their setts are legally protected under the Protection of Badgers Act 1992 (HM Government, 1992). The Protection of Badgers Act 1992 originally arose in order to protect Badgers from baiting and deliberate harm or injury. However, the legislation also contains restrictions that may be applicable to development within the close proximity of a Badger sett. Under the Act it is illegal to:

- ◆ Interfere, damaging or destroy a sett
- ◆ Obstruct access to a sett
- ◆ Disturb a Badger whilst it is occupying a sett.

This means that a development that disturbs Badgers is illegal without a licence. Work within ten metres of a Badger sett normally requires a licence from Natural Resources Wales, although ideally within 30 metres. Licences are

normally only granted during the 'open season' which extends from 1<sup>st</sup> July to 30<sup>th</sup> November in order to protect pregnant females and young cubs. Any development potentially affecting a Badger sett must take into consideration the welfare of the Badgers and incorporate suitable mitigation measures in order to minimise any impact to the sett, feeding areas and access to important feeding areas.

A Badger licence can only be obtained by a suitably qualified ecologist and the works under licence are normally undertaken under the guidance of the ecologist who then must provide a brief report to Natural Resources Wales on completion of the licensable activities.

There were Badger feeding signs along the north-eastern boundary just south of the river, where there were two possible entrance points in the fence /hedgerow identified (see target note 26). A Badger path runs along the field from the disused railway footpath and a latrine was found near the feeding remains used by Badgers to mark the edge of their territory on the boundary of the site (see photographic plate 11 (Figure Three in the appendices). A Badger sett was identified nearby (approximately 10 metres from the boundary fence located on adjacent land). The sett is far enough away on stable ground to not be affected by the proposed development. However it is important to not obstruct their access to foraging and runs, and there should not be a loss of foraging land.

The rest of the site was thoroughly searched but no other signs of Badgers were seen. The site has complete sheep fencing which would impinge entry to medium-sized mammals such as Badgers.

There was no information relating to Badgers or their signs found on the site in the data provided by cofnod. However, there were records relating to Badger sett(s) within the one kilometre grid squares SJ3849 and SJ3948 (recorded in 2007), with setts in SJ3748, SJ3749, SJ3848 and SJ3849 recorded in 2003.

## **Bats**

All British bat species and their roosts are legally protected under the Wildlife and Countryside Act 1981 (WCA) (as amended CroW 2000) and receive European protection under the Conservation (Natural Habitats) Regulations 1994 which implements the EC Habitats Directive (CEC, 1992) within the UK. In combination this legislation makes it an offence to:

- ◆ Capture or kill a bat
- ◆ Disturb a bat while in a place of shelter or rest
- ◆ Damage or destroy a bat's breeding site or resting place
- ◆ Obstruct access to a bat roost

All British bat species feed on insects which are found in greatest concentration within the shelter provided by overhanging vegetation, such as that found in overgrown hedges. Linear features such as hedges, also provide 'green corridors', through an otherwise open semi-natural and built-up landscape, which offer safe dispersal routes for bats travelling through the urban areas and the wider countryside.

The data received from cofnod listed one bat record that had been recorded within a one kilometre radius of the site since 01999; none were recorded for the site itself. The record was of a Pipistrelle species (*Pipistrellus* sp.) and was recorded in SJ3849 in 2003.

During the survey a number of potential bat roosting sites were noted. These include the mature trees in the grassland fields and the broadleaved woodland along the river. Some of the trees were of higher potential for bats as they had cavities and/or had large amounts of Ivy (*Hedera helix*) for bats to shelter in and to roost.

Some of the buildings had bat roosting potential. The enclosed buildings provide a dark, cool, damp environment with a constant temperature suitable for hibernating bats. The roofs are flat with no voids and are not tiled or lined so are not suitable for the crevice-liking species of bats. Attached to one of the buildings are drains with concrete chambers (see target note 12 and photographic plate 13). These have potential to provide hibernation opportunities for bats depending on the material inside for perching and the environmental conditions. Signs of bats were looked for although none were seen (please note not all areas were inspected). The large amount of debris on the floors made it difficult to detect droppings. Two of the buildings are closed with small entrance holes and have roosting opportunities inside where brickwork has deteriorated and lost its mortar, thus providing suitable cavities.

See target notes 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 18, 20, 25, 27, 28, 29, 30, 34, 38, 39, 42, 43, 59 and 68 and photographic plates 7 and 12 (Figure Three in the appendices).

The broadleaved woodland, hedgerows, mature trees and grassland on site, along with scrub on adjacent land, provide suitable commuting corridors and foraging opportunities for bats. The river and its associated riparian habitats have high potential for invertebrate prey for foraging bats. As mentioned above there is potential for some species of bat to roost in the mature and semi-mature trees on site (ivy-clad, lifted bark and crevices). The hedgerows are linked to a much larger woodland complex to the south of the site, as well as connecting to other hedgerows and watercourses in the surrounding landscape. It is highly likely that bats will be using this site for foraging and possibly for roosting including during winter hibernation.

## Common Dormouse

The Common Dormouse (*Muscardinus avellanarius*) is protected against killing, injury, disturbance and handling, under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). It is also listed under Section 42 of the Natural Environment and Rural Communities Act (2006). These are the species found in Wales which have been identified as requiring action under the UK Biodiversity Action Plan (BAP). The Common Dormouse is also listed on Schedule 2 of The Conservation of Habitats and Species Regulations 2010 as a European protected species of animal, making it an offence to:

- (a) deliberately capture, injure or kill a Common Dormouse;
- (b) deliberately disturb wild animals of this species;
- (c) damage or destroy a breeding site or resting place of this species.

Dormice are associated with woodland edge and species-rich hedgerows, especially those containing Hazel (*Corylus avellana*) and berry-bearing woody species. The species-rich hedgerows, riverbank trees and associated understorey on site would provide suitable habitat and foraging for dormice. No Common Dormouse or evidence of dormice were noted during the survey, although they were not specifically surveyed for.

There were no records of dormice listed in the data provided by cofnod as having been recorded within a one kilometre radius of the site since 01999. Dormice are known to have crossed into Wrexham County from the adjoining County of Cheshire following an introduction; however little is known about their location and distribution in Wrexham County. The possible presence of Common Dormouse should therefore be taken into consideration.

## European Otter

The European Otter (*Lutra lutra*) is protected against killing, injury, disturbance and handling, under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). It is also listed under Section 42 of the Natural Environment and Rural Communities Act (2006). These are the species found in Wales which have been identified as requiring action under the UK Biodiversity Action Plan (BAP). The Otter is also listed on Schedule 2 of The Conservation of Habitats and Species Regulations 2010 as a European protected species of animal, making it an offence to:

- (a) deliberately capture, injure or kill an Otter;
- (b) deliberately disturb wild animals of this species;
- (c) damage or destroy a breeding site or resting place of this species.

There is suitable habitat for Otter along the river and its bank. The river follows

a naturally meandering course proving suitable habitat for travelling and foraging, as well as for their holts. The Otter is a mobile, wide-ranging species (on land and water) requiring large territories. A number of Otter activity locations along the river were identified, including an Otter slide along the river bank at the far western end of the side and a spraint near to the bridge in the north-west corner (see target notes 36, 43 and 54 and photographic plate 13 (Figure Three in the appendices)). Otter prints and slides were noted near the deeper, slower sections of the river where there were also lots of branches piled on the side of the banks. A possible holt was recorded along the river within its central section (see target note 47).

It should be noted that the whole river was not surveyed due to accessibility. There is a lot of sheep activity along the river bank making the assessment of the presence riparian species more difficult.

No records of Otter were listed in the data provided by cofnod as having been recorded within a one kilometre radius of the site since 01999.

## **Water Vole**

The Water Vole (*Arvicola amphibius*) is protected against killing, injury, disturbance and handling, under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). It is also listed under Section 42 of the Natural Environment and Rural Communities Act (2006). These are the species found in Wales which have been identified as requiring action under the UK Biodiversity Action Plan (BAP).

There is suitable habitat for the Water Vole on site. Locations with high banks, Water Vole tunnels and holes along the river bank were identified during the survey (see target notes 35 and 48) and the emergence and inundation vegetation especially on slower sections with pools are suitable for feeding areas (see target notes 31, 48, 52, 53 and 55). The short floodplain grassland along sections of the bank are suitable habitat for Water Voles as they utilise strips of land along water courses. The Willow (*Salix* sp.) and Elder bark and bulbs of herbaceous plants provide a good source of food for possible over-wintering Water Voles.

No records of Water Vole were listed in the data provided by cofnod as having been recorded within a one kilometre radius of the site since 01999.

## **West European Hedgehog**

The Hedgehog (*Erinaceus europaeus*) is listed under Section 42 of the Natural Environment and Rural Communities Act (2006). These are the species found in Wales which have been identified as requiring action under the UK Biodiversity Action Plan (BAP). It is commonly found in gardens and short grass fields where it can find a variety of food stuffs including beetles,

earthworms, bird's eggs, slugs and snails. In winter when such food supplies are scarce, hedgehogs hibernate in sheltered nests of grass and dead leaves supported by Bramble.

The river and its bank provide suitable habitat for Hedgehogs. There is a variety of potential hibernation sites, with piles of dead wood and leaves from the broadleaved trees. The longer semi-improved grassland of the flood plain and the river bank provide increased foraging opportunities. The grazed semi-improved grassland further south could also be utilised by Hedgehogs. No evidence of Hedgehogs on site was seen during the survey.

The data provided by cofnod listed one record of Hedgehog within a one kilometre radius of the site, having been recorded at SJ375489 in 2012.

## Herpetofauna

Many of our native amphibians and reptiles are listed in the Natural Environment and Rural Communities Act (2006), having been identified as requiring action under UK BAP, with some (including the Great Crested Newt (*Triturus cristatus*) being having legal protection under Schedule 5 of the Wildlife and Countryside Act. The Great Crested Newt is also listed on Schedule 2 of The Conservation of Habitats and Species Regulations 2010 as a European protected species of animal, making it an offence to:

- (a) deliberately capture, injure or kill a Great Crested Newt;
- (b) deliberately disturb wild animals of this species;
- (c) deliberately take or destroy the eggs of this species;
- (d) damage or destroy a breeding site or resting place of this species.

There is suitable habitat for both reptiles and amphibians on site. This is predominantly the semi-improved neutral grassland along the river banks and the floodplain area. This area of longer vegetation provides foraging opportunities for reptiles and amphibians during their terrestrial stage. There are plentiful dead wood and tree roots in this riparian zone available for refuge and hibernation. Several logs were lifted to check for the presence of reptiles and amphibians but none were found during the survey.

The watercourse has both shallow, slow-running areas with pools, alongside the faster flowing main river. The river has vegetated islands, along with well-developed marginal and inundation vegetation; these areas provide opportunities for egg laying, particularly for amphibians. The deeper pools are suitable for mating displays during the breeding season.

See target notes 21, 34, 51 and 55 and photographic plate 14 (Figure Three in the appendices).

The grazed semi-improved grassland does not provide suitable habitat for hibernation or migration for neither reptiles or amphibians as it is exposed. The basic flushes within this grassland area may provide habitat in wet weather but are very isolated and exposed. There are also a number of rubble piles, as well as tree roots which could be used as hibernacula and refuges for both amphibians and reptiles, as would the native species-rich hedgerow and trees along the eastern boundary of the site.

See target notes 23, 27, 31, 37 and 44 and photographic plate 15 (Figure Three in the appendices).

No reptile or amphibian species were recorded during the survey, although they were not specifically surveyed for.

There were a number of records of both amphibian and reptile species in the data provided by cofnod, having been recorded within a one kilometre radius of the site since 01999 (none related to the site itself).

There were two records of Great Crested Newt, both recorded during the breeding season, at SJ381488 (just to the north of the site) in 2012 and at SJ375477 (to the south-west of the site) before 2007. Newts to the north of the site are not likely to reach the pools on the south side of the river due to the fast-flowing nature of the river itself (it acts as a natural barrier to any of the newt species). There is one record for Smooth Newt (*Lissotriton vulgaris*): at SJ381488 in 2012.

There was one record of Slow-worm (*Anguis fragilis*) in the data provided by cofnod – within SJ3849, recorded before 2009, along with one record of Adder (*Vipera berus*) at SJ380490, also recorded prior to 2009.

## **Invertebrates**

The diversity of habitats on site, with woodland, hedgerows, mature trees, semi-improved grassland and riparian habitats, provide suitable cover, feeding sources and basking areas for many invertebrate species. There will also be limited invertebrates associated with the sheep-grazed semi-improved grassland.

Invertebrates were not specifically surveyed for, however Golden-ringed Dragonfly (*Cordulegaster boltonii*) and Dor Beetle (*Anoplutrupes stercorarius*) (as Badger feeding remains) were recorded on site during the survey.

A number notable invertebrate species were listed in the data provided by cofnod as having been recorded since 01999 within a one kilometre radius of the site (none for the site itself). These included the butterfly species Dingy Skipper (*Erynnis tages*), Grizzled Skipper (*Pyrgus malvae*), White-letter Hairstreak (*Satyrrium w-album*) and Small Heath (*Coenonympha pamphilus*), as well as the moth species Latticed Heath (*Chiasmia clathrata*), Shaded

Broad-bar (*Scotopteryx chenopodiata*) and Northern Crescent Piercer (*Grapholita lunulana*). The Common Club-tail (*Gomphus vulgatissimus*) has also been recorded in the area.

## **Freshwater species**

The river, Afon Clywedog, was not surveyed specifically for faunal species such as invertebrates, crayfish and fish. Fish species were seen but not identified during the survey. If the river is likely to be affected by the proposed development it will require phase 2 surveys to identify fauna utilising its various micro-habitats.

## **Conclusions of the species survey**

The survey, desk study and subsequent risk assessment identified that for this site the significant species for which survey evidence or records were found are breeding birds, bats, European Otter, Water Vole and amphibians and possibly Common Dormouse, reptiles, West European Hedgehog and invertebrates.

## **Planning policy and legal framework of the assessment**

The National Planning Policy Framework, formally PPS9, states the UK government policy on biodiversity and nature conservation. A key policy is that local planning decisions should effectively maintain, enhance, restore and add to biodiversity. This places a duty of care on planners and local planning authorities to ensure the conservation of protected species and prevent harm to biodiversity.

This means the presence of a protected species is a material consideration when deciding planning applications. Planners must ensure the extent of any adverse effects occurring to the species and its habitat by the proposed development is fully investigated and appropriate mitigation put in place prior to the granting of planning permission. The local planning authority has the power to impose planning conditions or draw up an agreement with the developer under Section 106 of the Town and Country Planning Act 1990 to ensure the conservation of legally protected species, including badgers and bats is fully provided for.

## **UK biodiversity policy**

The UK Biodiversity Action Plan (UKBAP) (Anon, 1995), is the national strategy developed in response to the Convention on Biological Diversity signed in Rio in 1992. This has identified the species requiring priority action to address their causes of decline and take action to maintain and conserve their biodiversity.

The UK has produced a national priority species list where each species included has its own individual Species Action Plan (SAP). This has then been

extended to regional and local BAPs which develop plans for species of nature conservation importance at regional and local levels.

The UK Post-2010 Biodiversity Framework, which was published in 2012, replaces the previous UKBAP. However the lists of priority species and habitats still form the basis of country-based biodiversity work.

## **Synthesis and interpretation of risk assessments**

The survey, desk study and subsequent risk assessment identified that for this site the following significant species for which survey evidence or records were found are breeding birds, bats, European Otter, Water Vole and amphibians and possibly Common Dormouse, reptiles, West European Hedgehog and invertebrates.

The river and associated riparian habitats, including the semi-improved neutral grassland within the floodplain, are diverse and collectively form the richest area for biodiversity on site.

One of the hedgerows on site is classified as an "important" native species-rich hedgerow under The Hedgerow Regulations 1997 (HMSO, 1997), as it contains ten woody species. This hedgerow forms the central section of the north-eastern boundary of the site. Anyone wishing to remove all or part of a hedgerow covered by the Regulations needs to apply to the local planning authority.

One plant species that is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) were recorded on site during the extended Phase 1 survey: Himalayan Balsam (*Impatiens glandulifera*). All plants of this species should be removed so as to control its spread.

## **Ecological impacts and mitigation measures**

The potential ecological impacts of the proposed development works include possible disturbance to breeding birds, bats, European Otter, Water Vole and amphibians and possibly Common Dormouse, reptiles, West European Hedgehog and invertebrates.

The river and associated riparian habitats, including the semi-improved neutral grassland within the floodplain, are diverse and collectively form the richest area for biodiversity on site. No development must take place within this floodplain area. Phase 2 surveys, undertaken by suitably qualified ecologists, for European Otter, Water Vole, Great Crested Newt, Common Dormouse, bat species and flora would be required if the development of the solar array were to extend into this area. According to the site plan seen there is no plan to develop in this area.

Phase 2 surveys, undertaken by a suitably qualified ecologist, would also be required for bats (both activity and roost surveys) if any of the buildings, mature standard trees or hedgerows are to be removed.

Phase 2 surveys, undertaken by a suitably qualified ecologist, would be required for reptiles if any of the earth banks on site are to be removed.

One of the hedgerows on site is classified as an "important" native species-rich hedgerow under The Hedgerow Regulations 1997 (HMSO, 1997), as it contains ten woody species. This hedgerow forms the central section of the north-eastern boundary of the site. Anyone wishing to remove all or part of a hedgerow covered by the Regulations needs to apply to the local planning authority. Phase 2 surveys, undertaken by suitably qualified ecologists, for bats and Common Dormouse would be required if this hedgerow is to be considered for removal.

A re-survey of Badger activity should be undertaken on the site immediately prior to development work commencing. This is primarily to identify any new setts or areas of Badger activity within the site, as a sett was recorded approximately ten metres from the site's north-eastern boundary. This re-survey should be undertaken by a suitably qualified ecologist. Work within 10 metres of a Badger sett normally requires a licence from Natural Resources Wales, although ideally within 30 metres. Licences are normally only granted during the 'open season' which extends from 1<sup>st</sup> July to 30<sup>th</sup> November in order to protect pregnant females and young cubs.

The construction phase of this development should take place during May and June, when newts, particularly Great Crested Newts, are at their breeding ponds/locations. This would ensure minimum disturbance to any animals that move through the site to get to their breeding areas. It is unlikely that they will travel across the majority of the development site, as it comprises sheep-grazed poor semi-improved grassland. They are more likely to utilise the boundary hedgerows. Clearance of vegetation and soil for the construction of access roads, transformer stations etc. should be carried out under a method statement and an ecological watching brief to ensure the conservation of Great Crested Newts.

During the construction phase of this development all hedgerows and mature standard trees should be protected, with no work being undertaken within at least 10 metres. This buffer should be increased to 15 metres around the mature standard trees and along part of the western and southern boundaries where woodland lies adjacent to the site. Temporary fencing should be utilised to enforce a construction exclusion zone. The floodplain area, with river, associated riparian habitats and semi-improved neutral grassland should also be protected by fencing it off from the development site and making it a construction exclusion zone. This would ensure minimum disturbance to a

number of species including European Otter, Water Vole, Common Dormouse, West European Hedgehog, amphibians, invertebrates, breeding birds and bats. These construction exclusion zones are mapped in Figure Four in the appendices.

All fencing, whether temporary or permanent, should allow mammals to pass through. This is particularly important for Badgers as they make use of set pathways between setts and foraging areas. A sett was found on adjacent land near to the north-eastern boundary of the site. A Badger pathway leads on to the site through the native species-rich hedgerow and trees; this Badger route should be maintained throughout the construction and operational phases of this development.

A silt fence should be erected along the break of slope forming the northern edge of the development area, with the aim of minimising runoff from the land into the river. This will also ensure minimum disturbance to a number of species including European Otter, Water Vole, amphibians, invertebrates and bats. The on-site development team should be made aware of pollution prevention measures.

Vehicles/machinery should keep to the existing tracks through the site as far as possible, to minimise plant and soil disturbance.

Any clearance of vegetation, including the removal of trees and the cutting back of woody species, should not be undertaken during the bird breeding season, which extends from April to September, inclusive. If this duration cannot be avoided then any vegetation removal should be undertaken carefully and woody species checked prior to clearance for the presence of any birds' nests. If breeding birds are found or suspected, clearance work will not be permitted until an ecologist/environmental clerk of works is satisfied that breeding is complete, which may be as late as August or September.

An ecological clerk of works should oversee the construction exclusion zones during the construction phase of the development, as well as all these mitigation measures, as appropriate.

One plant species that is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) was recorded on site during the extended Phase 1 survey: Himalayan Balsam (*Impatiens glandulifera*). All plants of this species should be removed so as to control its spread. The seedbank lasts for approximately 18 months, so two years control should eradicate the plant if there is no further infestation from upstream.

To minimise any impacts on amphibians, reptiles and mammals (particularly Badger, West European Hedgehog and Red Fox (*Vulpes vulpes*)) during the construction phase, no open trenches should be left at night to prevent animals becoming trapped.

Any site lighting, in both the construction and the operational phases, should be kept to a minimum and be directional, as nocturnal animals are adapted to low-light conditions. No lighting should fall directly onto any area of woodland, trees, hedgerows, the river and associated riparian habitats nor on the existing buildings.

## Conclusions

The survey, desk study and subsequent risk assessment identified that for this site the following significant species for which survey evidence or records were found are breeding birds, bats, European Otter, Water Vole and amphibians and possibly Common Dormouse, reptiles, West European Hedgehog and invertebrates.

The river and associated riparian habitats, including the semi-improved neutral grassland within the floodplain, are diverse and collectively form the richest area for biodiversity on site. These areas should not be included in the development. Phase 2 surveys, undertaken by suitably qualified ecologists, for European Otter, Water Vole, Great Crested Newt, Common Dormouse, bat species and flora would be required if the development of the solar array were to extend into this area.

One of the hedgerows on site is classified as an "important" native species-rich hedgerow under The Hedgerow Regulations 1997 (HMSO, 1997), as it contains ten woody species. This hedgerow forms the central section of the north-eastern boundary of the site. Anyone wishing to remove all or part of a hedgerow covered by the Regulations needs to apply to the local planning authority. Phase 2 surveys, undertaken by suitably qualified ecologists, for bats and Common Dormouse would be required if this hedgerow is to be considered for removal.

None of the buildings, mature standard trees or hedgerows on site should be removed, as Phase 2 surveys, undertaken by a suitably qualified ecologist, would be required for bats (both activity and roost surveys) if any were to be removed. Phase 2 surveys, undertaken by a suitably qualified ecologist, would also be required for reptiles if any of the earth banks on site are to be removed.

One plant species that is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) were recorded on site during the extended Phase 1 survey: Himalayan Balsam (*Impatiens glandulifera*). All plants of this species should be removed so as to control its spread.

## General advice for increasing biodiversity

There is an opportunity on the proposed development to increase biodiversity on the site through pro-active mitigation works.

The riparian zone and semi-improved neutral grassland would benefit from the removal of sheep grazing by fencing from the adjacent poor semi-improved grassland. This would allow a more diverse flora to develop, as well as providing improved habitat for reptiles, amphibians, bats and small mammals. This would also create foraging area for the Barn Owl by increasing the small mammal population.

All areas of grassland on site, as well as the buffer strips left along all hedgerows and around the mature standard trees (within the construction exclusion zones), should be managed for wildlife. The grassland area under the panels could continue to be grazed by sheep, however it would be of benefit to let the sheep graze different sections of the site at different times. This would create areas of different length grass across the site and thereby producing a mosaic of different habitats within the site, thus benefiting invertebrates, birds and small mammals.

No artificial inputs, such as artificial pesticides and fertilisers, should be applied on site, particularly on the floodplain grassland within the riparian zone. This helps to maintain and improve the floristic diversity.

The existing native hedges should not be trimmed more frequently than once every three years and ideally should be kept at least 1.2 metres high. Dead wood should not be removed as this is beneficial for many species groups, particularly invertebrates, fungi, lower plants, the West European Hedgehog and reptiles.

Any trees to be planted as part of the development should be native and of local provenance. Ash (*Fraxinus excelsior*), Pedunculate Oak (*Quercus robur*), Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Dog-rose (*Rosa canina* agg.), Hazel (*Corylus avellana*), Holly (*Ilex aquifolium*), Field Maple (*Acer campestre*), Alder (*Alnus glutinosa*) and Elder (*Sambucus nigra*) could all be used (they all occur in the hedgerows in this area). These species could also be used to plant hedgerows on the site, for any woodland, to screen areas, to fill gaps in existing hedgerows (particularly the defunct ones) and link to existing hedges (this increases connectivity in the landscape). At least five woody species should be used and some of these should be allowed to grow into mature trees. Ideally these hedges should be allowed to grow to at least 1.2 metres high, and also a dense bushy structure should be encouraged. This would benefit breeding birds, bats, small mammals and invertebrates. Dead wood should not be removed as this is beneficial for many species groups, particularly invertebrates, fungi, lower plants, the West European Hedgehog and reptiles.

The brick and stone piles should be retained on site as these provide refugia and hibernacula for reptiles and amphibians. Further hibernaculas could be created if any vegetation or soil is being removed.

Some of the existing buildings on site could be improved to provide ideal conditions for hibernating bats. It would be best to select some of the buildings that are located close to existing habitat features, i.e. close to a hedgerow or a mature tree. These buildings could be partly boarded-up, allowing access to just bats and nesting birds; this would create a more secure and stable environment. Bat boxes, such as the Kent Bat Box or the Schwegler Bat Box, could also be installed on trees without roosting potential to encourage bat roosting on the site (Bat Conservation Trust, 2010).

Some of the buildings could be adapted for use by the Barn Owl by incorporating a nest box within them. The Barn Owl Trust recommend that construction of nest boxes for Barn Owl should be the priority conservation action in this area (please refer to the map on the Barn Owl Trust website [www.barnowltrust.org.uk](http://www.barnowltrust.org.uk)). Boxes could also be erected on a suitable tree or pole. The entrance to any box should face open areas and ideally suitable foraging habitat, and should avoid facing into the prevailing wind and rain (south-east is generally best).

Ponds could be created on site, particularly within the floodplain area; some of the wet flushes could be used. An increase in the pond network of the area would benefit bats, herpetofauna (particularly Great Crested Newts), invertebrates and birds. Any pond created should have some gently sloping sides and have some shade from trees, preferably on the north side. If the pond is less than 10 metres across it should slope to no more than a depth of 1.5 metres; if greater than 10 metres across the centre should be no more than two metres deep, so that emergent plants cannot grow, but submergent plants can thrive. The smaller the pond the greater the frequency of after-care management required (as a general rule). Fish species should not be introduced and let plant species colonise naturally. The Environment Agency should be consulted before any pond is created.

Whilst every care has been taken in obtaining the most up to date records, no desk study and visual assessment can absolutely guarantee to identify all potentially concealed badger setts or protected species. Records may be incomplete and conditions may vary across site from those expected.

If any signs of protected species are encountered during the course of the site works, then works must be halted and an on-site assessment should be carried out by a suitably qualified competent environmental scientist. The Magnificent Science Company Limited are always pleased to provide free initial advice to our clients. If there is any doubt, please do contact us on the number given below or by email to [projectmanager@magnificentscience.com](mailto:projectmanager@magnificentscience.com).

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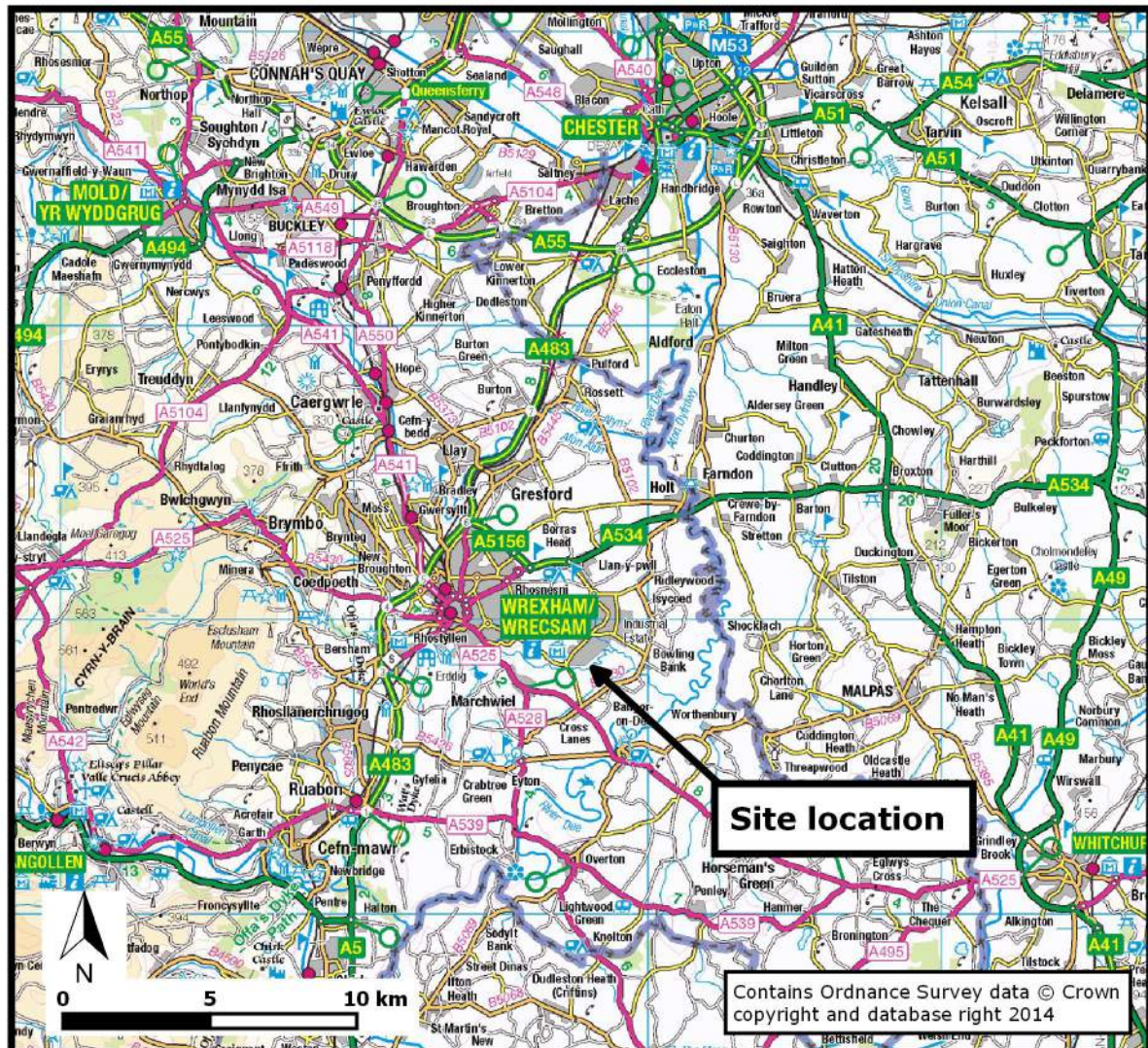
For The Magnificent Science Company Limited, November 02014

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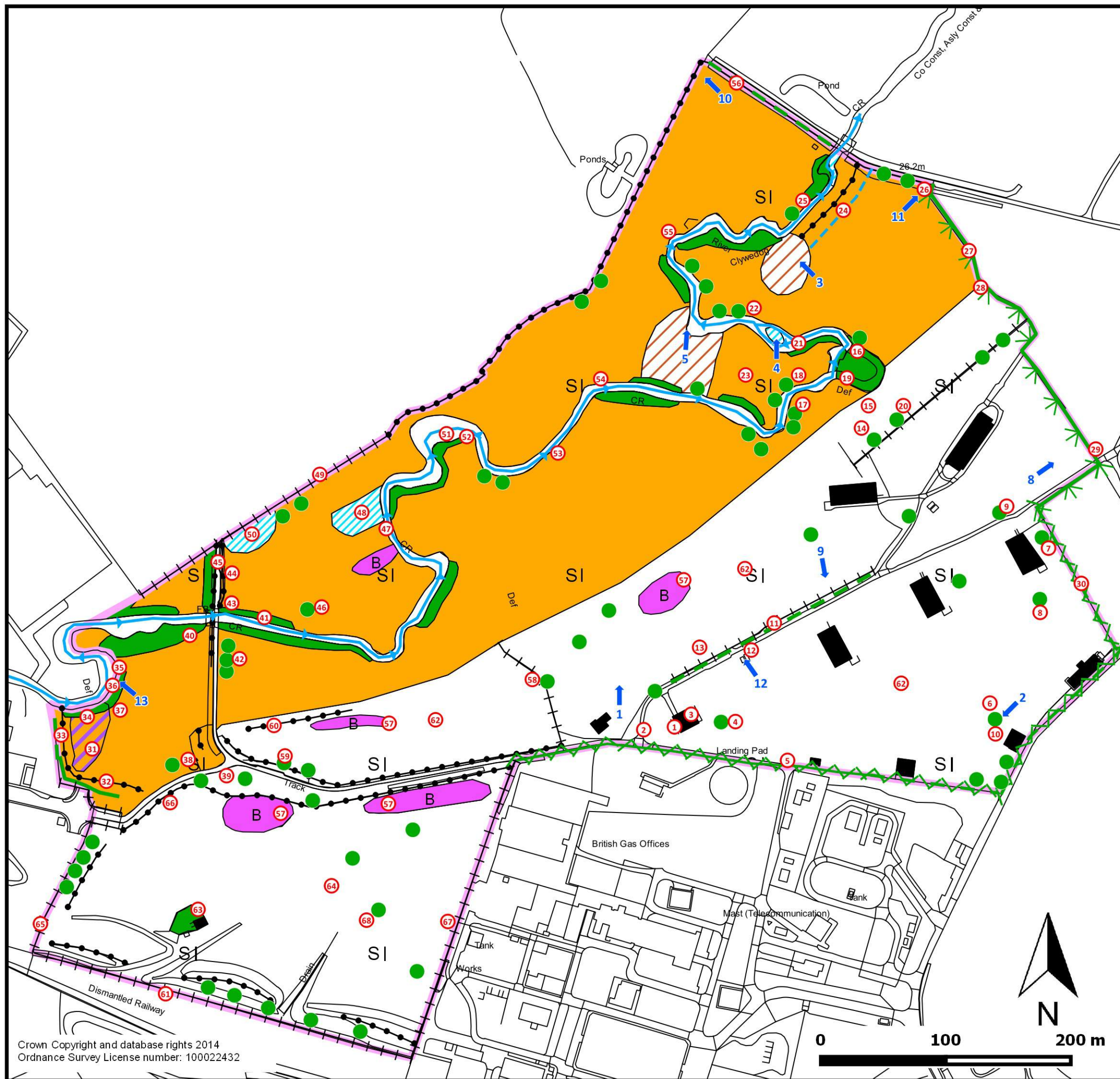
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# Appendices



## **Figure Two - Site plan and Phase 1 map**



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### Key

- Semi-natural broad-leaved woodland
- Semi-improved neutral grassland
- SI Poor semi-improved grassland
- Marshy grassland
- Basic flush
- Tall ruderal
- Inundation vegetation
- Marginal vegetation
- Buildings
- Native species-rich hedgerow
- Native species-rich hedgerow and trees
- Species-poor hedgerow
- Defunct hedgerow, native species-rich
- Defunct hedgerow, species-poor
- Running water
- Dry ditch
- Earth bank
- Fence
- Standard trees (Parkland and scattered trees)
- Target notes
- ↑ Photograph number & direction
- Site boundary

**Williams Farm Solar Farm**  
**Phase 1 Habitat Map**  
**Client: Solar Ventures Limited**  
**Location: SJ 38153 48382**  
**Mapped by: KD GIS mapping: FFM**  
**Issued: 07.11.2014**

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## Figure Three – Photographic plates

**Plate 1 below. Poor semi-improved grassland habitat looking towards standard trees and woodland along the river bank in the distance (looking northwards).**



**Plate 2 below. Standard tree with buildings in the background (looking south-west).**



**Plate 3 below. Tall ruderal vegetation in the floodplain (looking north-west).**



**Plate 4 below. River habitat with marginal and inundation vegetation (looking north).**



**Plate 5 below. River bank with tall ruderal vegetation (including Himalayan Balsam) and broadleaved woodland with semi-improved neutral grassland in background.**



**Plate 6 below. Basic flush vegetation.**



**Plate 7 below. One of the buildings with associated vegetation.**



**Plate 8 below. Native species-rich hedgerow and trees (north-eastern site boundary).**



**Plate 9 below. Native species-poor defunct hedgerow forming a section of internal boundary within the area of poor semi-improved grassland.**



**Plate 10 below. Section of earth bank in northern corner of site.**



**Plate 11 below. Badger latrines near feeding remains and Badger pathway through north-eastern boundary.**



**Plate 12 below. Example of a tree with bat roosting potential.**



**Plate 12 below. Underground drainage attached to building in southern section of site.**



**Plate 13 below. Otter slide along river bank at western end of site.**



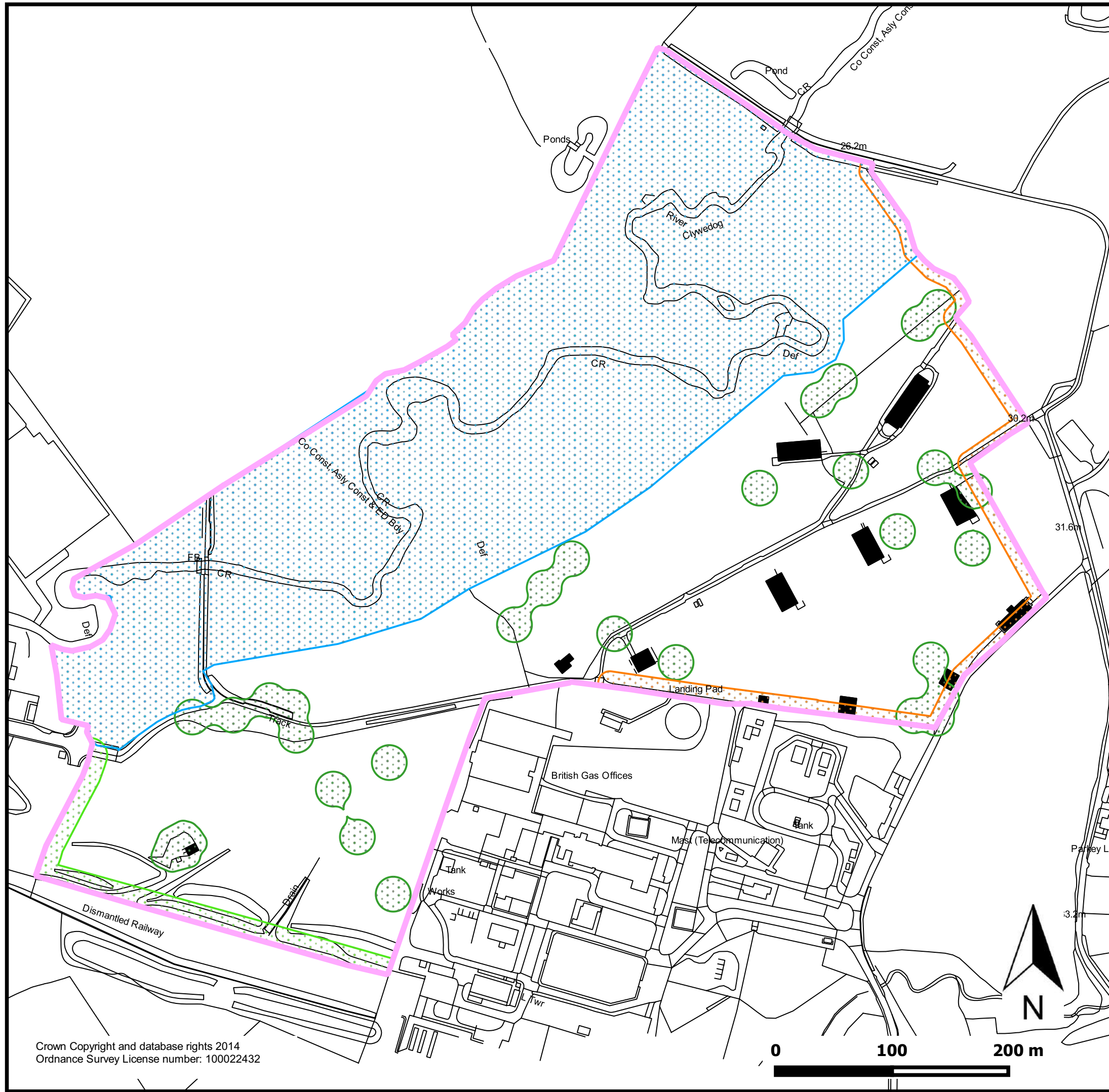
**Plate 14 below. Great Crested Newt habitat along slower sections of the river.**



**Plate 15 below. Rubble pile providing suitable reptile habitat.**



## **Figure Four – Site plan showing the Construction Exclusion Zones.**



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### Key

#### Construction Exclusion Zones

-  Buildings: Phase 2 bat survey required if removed
-  Hedgerows: no work within 10m of hedgerows
-  River/flood plain area
-  Trees: no work within 15m of trees (tree locations are approximate)
-  Woodland edge: no work within 15m of woodland edge
-  Site boundary

**Williams Farm Solar Farm  
 Mitigation Measures Map**  
**Client: Solar Ventures Limited**  
**Location: SJ 38153 48362**  
**Mapped by: KD GIS mapping: FFM**  
**Issued: 03.11.2014**

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## Target/field notes

| Target Note No. | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1               | Rubble and stone pile with soil and vegetation- reptile habitat.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2               | Rubble and stone pile with soil and vegetation- reptile habitat.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 3               | 15 buildings on site various sizes, WW2 factory and hangers, brick-built with concrete block roofs. Bird nesting and bat roosting potential (some buildings covered in ivy with nearby trees and hedgerows).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 4               | Four large trees Pedunculate Oaks ( <i>Quercus robur</i> ) 150-200 yrs old approx. age/size – medium bat roosting potential (lost limbs, lifted bark).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 5               | Post-and-wire fence with native species-rich hedgerow which turns into a defunct hedgerow at its eastern end. Woody species: Blackthorn ( <i>Prunus spinosa</i> ), Elder ( <i>Sambucus nigra</i> ), Hawthorn ( <i>Crataegus monogyna</i> ), Dog-rose ( <i>Rosa canina</i> agg.) and Bramble ( <i>Rubus fruticosus</i> agg.). Ground flora species: Common Bent ( <i>Agrostis capillaris</i> ), Rough Meadow-grass ( <i>Poa trivialis</i> ), Common Sedge ( <i>Carex nigra</i> ), Common Nettle ( <i>Urtica dioica</i> ) and Creeping Thistle ( <i>Cirsium arvense</i> ). Habitat for nesting birds and bat commuting and foraging corridors. Potential Common Dormouse ( <i>Muscardinus avellanarius</i> ) habitat. |
| 6               | Large tree Pedunculate Oak 150 yrs old approx age/size – bird nesting and bat roosting potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 7               | Large tree Pedunculate Oak 150 yrs old approx age/size – bird nesting and bat roosting potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 8               | Large tree Pedunculate Oak 150 yrs old approx age/size – bird nesting and bat roosting potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 9               | Large tree Pedunculate Oak 150 yrs old approx age/size – bird nesting and bat roosting potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 10              | Underground drainage channels x 2 associated with/on old office Building – bat roosting potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 11              | Wire fence, defunct species-poor hedgerow. Woody sp.: Hawthorn.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 12              | Drainage channel, vegetated with Soft Rush ( <i>Juncus effusus</i> ) and Creeping Thistle – Bat roosting potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 13              | Coppiced Ash ( <i>Fraxinus excelsior</i> ) tree, with bat roosting potential and bird nesting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 14              | Large tree Pedunculate Oak 150 yrs old approx age/size - Bat Potential and Bird Nesting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 15              | Mole ( <i>Talpa europaea</i> ) present.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 16              | Large tree Pedunculate Oak 150 yrs old approx age/size- Bat Potential and Bird Nesting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 17              | Himalayan Balsam ( <i>Impatiens glandulifera</i> ) lining river bank both sides- Schedule 9 Invasive.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 18              | Large Crack Willow ( <i>Salix fragilis</i> ) on riverbank, notable tree, bat commute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 19              | Wide wet ditch with island near riverbank. Large Crack Willows ( <i>Salix fragilis</i> ) and Common Nettle ( <i>Urtica dioica</i> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 20 | Large tree Pedunculate Oak ( <i>Quercus robur</i> ) 150 yrs old approx age/size - bird nesting and bat roosting potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 21 | River, medium-sized meandering with gravel and mud banks, and deep slow water areas, marginal vegetation and islands. A Feather-moss, Common Reed ( <i>Phragmites australis</i> ), Soft Rush ( <i>Juncus effusus</i> ), Fern-leaved Hook-moss ( <i>Cratoneuron filicinum</i> ), Yelooow Flag ( <i>Iris versicolor</i> ). European Otter ( <i>Lutra lutra</i> ), Water Vole ( <i>Arvicola amphibius</i> ), Water Shrew ( <i>Neomys fodiens</i> ) habitat; newt habitat on bank particularly near ponds on east side, fast/wide river maybe barrier from ponds to floodplain grassland.                                                                          |
| 22 | Grassland Semi-improved Neutral. Good slightly acid (sand, mud stone, river deposits) - richer area for herbs and less grazed. Extra species include: Red Champion, Long-headed Poppy, Crested Dog's-tail, Sweet Vernal-grass and Red Fescue.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 23 | Semi-improved neutral grassland. Common Bent, Wavy Hair-grass, Rough Meadow-grass, Meadow Fescue. Reptile and amphibian habitat.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 24 | Earth Bank and Dry Ditch - Reptile and Amphibian habitat. Common Nettle ( <i>Urtica dioica</i> ), Creeping Thistle, Common Sedge ( <i>Carex nigra</i> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 25 | Large Trees Crack Willows ( <i>Salix fragilis</i> )- notable tree. Bat foraging corridor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 26 | Badger feeding signs near large open drainage pipe under path into adjacent woodland area towards sett - Badger activity, path and access. Latrine identified with 3 fresh deposits and 2 older. Badger foraging area. Beetle cases, keep access for Badger/ mammal pass.                                                                                                                                                                                                                                                                                                                                                                                      |
| 27 | Hedgerow partially intact/defunct, native species-rich (Hab Reg ). With Earth Bank, Hedgerows and Trees with Bird nesting, Bat corridor, and Common Dormouse ( <i>Muscardinus avellanarius</i> ) potential. Field Maple, Sycamore, Pedunculate Oak, Hawthorn, Blackthorn, Ash, Bramble, Apple tree sp., Dog-rose, Holly. Ground flora Common Bent, Rough Meadow-grass, Creeping Thistle, Common Sedge, Common Nettle, Common Chickweed. Nesting birds, Hedgerows Regs, Reptile and Amphibian hibernation, Dormice Bat corridor and connectivity to landscape.                                                                                                  |
| 28 | Large Ash ( <i>Fraxinus excelsior</i> ) Notable Tree - Bat potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 29 | Large Notable tree Pedunculate Oak ( <i>Quercus robur</i> ) 150 yrs old approx age/size in hedgerow- Bat species potential.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 30 | Fence and Trees defunct Hedgerow species-poor. Blackthorn, Hawthorn, Dog-rose, Oak sp x2. Nesting birds, Bat foraging/commute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 31 | Marshy grassland - Reptile and Amphibian habitat. Mobile species Otter ( <i>Lutra lutra</i> ), Water Vole ( <i>Arvicola amphibius</i> ). Common Bird's-foot-trefoil ( <i>Lotus corniculatus</i> ), Spear Thistle ( <i>Cirsium vulgare</i> ), Tormentil ( <i>Potentilla tormentilla</i> ), Creeping Cinquefoil ( <i>Potentilla reptans</i> ), Creeping Buttercup ( <i>Ranunculus repens</i> ), White clover ( <i>Trifolium repens</i> ), Water Chickweed ( <i>Myosoton aquaticum</i> ), Water Mint ( <i>Mentha aquatica</i> ), Common Sorrel ( <i>Rumex acetosa</i> ), Common Mallow ( <i>Malva sylvestris</i> ), Common Selfheal ( <i>Prunella vulgaris</i> ). |
| 32 | Species-poor hedgerow. young Blackthorn shrubs, Common Nettle.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|    |                                                                                                                                                                                                                                                                                                                      |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 33 | Wire and post fence with species-poor defunct hedgerow. Elder ( <i>Sambucus nigra</i> ), Dog-rose, Bramble, Common Hawkweed ( <i>Hieracium vulgatum</i> ).                                                                                                                                                           |
| 34 | River bank trees – Semi-natural Woodland. Dog-rose, Ash, Crack Willow ( <i>Salix fragilis</i> ), Elder ( <i>Sambucus nigra</i> ), ground flora includes Creeping Cinquefoil, Hoary Willowherb. Nesting bird habitat, bat flight corridors, bat habitat potential, Great Crested Newt habitat corridor between ponds. |
| 35 | Holes and tunnels in bank - Water vole habitat. Not possible to access whole bank.                                                                                                                                                                                                                                   |
| 36 | Otter slide, path and prints. Adjacent riverbank and trees.                                                                                                                                                                                                                                                          |
| 37 | Tall Ruderal - Reptile and Amphibian Habitat. Common Nettle ( <i>Urtica dioica</i> ), White Dead-nettle ( <i>Lamium album</i> ).                                                                                                                                                                                     |
| 38 | Large notable tree Pedunculate Oak ( <i>Quercus robur</i> ) 150 yrs old approx age/size – Bat potential.                                                                                                                                                                                                             |
| 39 | Large notable tree Pedunculate Oak ( <i>Quercus robur</i> ) 150 yrs old approx age/size – Bat potential.                                                                                                                                                                                                             |
| 40 | Large Alder ( <i>Alnus glutinosa</i> ) x 3 – Bat potential.                                                                                                                                                                                                                                                          |
| 41 | Adjacent River bank Notable Common Alder tree.                                                                                                                                                                                                                                                                       |
| 42 | Large Alder ( <i>Alnus glutinosa</i> ) x 3 – Bat potential.                                                                                                                                                                                                                                                          |
| 43 | Bridge, Concrete, steep banks/channelled - Bat potential and Otter spraint location.                                                                                                                                                                                                                                 |
| 44 | Tall Ruderal- Reptile and Amphibian Habitat. Common Nettle ( <i>Urtica dioica</i> ), Spear Thistle ( <i>Cirsium vulgare</i> ), Musk Thistle ( <i>Carduus nutans</i> ).                                                                                                                                               |
| 45 | Large Earth bank and trees- Reptile and Amphibian hibernation. Alder ( <i>Alnus glutinosa</i> ), Sycamore ( <i>Acer pseudoplatanus</i> ), Hawthorn ( <i>Crataegus monogyna</i> ).                                                                                                                                    |
| 46 | Notable Tree Large Crack Willow ( <i>Salix fragilis</i> ) on riverbank.                                                                                                                                                                                                                                              |
| 47 | Otter habitat, possible holt with slide, scat.                                                                                                                                                                                                                                                                       |
| 48 | Water Vole habitat slow water pool next to river. Greater Reedmace.                                                                                                                                                                                                                                                  |
| 49 | Wire and post fence with species-poor hedgerow and trees on adjacent land. Alder ( <i>Alnus glutinosa</i> ), Hawthorn ( <i>Crataegus monogyna</i> ), Crack Willow ( <i>Salix fragilis</i> ), Ash ( <i>Fraxinus excelsior</i> ), Oak.                                                                                 |
| 50 | Inundation vegetation. Common Nettle ( <i>Urtica dioica</i> ), White Dead-nettle ( <i>Lamium album</i> ), Common Sorrel ( <i>Rumex acetosa</i> ), Common Mallow ( <i>Malva sylvestris</i> ) and Himalayan Balsam ( <i>Impatiens glandulifera</i> ).                                                                  |
| 51 | Gravel beach, slow water - Amphibian habitat, fish egg laying habitat, nesting bird habitat.                                                                                                                                                                                                                         |
| 52 | Water Vole habitat slow water pool next to river.                                                                                                                                                                                                                                                                    |
| 53 | Water Vole habitat slow water pool next to river.                                                                                                                                                                                                                                                                    |
| 54 | Otter habitat.                                                                                                                                                                                                                                                                                                       |
| 55 | Culvert with in inundation vegetation - Amphibian and Water Vole habitat. Greater Reedmace.                                                                                                                                                                                                                          |
| 56 | Earth bank and defunct hedgerow. Bramble, Pedunculate Oak sapling,                                                                                                                                                                                                                                                   |

|    |                                                                                                                                                                   |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | Ash, Hawthorn, Common Sedge, Common Nettle.                                                                                                                       |
| 57 | Basic Flush on slope. Fern-leaved Hook-moss ( <i>Cratoneuron filicinum</i> ), Common Sedge ( <i>Carex nigra</i> ), Marsh Horsetail ( <i>Equisetum palustre</i> ). |
| 58 | Blackthorn, Hawthorn. Was possibly once a hedgerow?                                                                                                               |
| 59 | Large trees x 2 Pedunculate Oak ( <i>Quercus robur</i> ) 150 yrs old approx age/size – Bat potential.                                                             |
| 60 | Earth Bank with Creeping Thistle.                                                                                                                                 |
| 61 | Post and Wire fence. Species-rich Hedgerow on adjacent land. Ash, Oaks, Hawthorn, Blackthorn, Field maple, Dog-rose.                                              |
| 62 | Poor semi-improved grassland.                                                                                                                                     |
| 63 | Silver Birch woodland ( <i>Betula pendula</i> ) x 6 near building 15.                                                                                             |
| 64 | Semi-improved grassland (grazed) with Basic Flushes. Vegetation sedges.                                                                                           |
| 65 | Post and wire fence with adjacent land with Semi-natural broadleaved woodland.                                                                                    |
| 66 | Spoil dump with rabbit warren.                                                                                                                                    |
| 67 | Fence wire and post that separates adjacent industrial estate and Earth Bank with Birch trees and scrub.                                                          |
| 68 | Large trees x 3 Pedunculate Oak ( <i>Quercus robur</i> ) 150 yrs old approx age/size – Nesting bird and Bat potential.                                            |