



**WAKEFIELD ROAD, MAPPLEWELL,
BARNSELY.**

OS REF: SE 340 098.

**ECOLOGICAL IMPACT ASSESSMENT
(EcIA).**

Ref No: 180302.

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1. INTRODUCTION.

1.1. There are plans to develop an area of land off Wakefield Road, Mapplewell in Barnsley. The site is a former factory site, an area of grassland to the east and an area of dense scrub to the north. The southern part of the site is to be developed into a Lidl store and the rest of the site is to be a housing development. This report covers the whole site but is only to be used in relation to the Lidl development at the southern end of the site.

1.2. Whitcher Wildlife Ltd carried out a protected fauna survey of the site on 2nd July 2008. Further protected fauna surveys of the site were carried out on 20th October 2009 and 12th March 2014 and an Extended Phase 1 Habitat Survey of the site on 15th June 2016.

1.3. Whitcher Wildlife Ltd also carried out great crested newt and reptile surveys of the site between the beginning of April and the 16th May 2018.

1.4. Whitcher Wildlife Ltd was commissioned to carry out a Preliminary Ecological Appraisal (PEA) of the site to update the previous reports, to include all additional survey results and to establish whether there are any issues that may affect the proposed works.

1.5. Now all further surveys have been carried out, Whitcher Wildlife Ltd have been commissioned to prepare an Ecological Impact Assessment (EcIA) in line with the CIEEM guidance, to support the application for planning permission.

1.6. Appendices I and II of this report provide additional information on specific species and are designed to assist the reader in understanding the contents of this report.

2. SURVEY METHODOLOGY.

2.1. Prior to visiting the site, the survey area was cross referenced to maps and aerial photographs to give a general idea of the habitats and potential issues within the area and to identify potential access and walking routes.

2.2. The survey area was walked where access was agreed and public rights of way were used where no access was agreed. All habitats within and immediately around the survey area were documented and the dominant species within that habitat listed in line with the JNCC Handbook for Phase 1 Habitat surveys.

2.3. The survey area and immediate surrounding area was thoroughly searched for evidence of badger (*Meles meles*) activity by looking for the following signs in line with Harris S, Cresswell P and Jefferies D (1989). *Surveying Badgers*. Mammal Society: -

- * Badger setts.
- * Badger latrines or dung pits.
- * Badger snuffle holes and evidence of foraging.
- * Badger paths.
- * Badger prints in areas of soft mud.
- * Badger hairs caught on fencing.

2.4. The survey area was searched for watercourses and where found all watercourses within the survey area and for approximately 50m in each direction were thoroughly searched for evidence of water vole (*Arvicola amphibius*) activity by looking for the following signs, in line with Rob Strachan, Tom Moorhouse and Merryl Gelling (2011). *Water Vole Handbook: Third Edition*: -

- * Water vole burrows.
- * Water vole faeces and latrines.
- * Water vole feeding stations.
- * Water vole runs.
- * Water vole prints in areas of soft mud.
- * Water vole lawns.
- * Predator field signs.

2.5. The survey area was searched for watercourses and where found all watercourses within the survey area and for approximately 50m in each direction were thoroughly searched for evidence of otter (*Lutra lutra*) activity by looking for the following signs in line with the P Chanin (2003). *Monitoring the Otter and Conserving Natura 2000 Rivers: Monitoring Series No10 Guidelines*: -

- * Otter prints in soft mud.
- * Otter spraints.
- * Otter Holts.

2.6. The survey area was searched for watercourses and waterbodies. Where found, and where safe to enter the water, all were thoroughly searched for the presence of crayfish, for approximately 50m in each direction of the site, by searching under rocks and logs. Where stated, crayfish traps were also deployed into the watercourse. All survey work was carried out in accordance with the *Conserving Natural 2000 Rivers Monitoring Series No 1, Protocol for Monitoring the White Clawed Crayfish*.

2.7. The survey area was searched for mature trees and derelict buildings and where found these were checked for potential bat roosting sites in line with Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edition) by looking for the following signs: -

- * Holes, cracks or crevices.
- * Bat Droppings.

2.8. The land immediately adjacent to the survey area was assessed for bat roosting potential and bat foraging potential. Connective routes and flight lines were also assessed whilst on site and using maps of the area.

2.9. The area within 500m of the survey site was cross referenced to maps to highlight all ponds close to the site. Where possible, all ponds identified were accessed using agreed access or public rights of way to assess the potential for great crested newts (*Triturus cristatus*) to be present.

2.10. The survey area was assessed for the potential for reptiles and suitable reptile habitats. Where applicable the area was also searched for the presence of reptiles.

2.11. Where appropriate, the habitat within and surrounding the survey area was searched for species such as hazel, oak, honeysuckle, bramble and other species which may provide potential habitat for hazel dormice (*Muscardinus avellanarius*). Field signs such as feeding remains and nests were also searched for where possible,

in line with P Bright, P Morris and T Mitchell-Jones *the Dormouse Conservation Handbook 2nd Edition*.

2.12. Where appropriate, the area within and surrounding the survey area was assessed for its potential to house habitat for red squirrels. Field signs of red squirrels were searched for at least every 50m, looking for any dreys, feeding signs or sightings of red squirrels.

2.13. All surveys were carried out in line with the Chartered Institute of Ecological and Environmental Management (CIEEM) survey standards and advice.

2.14. This document is prepared in line with The National Planning Policy Framework (NPPF). This sets out the government policy on biodiversity and nature conservation and places a duty on Planning Authorities to give material consideration to the effect of a development on legally protected species when considering planning applications. The NPPF and the Planning Practice Guidance on “Natural Environment” also promote sustainable development by ensuring that developments take account of the role and value of biodiversity and that it is conserved and enhanced within the development.

2.15. This report is prepared in line with the Natural Environment and Rural Communities (NERC) Act that came into force on 1st Oct 2006. Section 41 (S41) of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England.

2.16. This survey was carried out by Jenny Whitcher Roebuck MCIEEM and qualified and licenced Whitcher Wildlife staff. Since 2001 Jenny has had experience in a professional capacity as a Wildlife Consultant carrying out Ecology Surveys and Phase 1 Habitat surveys. Jenny holds Natural England Survey Licences in respect of bats, great crested newts, crayfish and barn owls, NRW and SNH Survey Licences in respect of bats and great crested newts. She has also successfully completed a number of courses run by the Chartered Institute of Ecology and Environmental Management (CIEEM), the Bat Conservation Trust (BCT) and the Field Studies Council (FSC) in the relative protected species, plant species and in carrying out Phase 1 Habitat Surveys. As a full member of CIEEM she is committed to continuous professional development, a continual process of learning and career development, a condition of CIEEM membership.

3. ECOLOGICAL BASELINE.

3.1. Data Search Results.

3.1.1. Desktop data searches were requested from Barnsley Biological Records Centre, South Yorkshire Bat Group and South Yorkshire Badger Group for records of protected species and designated sites within 2km of the survey area.

3.1.2. Barnsley Biological Records Centre hold records of great crested newts in the Barnsley Canal 1.4km to the southwest of the survey area. There are no records of this species any nearer to the site and there are no ponds within a 1km of the survey area.

3.1.2.1. There are records of three species of bat, Noctule, Daubenton's and Pipistrelle. All records are over 1km from the site. There are no records specific to the site.

3.1.2.2. There are records of water voles within 2km of the site, but the nearest record is from 2012 and lies over 1.1km to the east of the survey area

3.1.2.3. There are a number of records of red list bird species within 2km of the survey area but none of these records are within the survey area and the records are mainly to the southwest. There are no records of protected species relevant to the site.

3.1.2.5. The Barnsley Canal at Wilthorpe is a Local Wildlife Site and this is located 1.4km to the south of the survey area.

3.1.3. South Yorkshire Bat Group holds one hundred and seventy-eight records of bats and bat roosts within 2km of the survey area. There are four records within 1km of the site, all of individual bats with the nearest record from 2003 lying 450m to the north of the survey area. The nearest roost record is from 2002 and lies 1.8km to the south of the survey area.

3.1.4. South Yorkshire Badger Group have no records of badger setts or RTAs within 2km of the survey area.

3.1.5. From information received from Barnsley Council it is known that Staincross Cutting Regionally Importance Geological of Geomorphological Site (RIGS) is present along the dismantled railway cutting to the southeast of the survey area.

3.2. The Surveyed Area.

3.2.1. The site is a redundant rubber factory. During the previous surveys, carried out in 2008 and 2009, the factory buildings were still present, covering half the site. The factory buildings were demolished approximately six years ago and were not present during the surveys carried out in 2014, 2016 and 2018. The demolished buildings have left piles of rubble, which are becoming overgrown. Areas of scattered scrub and grassland cover the rest of the site.

3.2.2. The aerial photograph below shows the survey area within the red line. This also shows the piles of rubble where the buildings once stood. The yellow area is the area of the proposed Lidl development on the site and the area this report has been prepared for.



3.3. Description of Habitats.

3.3.1. Appendix III of this report contains annotated maps marked up with the varying habitats that are cross referenced to target notes in Appendix IV of this report. The habitats on and adjacent to the site are: -

- Neutral Grassland and Tall Ruderal
- Tall Ruderal
- Short Ephemeral
- Scattered Scrub
- Dense Continuous Scrub
- Scattered Trees
- Bracken
- Hedgerow Native Species Poor
- Hedgerow with Trees, Native Species Poor
- Standing Water
- Fence
- Wall
- Bare Ground

3.3.2. Neutral Grassland and Tall Ruderal

3.3.2.1. At the eastern side of the site there is an area of a mosaic of grassland and tall ruderal herbs with some areas of scattered scrub. Since the previous survey was carried out in 2016 this grassland area has reduced in size as it is becoming overgrown with bramble scrub and there are more tall ruderal plants growing in this area than in the previous survey.

3.3.2.2. The main grass species present in this area are barren brome (*Bromus sterilis*), tufted hair grass (*Deschampsia cespitosa*), Yorkshire Fog (*Holcus lanatus*), cocks foot (*Dactylis glomerata*) and perennial rye grass (*Lolium perenne*).

3.3.2.3. The tall ruderal species present include greater willowherb (*Epilobium hirsutum*), rosebay willowherb (*Chamerion angustifolium*), coltsfoot (*Tussilago farfara*), cow parsley (*Anthriscus sylvestris*), nettle (*Urtica dioica*), thistle (*Cirsium sp(p)*), ribwort plantain (*Plantago lanceolata*), sow thistle (*Sonchus oleraceus*), dock (*Rumex acetosella*), red clover (*Trifolium pretense*), dandelion (*Taraxacum officinale*), ragwort (*Senecio jacobaea*), mugwort (*Artemisia vulgaris*), herb Robert

(*Geranium robertianum*), cleavers (*Galium aparine*), yarrow (*Achillea millefolium*), biting stonecrop (*Sedum acre*), dog rose (*Rosa canina*), buddleia (*Buddleja davidii*), greater plantain (*Plantago major*), red valerian (*Centranthus ruber*), bittersweet (*Solanum dulcamara*), birds foot trefoil (*Lotus corniculatus*), ox eye daisy (*Leucanthemum vulgare*), great lettuce (*Lactuca sativa*), hogweed (*Heracleum sphondylium*), bush vetch (*Vicia sepium*), Common Spotted Orchid (*Dactylorhiza fuchsia*), Northern Marsh Orchid (*Dactylorhiza purpurella*), elder (*Sambucus nigra*), bramble (*Rubus fruticosus*), sapling silver birch (*Betula pendula*), sapling hawthorn (*Crataegus monogyna*), sapling goat willow (*Salix caprea*), bracken (*Pteridium aquilinum*), dead nettle (*Lamiun purpureum*), soft rush (*Juncus effuses*).

3.3.2.4. Two photographs looking over the area of grassland and tall ruderal herbs showing.



3.3.3. Tall Ruderal

3.3.3.1. Alongside Wakefield Road at the northwestern side of the site there is an area of tall ruderal herbs, mainly nettle (*Urtica dioica*), cow parsley (*Anthriscus sylvestris*), some bracken (*Pteridium aquilinum*) and occasional hawthorn (*Crataegus monogyna*), elder (*Sambucus nigra*), dog rose (*Rosa canina*) and bramble (*Rubus fruticosus*).

3.3.3.2. Tall ruderal species are also present in the Neutral Grassland and the species present are listed in that section above.

3.3.3.3. Photograph looking north along Wakefield Road from the access road to the site.



3.3.4. Short Ephemeral

3.3.4.1. The western side of the site is where the buildings have been demolished leaving areas of rubble and tarmac that are becoming overgrown with plants growing in broken areas of tarmac and in the piles of rubble. +

3.3.4.2. The main species present in this area greater willowherb (*Epilobium hirsutum*), rosebay willowherb (*Chamerion angustifolium*), coltsfoot (*Tussilago farfara*), cow parsley (*Anthriscus sylvestris*), nettle (*Urtica dioica*), thistle (*Cirsium sp(p)*), ribwort plantain (*Plantago lanceolata*), sow thistle (*Sonchus oleraceus*), dock (*Rumex acetosella*), red clover (*Trifolium pretense*), dandelion (*Taraxacum officinale*), ragwort (*Senecio jacobaea*), mugwort (*Artemisia vulgaris*), herb Robert (*Geranium robertianum*), cleavers (*Galium aparine*), yarrow (*Achillea millefolium*),

biting stonecrop (*Sedum acre*), dog rose (*Rosa canina*), buddleia (*Buddleja davidii*), greater plantain (*Plantago major*), red valerian (*Centranthus ruber*), bittersweet (*Solanum dulcamara*), birds foot trefoil (*Lotus corniculatus*), ox eye daisy (*Leucanthemum vulgare*), great lettuce (*Lactuca sativa*), hogweed (*Heracleum sphondylium*), bush vetch (*Vicia sepium*), Common Spotted Orchid (*Dactylorhiza fuchsia*), Northern Marsh Orchid (*Dactylorhiza purpurella*), elder (*Sambucus nigra*), bramble (*Rubus fruticosus*), sapling silver birch (*Betula pendula*), sapling hawthorn (*Crataegus monogyna*) and sapling goat willow (*Salix caprea*).

3.3.4.4. Photograph looking west across the area of tarmac and rubble showing the vegetation growing.



3.3.5. Scattered Scrub

3.3.5.1. There are several areas of scattered scrub across the eastern side of the site. This is mainly areas of bramble (*Rubus fruticosus*) with dog rose (*Rosa canina*), hawthorn (*Crataegus monogyna*), sapling silver birch (*Betula pendula*) and sapling goat willow (*Salix caprea*). The scrub areas are larger than during the survey in 2016 as the scrub is now encroaching into other areas of habitat.

3.3.5.2. Photograph looking east showing some of the scattered scrub on the site.



3.3.6. Dense Continuous Scrub

3.3.6.1. Either side of the access road into the site there is an area of scrub with occasional conifer trees and shrubs. The species present include hawthorn (*Crataegus monogyna*), lilac (*Lilac vulgaris*), dog rose (*Rosa canina*), heather (*Ericoids spp.*), two types of hebe (*Hebe sp.*), bramble (*Rubus fruticosus*), sapling silver birch (*Betula pendula*) and elder (*Sambucus nigra*).

3.3.6.2. There are a few other species growing below this scrub, including thistle (*Cirsium sp(p)*), nettle (*Urtica dioica*), yarrow (*Achillea millefolium*), cotton lavender (*Santolina chamaecyparissus*), Yorkshire fog (*Holcus lanatus*), cow parsley (*Anthriscus sylvestris*), dandelion (*Taraxacum officinale*), greater willowherb (*Epilobium hirsutum*), mugwort (*Artemisia vulgaris*), rosebay willowherb (*Chamerion angustifolium*) and ox-eye daisy (*Leucanthemum vulgare*).

3.3.6.3. In the southwest corner of the site there is an area of scrub consisting of bramble (*Rubus fruticosus*), hawthorn (*Crataegus monogyna*), elder (*Sambucus nigra*), sapling and semi-mature silver birch (*Betula pendula*) and goat willow (*Salix caprea*). This has been recently cut down to ground level due to adjacent works to the power lines but is still classed as dense scrub because it will grow back as scrub.

3.3.6.4. Along the northern edge of the site there is a large area of dense scrub. This is mainly bramble (*Rubus fruticosus*), hawthorn (*Crataegus monogyna*), dog rose (*Rosa canina*), elder (*Sambucus nigra*), semi-mature oak (*Quercus sp(p)*), silver birch (*Betula pendula*) and goat willow (*Salix caprea*).

3.3.6.5. Within the grassland area at the eastern side of the site dense scrub is encroaching into the grassland and tall ruderal habitat with mainly dense bramble (*Rubus fruticosus*).

3.3.6.6. The two photographs below show the area of dense scrub at the northern edge of the site.



3.3.7. Scattered Trees

3.3.7.1. There are several scattered trees on the site. These trees include apple (*Malus domestica*), oak (*Quercus sp(p)*), silver birch (*Betula pendula*) goat willow (*Salix caprea*), weeping willow (*Salix babylonica*) and ornamental conifer. Most of the trees are semi-mature with the exception of the two weeping willow trees on the western side of the site.

3.3.7.2. The photograph below shows two large weeping willow trees to the north of the site entrance on the western side of the site.



3.3.7.3. Photograph showing an ornamental conifer at the side of the access to the site and a small silver birch at the southwest corner of the site.



3.3.8. Bracken

3.3.8.1. There are two areas of bracken (*Pteridium aquilinum*) on the site. One at the northwest corner of the site and one on the eastern edge of the site. The bracken on the eastern edge of the site has been recently cut down due to adjacent works to power lines but is still classed as bracken habitat as it will grow back.

3.3.8.2. Photograph showing the area of bracken at the northwest corner of the site.



3.3.9. Hedgerow, Native Species Poor

3.3.9.1. At the western side of the site there is a large unmanaged Leyland cypress (*Cupressus x leylandii*) hedgerow between the site and the adjacent road. The northern half of this hedgerow still remains but the southern half of the hedgerow was removed between the 2016 survey and this survey being carried out.

3.3.9.2. The photograph below looks north showing the remaining section of hedgerow at the western side of the site and showing the area where the southern half of the hedgerow has been removed.



3.3.9.3. At the southwest corner of the site there is a short section of Leyland cypress (*Cupressus x leylandii*) hedgerow between the site and the property to the south. The photograph below shows this hedgerow.



3.3.10. Hedgerow with Trees, Native Species Poor

3.3.10.1. Along the southeast and east site boundaries there are broken hedgerows consisting of semi-mature and small mature trees. Some of these trees are growing on site but most are outside the site boundary. The species present include goat willow (*Salix caprea*), crack willow (*Salix fragilis*), cherry (*Prunus sp(p)*), oak (*Quercus sp(p)*), silver birch (*Betula pendula*), black poplar (*Populus nigra*), hawthorn (*Crataegus monogyna*), elder (*Sambucus nigra*) and apple (*Malus domestica*).

3.3.10.2. Photograph showing the southeast boundary.



3.3.10.3. Photograph showing the eastern boundary.



3.3.11. Standing Water

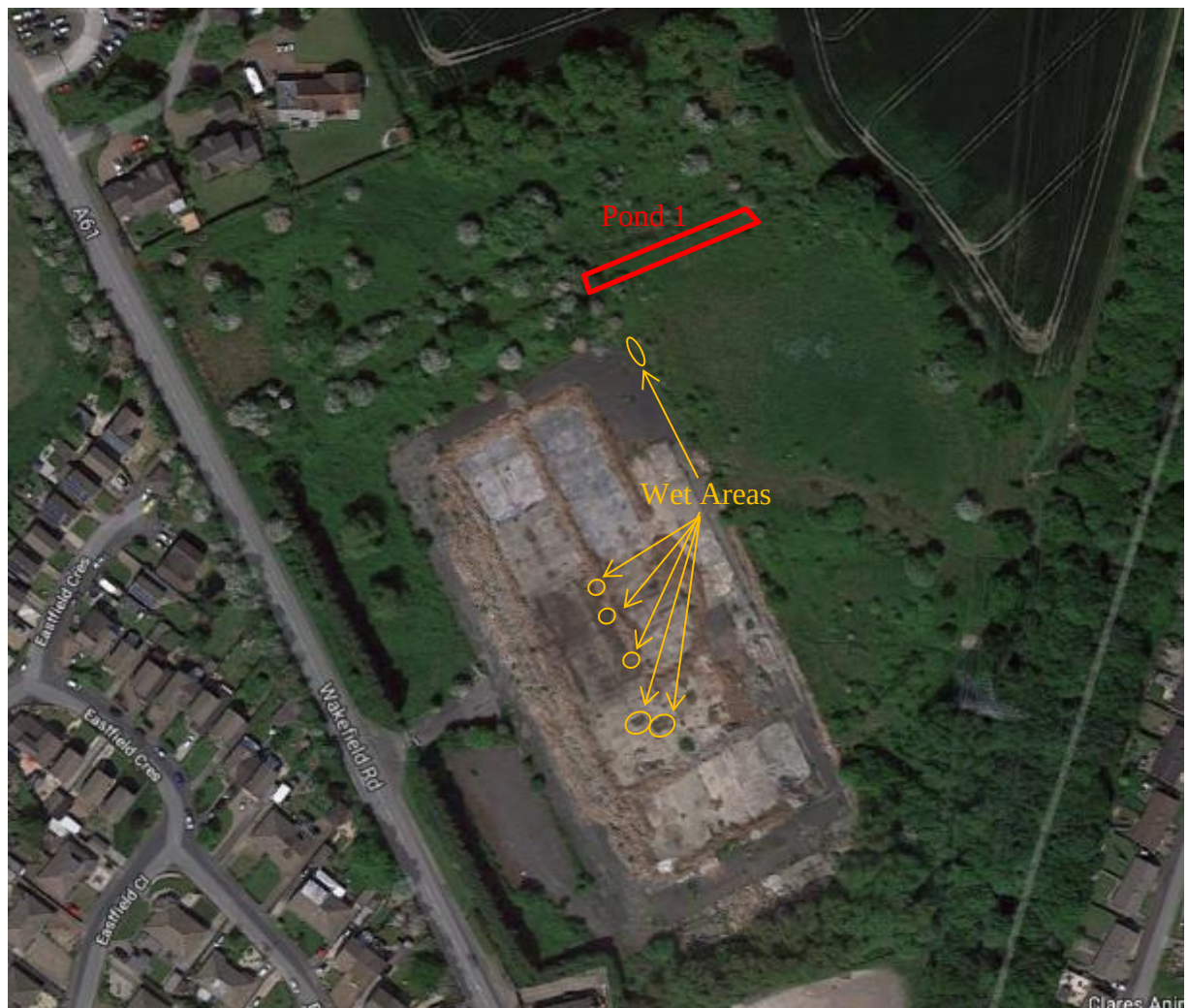
3.2.11.1. One pond was identified on the site during the survey, this was classed as three ponds during the previous surveys but is now classed as one pond.

3.2.11.2. Pond 1 is long and narrow suggesting that this was once a ditch which has become partially filled in and now forms a pond. The pond is approximately 20m long and 2m wide. During heavy rain this fills and then gradually seeps away through the ground to the south and at the eastern end. This is shown by the wet muddy ground which eventually dries as the pond dries up. The pond is very overgrown with bulrush

(*Typha latifolia*) and soft rush (*Juncus effuses*) in the water and the dense scrub, dominated by bramble, growing along the banks of the pond. Since the previous surveys of the site Pond 1 has become more overgrown with vegetation both in and on the banks of the pond.

3.2.11.3. Also, a few small areas of standing water were identified on the site, named Wet Areas for this report. During various visits to the site these ponds had varying depths of water or were dry and only appear to contain water after periods of rain which then either dries up or drains away.

3.2.11.4. The photograph below shows the approximate locations of Pond 1 and the Wet Areas.



3.3.11.5. The photographs below look either way from the center of Pond 1 showing the dense vegetation growing. The photographs below were taken in early April before the first newt survey was carried out.



3.3.11.6. The photograph below was taken at the end of the newt surveys when the pond had dried up.



3.3.11.7. The Wet Areas on site are mainly old sunken tanks in the area where the buildings were, which are filled with rubble with some vegetation growing. However, these areas quickly dry up when the weather is dry.

3.3.11.8. The two photographs below show two of these Wet Areas after heavy rain.



3.3.11.9. The photographs below show the same two Wet Areas once the water has dried up or soaked away.



3.3.12. Fence

There are several fences around the site, mainly post and mesh, but all the fences are in a poor state with large sections missing or fallen over.

3.3.13. Wall

3.3.13.1. At the western side of the site there is a small section of brick wall either side of the access onto the site which is becoming overgrown with scrub.

3.3.13.2. Along the northeast side of the site, between the site and the field is the remains of an old low stone wall.

3.3.14. Bare Ground

3.3.14.1. There is a tarmac access road leading to a tarmac road which once lead around the buildings but now leads round the piles of rubble. There is also a tarmac car park to the south of the access road.

3.3.14.2. Where the buildings once stood at the western side of the site there are now large piles of rubble and concrete bases. These areas are becoming overgrown with short ephemeral plants.

3.3.14.3. The two photographs below show some of the areas of tarmac and concrete on the site.



3.4. Description of Fauna.

3.4.1. No badger setts or badger field signs were identified within the survey area.

3.4.2. No watercourses were identified within the survey area. Therefore, there is no habitat for water voles, otters or white clawed crayfish within the survey area.

3.4.3. One pond was identified on the site during the survey, this was classed as three ponds during the previous surveys but is now classes as one pond.

3.4.4. Pond 1 is long and narrow suggesting that this was once a ditch which has become partially filled in and now forms a pond. The pond is approximately 20m long and 2m wide. During heavy rain this fills and then gradually seeps away through the ground to the south. This is shown by the wet muddy ground which eventually dries leaving very low water levels in the pond. During previous survey surveys carried out

on the site in July 2008, March 2014 and June 2016 the pond contained approximately 150mm of water. During the survey carried out in October 2009 the pond was totally dry. During great crested newt surveys carried out in 2018 the pond contained water at the start of the surveys but by early May the pond was totally dry.

3.4.4.1. During the survey in 2014 tadpoles were seen in Pond 1 and during a site visit in March 2018 frogspawn was identified in Pond 1.

3.4.4.2. Also, a number of small areas of standing water were identified on the site, named Wet Areas for this report. During various visits to the site these Wet Areas had varying depths of water or were dry and only appear to contain water after periods of rain which then either dries up or drains away.

3.4.4.3. The table below shows the HSI scores for Pond 1. An HSI assessment was also carried out on a few of the Wet Areas and all had the same scores. The HSI assessment is a method of calculating the potential presence of great crested newts in a pond by awarding points against specified criteria. An explanation of the HSI criteria is included in Appendix VI of this report.

Pond ref	Pond 1	Wet Areas
SI1 - Location	1	1
SI2 - Pond area	0.1	0.01
SI3 - Pond drying	0.1	1
SI4 - Water quality	0.33	0.33
SI4 - Shade	0.3	1
SI6 - Fowl	1	1
SI7 - Fish	1	1
SI8 - Ponds	0.5	0.5
SI9 - Terr'l habitat	0.67	0.67
SI10 - Macrophytes	0.8	0.3
HSI Score	0.44	0.45
	Poor	Poor

3.4.4.4. The pond and Wet Areas all scored poor on the HSI assessment. Statistically, only a very low number of ponds which score “low” contain great crested newts.

3.4.4.5. Great crested newt surveys were carried out of Pond 1 and all Wet Areas while they contained water to carry out surveys. The surveys were carried out between 10th April and 25th April 2018. A further survey was attempted on 9th May, but Pond 1 and all Wet Areas were totally dry. The survey results are shown below. (All Wet Areas are recorded in one table).

3.4.4.6. The tables below outline the results of the great crested newt surveys carried out on the site. M = male, F = female, GCN = great crested newt, SM = smooth newt and PAL = palmate newt.

Pond 1.

Survey Date		10 th April	16 th April	24 th April	9 th May
PM	Weather	Light rain	Fine	Light rain	N/A
	Temp	7°C	11°C	12°C	N/A
AM	Weather	N/A	N/A	N/A	N/A
	Temp	N/A	N/A	N/A	N/A
Surveyors		SR	JR	JR	N/A
		JR	N/A	N/A	N/A
Bottle traps	Traps	Too shallow to trap	Too shallow to trap	Too shallow to trap	Dried Up
	Results	N/A	N/A	N/A	N/A
Torch search		3 Toads, 2 Frogs, Frog spawn	2 Toads, 1 Frog, 1M SM	Nothing	N/A
Egg search		Nothing	Nothing	Nothing	N/A
Turbidity		2	2	2	N/A
Vegetation cover		3	3	4	N/A

Wet Areas (all areas on site combined, except Pond 1)

Survey Date		10 th April	16 th April	24 th April	9 th May
PM	Weather	Light rain	Fine	Light rain	N/A
	Temp	7°C	11°C	12°C	N/A
AM	Weather	N/A	N/A	N/A	N/A
	Temp	N/A	N/A	N/A	N/A
Surveyors		SR	JR	JR	N/A
		JR	N/A	N/A	N/A
Bottle traps	Traps	Too shallow to trap	Too shallow to trap	Too shallow to trap	Dried Up
	Results	N/A	N/A	N/A	N/A
Torch search		Nothing	Nothing	Nothing	N/A
Egg search		Nothing	Nothing	Nothing	N/A
Turbidity		0	2	1	N/A
Vegetation cover		3	3	3	N/A

3.4.4.7. No other ponds were identified within 1km of the survey area whilst on site or on an Ordnance Survey Map of the area. The ponds on site are isolated from any other ponds and the pond and wet areas all dry up regularly and are clearly transient ponds that dry up quickly.

3.4.4.8. No great crested newts were found during any of the surveys carried out. One male smooth newt was identified during the second survey. Low numbers of frogs and toads were also identified during the first two surveys, but none were found during the third survey.

3.4.5. There are no longer any buildings on the site and few large trees on the site, except the two weeping willow trees and the tall conifer hedgerow on the western site boundary. No bat roost potential was found in these trees during this survey. There are some large trees outside the southern boundary along a dismantled railway corridor, but these are outside the site and will not be affected. Therefore, it is assessed that there is no suitable habitat for roosting bats within the survey area.

3.4.6. The grassland and scrub area at the eastern side of the site has moderate bat foraging opportunities. The tree lines along the site boundaries also have potential for commuting and foraging bats, especially the southern boundary and the dismantled railway corridor to the south of the site. However, the majority of the habitat with moderate potential for foraging and commuting bats is outside the boundary of the proposed Lidl development. Also, the tree lines and dismantled railway corridor are outside the development.

3.4.7. The vegetation within the survey area provides opportunities for nesting birds during the nesting season, which extends from March to September each year. No active nests were identified during this survey, but abundant bird activity was seen and heard on the site.

3.4.8. The western part of the site provides potential habitat for reptiles due to abundant refugia and basking sites. Therefore, full reptile surveys were carried out of the site between April and the 16th May 2018. Forty-five refugia mats were laid out on the site in suitable areas and these refugia were checked seven times on days when the weather was suitable. The table below contains the results of the reptile surveys.

Date	Name	Temp	Weather	Results
27 th March 2018	JR & SR	Laid out 45 refugia mats		
19 th April 2018	JR	18°C	Fine and sunny	Nothing found
23 rd April 2018	SR	16°C	Fine and Sunny	Nothing found
3 rd May 2018	JC	7.5°C	Fine	Nothing found
9 th May 2018	JR	15°C	Fine and sunny	Nothing found
11 th May 2018	SR	12°C	Overcast, mild	Nothing found
14 th May 2018	RG	15°C	Fine and sunny	Nothing found
16 th May 2018	SW	12°C	Fine	Nothing found

3.4.8.1. During the reptile surveys carried out on the site, no reptiles were identified.

3.4.9. No suitable dormouse habitat was identified during this survey. The site is also outside the known range of this species.

3.4.10. No red squirrels or red squirrel field signs were identified during this survey and there is no suitable habitat within the survey area. The site is also outside the known range of this species.

3.4.11. Two small Cotoneaster plants were identified on the northern side of the tarmac roads which ran around the buildings. Cotoneaster is an invasive species of plant listed under Schedule 9 of The Wildlife and Countryside Act 1981 and it is an offence to cause the plants to spread. Cotoneaster spreads by berries that are present through the winter. No other invasive plant species were identified.

3.4.11.1. The photograph below shows one of these plants on the northern side of the tarmac road.



3.4.12. During previous surveys Common Spotted Orchids and Northern Marsh Orchids were identified at the eastern side of the site. During this survey they are also now growing in gaps and cracks in the tarmac at the southwest side of the site.

3.4.12.1. Some types of orchid have higher levels of protection in the UK, but these two species are more common and only have protection from being uprooted without permission from the landowner or occupier.

4. IMPACT ASSESSMENT, MITIGATION AND RESIDUAL EFFECTS.

4.1. Designated Sites.

4.1.1. Impact Assessment.

4.1.1.1. No designated sites were identified within the surveyed area.

4.1.1.2. The Staincross Cutting Regionally Importance Geological of Geomorphological Site (RIGS) lies along the dismantled railway cutting to the southeast of the survey area.

4.1.1.3. Therefore, there will be **no impact** on designated sites during the proposed development. The broken hedge with trees will remain between the site boundary and the RIGS.

4.1.2. Mitigation.

Lighting on the site must be down lighting and will not shine onto the RIGS site to the southeast of the proposed development.

4.1.3. Residual Effects.

There will be **no residual impact** on designated sites during the development.

4.2. Habitats.

4.2.1. Impact Assessment.

4.2.1.1. The main habitats to be affected by the proposed Lidl development on the site are bare ground and short ephemeral in the area where the buildings once stood. A small area of the dense scrub on the site and occasional small scattered trees will also be affected. A very small area of the grassland habitat will also be affected by the works.

4.2.1.2. The areas of higher ecological value, standing water, hedgerows and the majority of the area of grassland, will remain unaffected by this development.

4.2.1.3. Therefore, the proposed works will have a **low impact on high value habitats** during the proposed Lidl development.

4.2.2. Mitigation.

Some trees will be planted as decorative planting along the edges of the car park. These will include native species, including fruit and berry bearing species.

4.2.3. Residual Effects.

The residual impact of the development on habitats will be a **low impact at a local level** as the main habitat affected will be the bare ground and short ephemeral with a small area of scrub and a low number of small scattered trees.

4.3. Species – Bats.

4.3.1. Impact Assessment.

The proposed Lidl development will have a **very low impact on foraging and commuting bats at a site level** during the development as the small amount of vegetation to be cleared will not fragment any foraging or commuting habitat.

4.3.2. Mitigation.

All lighting will be aimed away from the site boundaries and will be down lighting to prevent disturbing bats commuting past the site. The trees planted around the car park will increase bat foraging potential as they grow.

4.3.3. Residual Effects.

There will be **no residual impact** on foraging and commuting bats during the proposed Lidl development.

4.4. Species – Birds.

4.4.1. Impact Assessment.

4.4.1.1. The vegetation on the site provides a suitable nesting habitat for various species of bird during the nesting season, which extends from March to September each year. However, there is little vegetation to be affected by the proposed Lidl development.

4.4.1.2. Vegetation clearance works carried out during the nesting season will potentially have a **moderate impact on nesting birds at a site level**.

4.4.2. Mitigation.

Any vegetation clearance works will be carried out outside the nesting season, which extends from March to September each year, or will be immediately preceded by a thorough nesting bird survey carried out by a suitably experienced surveyor.

4.4.3. Residual Effects.

The residual impact of the development on nesting birds will be **negligible at a site level** because there will be a very negligible loss of common nesting habitat found in abundance throughout the surrounding area.

4.5. Species – Reptiles and Amphibians.

4.5.1. Impact Assessment.

4.5.1.1. The proposed Lidl site was assessed as providing habitat for amphibians and reptiles due to the rubble piles on the site. Surveys carried out on the site for great crested newts and reptiles identified neither species present on the site. However, during the great crested newt surveys one smooth newt and low numbers of frogs and toads were identified in the pond on the site.

4.5.1.2. There are no records of reptile species within the surrounding area.

4.5.1.3. The proposed development will therefore have a **low impact on amphibians and reptiles at a site level** in the unlikely event that individual animals are present on the site.

4.5.2. Mitigation.

Precautionary measures will be put in place during the site clearance and development works. The measures will include the briefing of personnel working on the site and care during key phases of the works.

4.5.3. Residual Effects.

The residual impact of the development on amphibians and reptiles will be **negligible at a site level** because there will be a minor loss of a small part of the suitable habitat.

5. COMPENSATION AND ENHANCEMENT MEASURES.

5.1. Native plant species will be planted around the car park, including fruit and berry bearing species, to provide habitat and a food source.

5.2. Two bird boxes will be erected on trees adjacent to the site to provide nesting opportunities for a variety of species of birds. These will include one each of the following, of a similar design.

- Vivara Pro Seville 32mm WoodStone Nest Box



- Vivara Pro Seville 28mm WoodStone Nest Box



Prepared by:	
Jenny Whitcher Roebuck MCIEEM.	Date: 16 th May 2018.

Checked by:	
Derek Whitcher. BSc, MCIEEM, MCMI	Date: 16 th May 2018.

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Appendix I. NESTING BIRD INFORMATION.

Ecology

The nesting season will vary according to the weather each year but generally commences in March, peaks during May and June and continues until September. It is also worth remembering that some birds nest in trees and scrub, but others are ground nesting or prefer man-made structures or buildings.

Surveys

Nesting bird surveys search for potential nest sites in vegetation, buildings etc. Potential nesting sites are observed over a suitable period of time for bird movements or calling male birds that would indicate the presence of a nest. The presence of a nest can be identified from the field signs without the necessity to see the nest itself, thereby avoiding any disturbance of the nests. The best way to avoid this issue is to plan for vegetation clearance to be carried out outside the bird-nesting season.

Legislation

Nesting birds are protected under The Wildlife and Countryside Act 1981.

Part 1. -(1) Of the Act states that: - If any person intentionally: - kills, injures or takes any wild bird; takes, damages or destroys the nest of any wild bird while that nest is in use or being built; or takes or destroys an egg of any wild bird, he shall be guilty of an offence.

Part 1. -(5) of the Act states that: - If any person intentionally: - disturbs any wild bird included in Schedule 1 while it is building a nest or is in, on, or near a nest containing eggs or young; or disturbs young of such a bird, he shall be guilty of an offence and liable to a special penalty.

The Countryside and Rights of Way Act 2000 amends the above by inserting after “intentionally” the words “or recklessly”.

Appendix II. REPTILE INFORMATION.

Ecology

There are five main species of reptile that reside in the UK; Common or Viviparous Lizard (*Lacerta vivipara*); Sand Lizard (*Lacerta agilis*); Slow Worm (*Anguis fragilis*); Grass Snake (*Natrix natrix*) and Adder (*Vipera berus*). The Adder is the only native species that is venomous although this is rarely harmful to humans.

Reptiles occupy a wide range of habitats including woodland, marshes, heathland, moors, sand dunes, hedgerows and bogs. Sand Lizards are confined to moorland and coastal sand dunes where they lay their eggs in the warm sand. The range of the Sand Lizard in the UK is therefore very limited. Slow Worms can be found in a wide variety of habitats throughout Britain and is the most likely reptile to be found in urban and suburban environments.

Maintaining the right body temperature is vital to reptiles' survival. In the morning, they find a warm basking site to heat up their bodies, then later they may move back into the shade because they do not sweat and have to be careful not to overheat. During hot summers, Adders will try to move to damper, cooler sites.

Over winter reptiles will hibernate in burrows or under logs where they are protected from the cold and predators, emerging from February onwards as the weather warms up.

Reptiles generally begin to mate April to May with young born in late July to September. The Common Lizard gives birth to live young, hence the term viviparous, meaning live bearing.

Surveys

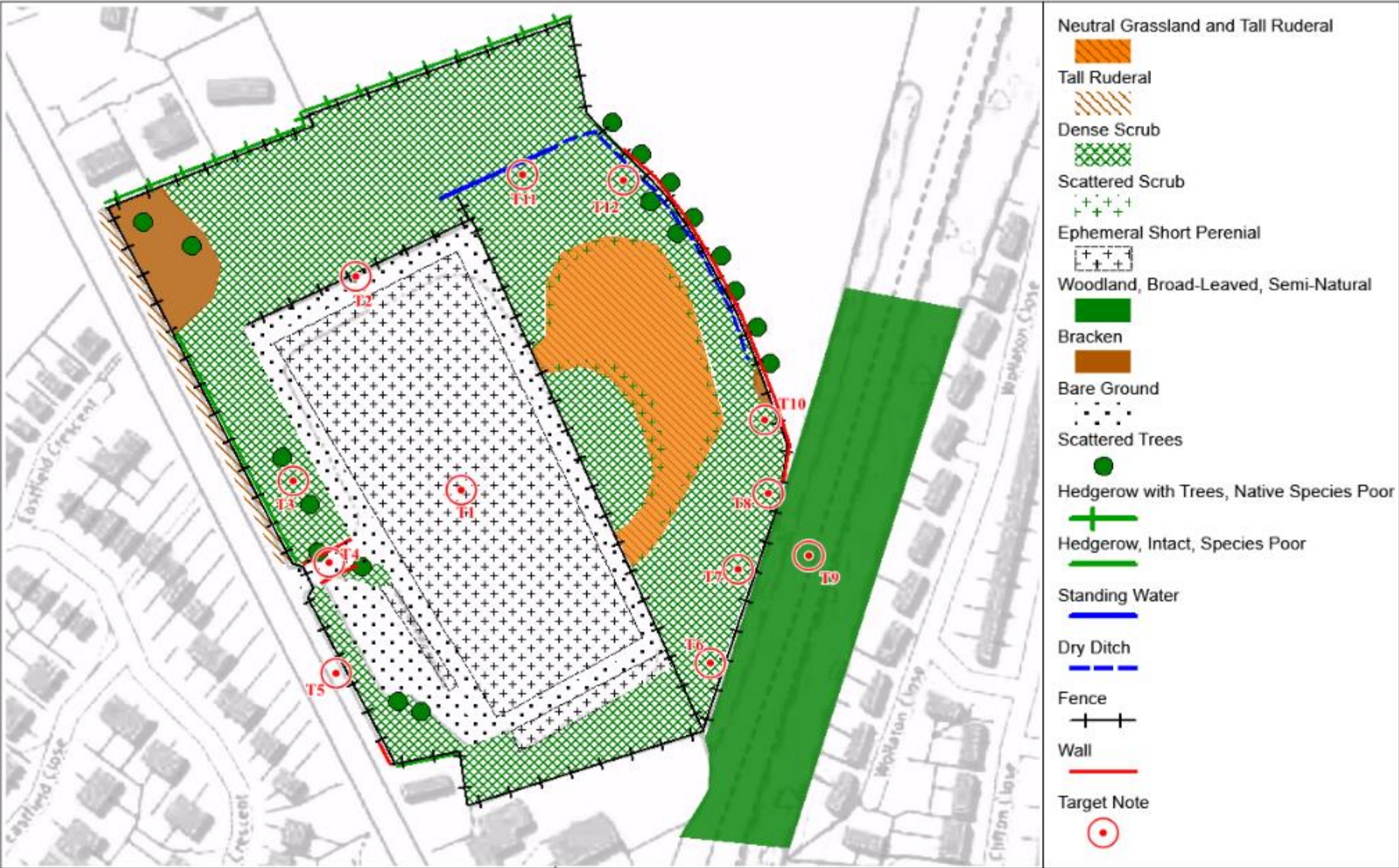
Reptile surveys involve the searching of refuge such as logs and stones for any animal sheltering below. Artificial refuge may be laid out on site for the purpose of reptile surveys.

Legislation

Reptiles are protected under Appendix II (sand lizards) and Appendix III (common lizard, slow worms, smooth snake, grass snake and adders) of the BERN Convention (1982), partially protected under Schedule 5 of the Wildlife and Countryside Act (1981), Annex IV of the Habitats Directive and are all listed under section 41 of the Natural Environment and Communities Act (2006) making them a species of principal importance.

This makes it an offence to disturb any reptile while it is occupying a structure or place it uses for shelter or protection or to obstruct access to such a place.

Appendix III. ANNOTATED MAP OF THE SURVEY AREA.



Site: Wakefield Road, Mapplewell Lidl
Reference: 180302

Prepared by: Whitcher Wildlife Ltd
Date: 9th May 2018



Appendix IV. TARGET NOTES.

- T1 - The area where the buildings once stood and where the Wet Areas are.
- T2 - The cotoneaster identified on the site.
- T3 - The two large weeping willow trees.
- T4 - The site entrance road.
- T5 - The area where the large conifer hedge has been removed.
- T6 - The electricity pylon.
- T7 - Area where vegetation has been cleared due to works to the power lines.
- T8 - Wet area of ground where the dry ditch runs to when there is heavy rain.
- T9 - The Staincross Cutting RIGS site.
- T10 - Area of bracken that has been cleared but is beginning to regrow.
- T11 - The location of Pond 1.
- T12 - Scattered trees along the site boundary, most outside the site.

Appendix V. SPECIES LISTS.

Neutral Grassland and Tall Ruderal Species.	DAFOR Assessment.
barren brome (<i>Bromus sterilis</i>)	O
tufted hair grass (<i>Deschampsia cespitosa</i>)	O
Yorkshire Fog (<i>Holcus lanatus</i>)	F
cocks foot (<i>Dactylis glomerata</i>)	A
perennial rye grass (<i>Lolium perenne</i>)	D
greater willowherb (<i>Epilobium hirsutum</i>)	F
rosebay willowherb (<i>Chamerion angustifolium</i>)	F
coltsfoot (<i>Tussilago farfara</i>)	O
cow parsley (<i>Anthriscus sylvestris</i>)	O
nettle (<i>Urtica dioica</i>)	A
thistle (<i>Cirsium sp(p)</i>)	F
ribwort plantain (<i>Plantago lanceolata</i>)	F
sow thistle (<i>Sonchus oleraceus</i>)	O
dock (<i>Rumex acetosella</i>)	F
red clover (<i>Trifolium pretense</i>)	F
dandelion (<i>Taraxacum officinale</i>)	F
ragwort (<i>Senecio jacobaea</i>)	O
mugwort (<i>Artemisia vulgaris</i>)	O
herb Robert (<i>Geranium robertianum</i>)	O
cleavers (<i>Galium aparine</i>)	O
yarrow (<i>Achillea millefolium</i>)	O
biting stonecrop (<i>Sedum acre</i>)	O
dog rose (<i>Rosa canina</i>),	O
buddleia (<i>Buddleja davidii</i>)	O
greater plantain (<i>Plantago major</i>)	O
red valerian (<i>Centranthus ruber</i>)	O
bittersweet (<i>Solanum dulcamara</i>)	O
birds foot trefoil (<i>Lotus corniculatus</i>)	O
ox eye daisy (<i>Leucanthemum vulgare</i>)	O
great lettuce (<i>Lactuca sativa</i>)	R
hogweed (<i>Heracleum sphondylium</i>)	O
bush vetch (<i>Vicia sepium</i>)	O
	O

Common Spotted Orchid (<i>Dactylorhiza fuchsia</i>)	O
Northern Marsh Orchid (<i>Dactylorhiza purpurella</i>)	O
elder (<i>Sambucus nigra</i>)	A
bramble (<i>Rubus fruticosus</i>)	O
silver birch (<i>Betula pendula</i>)	O
hawthorn (<i>Crataegus monogyna</i>)	O
goat willow (<i>Salix caprea</i>)	O
bracken (<i>Pteridium aquilinum</i>)	O
dead nettle (<i>Lamium purpureum</i>)	R
soft rush (<i>Juncus effuses</i>)	

Tall Ruderal Species.	DAFOR Assessment.
nettle (<i>Urtica dioica</i>)	D
cow parsley (<i>Anthriscus sylvestris</i>)	F
bracken (<i>Pteridium aquilinum</i>)	O
hawthorn (<i>Crataegus monogyna</i>)	F
elder (<i>Sambucus nigra</i>)	O
dog rose (<i>Rosa canina</i>)	O
bramble (<i>Rubus fruticosus</i>)	A

Short Ephemeral Species.	DAFOR Assessment.
greater willowherb (<i>Epilobium hirsutum</i>)	F
rosebay willowherb (<i>Chamerion angustifolium</i>)	F
coltsfoot (<i>Tussilago farfara</i>)	O
cow parsley (<i>Anthriscus sylvestris</i>)	O
nettle (<i>Urtica dioica</i>)	D
thistle (<i>Cirsium sp(p)</i>)	F
ribwort plantain (<i>Plantago lanceolata</i>)	F
dock (<i>Rumex acetosella</i>)	F
red clover (<i>Trifolium pretense</i>)	F
dandelion (<i>Taraxacum officinale</i>)	A
ragwort (<i>Senecio jacobaea</i>)	F
herb Robert (<i>Geranium robertianum</i>)	F
cleavers (<i>Galium aparine</i>)	F
yarrow (<i>Achillea millefolium</i>)	O

biting stonecrop (<i>Sedum acre</i>)	O
greater plantain (<i>Plantago major</i>)	F
red valerian (<i>Centranthus ruber</i>)	F
bittersweet (<i>Solanum dulcamara</i>)	F
birds foot trefoil (<i>Lotus corniculatus</i>)	O
ox eye daisy (<i>Leucanthemum vulgare</i>)	F
Common Spotted Orchid (<i>Dactylorhiza fuchsia</i>)	O
Northern Marsh Orchid (<i>Dactylorhiza purpurella</i>)	O

Scattered Scrub Species.	DAFOR Assessment.
bramble (<i>Rubus fruticosus</i>)	D
dog rose (<i>Rosa canina</i>)	O
hawthorn (<i>Crataegus monogyna</i>)	A
silver birch (<i>Betula pendula</i>)	O
goat willow (<i>Salix caprea</i>)	O

Dense Continuous Scrub Species.	DAFOR Assessment.
hawthorn (<i>Crataegus monogyna</i>)	D
lilac (<i>Lilac vulgaris</i>)	O
dog rose (<i>Rosa canina</i>)	O
heather (<i>Ericoids spp.</i>)	R
hebe (<i>Hebe sp.</i>)	R
bramble (<i>Rubus fruticosus</i>)	D
silver birch (<i>Betula pendula</i>)	O
elder (<i>Sambucus nigra</i>)	O
thistle (<i>Cirsium sp(p)</i>)	O
nettle (<i>Urtica dioica</i>)	A
yarrow (<i>Achillea millefolium</i>)	O
cotton lavender (<i>Santolina chamaecyparissus</i>)	R
Yorkshire fog (<i>Holcus lanatus</i>)	F
cow parsley (<i>Anthriscus sylvestris</i>)	O
dandelion (<i>Taraxacum officinale</i>)	F
greater willowherb (<i>Epilobium hirsutum</i>),	F
mugwort (<i>Artemisia vulgaris</i>)	O
rosebay willowherb (<i>Chamerion angustifolium</i>)	O
ox-eye daisy (<i>Leucanthemum vulgare</i>)	O

hawthorn (<i>Crataegus monogyna</i>)	F
elder (<i>Sambucus nigra</i>)	O
silver birch (<i>Betula pendula</i>)	O
goat willow (<i>Salix caprea</i>)	O
dog rose (<i>Rosa canina</i>)	O
oak (<i>Quercus sp(p)</i>)	R

Scattered Trees Species.	DAFOR Assessment.
apple (<i>Malus domestica</i>)	R
oak (<i>Quercus sp(p)</i>)	O
silver birch (<i>Betula pendula</i>)	D
goat willow (<i>Salix caprea</i>)	A
weeping willow (<i>Salix babylonica</i>)	O
conifer	O

Bracken Species.	DAFOR Assessment.
bracken (<i>Pteridium aquilinum</i>)	D

Hedgerow Native Species Poor Species.	DAFOR Assessment.
Leyland cypress (<i>Cupressus x leylandii</i>)	D

Hedgerow with Trees, Native Species Poor Species.	DAFOR Assessment.
Leyland cypress (<i>Cupressus x leylandii</i>)	D

Standing Water Species.	DAFOR Assessment.
bulrush (<i>Typha latifolia</i>)	D
soft rush (<i>Juncus effuses</i>)	A

Appendix VI. HABITAT SUITABILITY INDEX (HSI) ASSESSMENT INFORMATION.



Amphibian and Reptile Groups of the United Kingdom
ARG UK Advice Note 5

www.arguk.org

Great Crested Newt Habitat Suitability Index

May 2010

Background

The Habitat Suitability Index (HSI) for the great crested newt was developed by Oldham *et al.* (2000). HSI scoring systems were originally developed by the US Fish and Wildlife Service as a means of evaluating habitat quality and quantity. An HSI is a numerical index, between 0 and 1. Values close to 0 indicate unsuitable habitat, 1 represents optimal habitat. The HSI for the great crested newt incorporates ten suitability indices, all of which are factors known to affect this species. These ten suitability indices are retained in this current Advice Note.

In the HSI system proposed by Oldham *et al.* (2000) one of the suitability indices (SI₉, terrestrial) involves more lengthy measurement and calculation than the others. In using the HSI system with volunteer surveyors in Kent, Lee Brady has substituted a simpler evaluation of terrestrial habitat quality (a four-point scale), for ease of use.

Several other, local, surveys have utilised the HSI, but incorporating their own variations on the original system. In 2007 a workshop was held at the Herpetofauna Workers' Meeting to evaluate the use of the HSI for the great crested newt, with the aims of:

- Identifying components of the system that may need clarification or refinement
- Agreeing on a standard that can readily be used by volunteers and professionals alike.

The outputs of the workshop and subsequent consultation have been used to formulate the current Advice Note. As far as possible a conservative approach has been adopted in modifying the use of the original HSI suitability indices. However, a major departure is the adoption of Lee Brady's four-point evaluation of terrestrial habitat. This differs from the original HSI in that it has been developed with respect to newt presence/absence at a pond, rather than estimating population size.

Use and limitations of the HSI

The HSI for great crested newts is a measure of habitat suitability. **It is not a substitute for newt surveys.** In general, ponds with high HSI scores are more likely to support great crested newts than those with low scores. However, the system is not sufficiently precise to conclude that any particular pond with a high score will support newts, or that any pond with a low score will not do so.

There is a positive correlation between HSI scores and the numbers of great crested newts observed. In general, high HSI scores are likely to be associated with greater numbers of great crested newts. The relationship is not sufficiently strong, however, to allow estimations of the numbers of newts in any particular pond.

HSI scoring can be useful in:

- Evaluating the general suitability of a pond, or ponds, for great crested newts
- Comparing general suitability of ponds across different areas
- Evaluating the suitability of receptor ponds in a proposed mitigation scheme
- Identifying habitat management priorities.

How to collect data and calculate the HSI

The HSI is a geometric mean of ten suitability indices:

$$HSI = (SI_1 \times SI_2 \times SI_3 \times SI_4 \times SI_5 \times SI_6 \times SI_7 \times SI_8 \times SI_9 \times SI_{10})^{1/10}$$

- Ten factors are scored for a pond, in the field and from map work (field scores).
- The ten field scores are converted to SI scores, on a scale from 0.01 to 1 (0.01 is used as the lower end of the scale in stead of 0, because multiplying by 0 reduces all other SI scores to 0).
- The ten SI scores are multiplied together.
- The tenth root of this number is calculated ($x^{1/10}$ i.e. x to the power of 0.1).

The calculated HSI for a pond should score between 1 and close to 0 (the calculations above do not allow the HSI to be exactly 0).

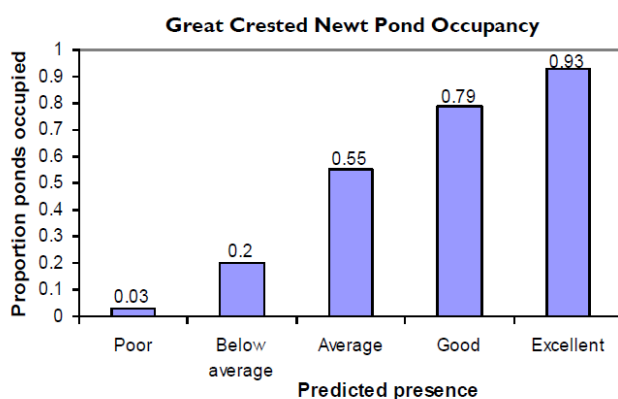
Some of the field scores are categorical, some are numerical. The numerical field scores are converted to SI scores by reading off the values from graphs produced by Oldham *et al.* (2000) reproduced in this Advice Note.

Full details of the scoring system, including descriptions of the criteria used in the categorical scores are given in *Details of suitability indices and definitions of categories* (below). Scores for two of the factors (SI₁ and SI₈) can be gained as desktop/map exercises and so do not have to be completed in the field. The remaining factors should be recorded as field scores, and later converted to suitability indices, in some cases reading SI scores from the graphs provided. A summary of data to collect is given in the appendix *Summary of scoring system*.

Categorisation of HSI scores

Lee Brady has developed a system for using HSI scores to define pond suitability for great crested newts on a categorical scale:

HSI	Pond suitability
< 0.5	= poor
0.5-0.59	= below average
0.6-0.69	= average
0.7-0.79	= good
> 0.8	= excellent



The graph shows occupancy of ponds by great crested newts in south-east England. 248 ponds were surveyed on three to six occasions, using egg-searching, torching and bottle-trapping. As pond suitability increases from 'poor' to 'excellent', so does the proportion of ponds occupied by great crested newts.

Details of suitability indices and definitions of categories

Factor 1. Geographic location (SI₁)

Sites should be scored according to the zone in which they occur. This scoring can be carried out either in the field, or as part of a desktop exercise.

Zone A, location is optimal, SI = 1

Zone B, location is marginal, SI = 0.5

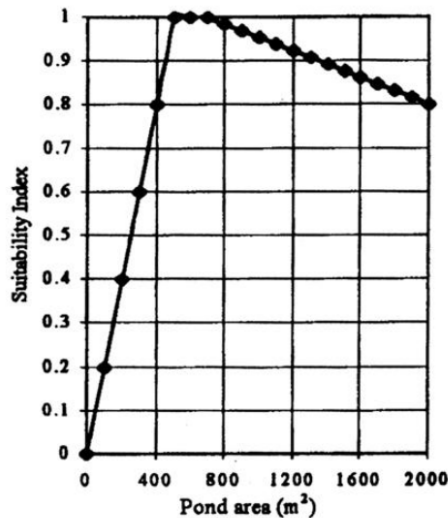
Zone C, location is unsuitable, SI = 0.01.

Some sites will fall on boundary lines between zones. In such cases, select medium-value scores i.e. Zone B.



Factor 2. Pond area

Pond area is the surface area of the pond when water is at its highest level (excluding flooding events). This is usually in the spring. If the pond is being measured at another time of year, the spring time area should still be evident from vegetation types and evidence of a draw down zone around the pond.



Pond area should be measured as accurately as possible. There are several ways of doing this, for example by measuring axes of regularly shaped ponds, either by pacing out in the field, or taking measurements from a map. Irregularly shaped ponds may have to be treated as a series of geometric shapes, calculating the area for each and adding together.

Since it can be difficult reading off SI scores from the graph, pond area should be rounded to the nearest 50 m².

It can be particularly difficult to read off SI scores for very small ponds. For ponds smaller than 50 m² use a score of 0.05.

For ponds larger than 2000 m² omit this factor from the HSI calculation (as there are no data for such large ponds).
i.e. $HSI = (SI_1 \times SI_3 \times SI_4 \times SI_5 \times SI_6 \times SI_7 \times SI_8 \times SI_9 \times SI_{10})^{1/9}$.

Factor 3. Permanence

Pond permanence should be deduced from local knowledge and personal judgement. A landowner may know how often a pond dries. However, if not, the surveyor should make a judgement based on water level at the time of the survey, and taking seasonality into consideration. For example, a pond that is already dry by late spring is likely to dry out every year, etc.

Category	SI	Criteria
Never dries	0.9	Never dries.
Rarely dries	1.0	Dries no more than two years in ten or only in drought.
Sometimes dries	0.5	Dries between three years in ten to most years.
Dries annually	0.1	Dries annually.

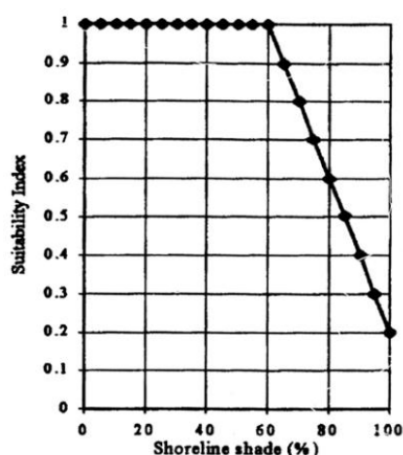
Factor 4. Water quality

The assessment of water quality is subjective and should be based on invertebrate diversity, the presence of submerged water plants and knowledge of the water sources feeding the pond. Water quality should not be confused with water clarity. Sometimes clear water can be devoid of invertebrates, and turbid ponds can support a wealth of invertebrates. There is no quick and simple invertebrate index of water quality. However, some species are indicators of water quality.

Category	SI	Criteria
Good	1.0	Water supports an abundant and diverse invertebrate community. Netting reveals handfuls of diverse invertebrates, including groups such as mayfly larvae and water shrimps.
Moderate	0.67	Moderate invertebrate diversity
Poor	0.33	Low invertebrate diversity (e.g. species such as midge and mosquito larvae). Few submerged plants.
Bad	0.01	Clearly polluted, only pollution-tolerant invertebrates (such as rat-tailed maggots), no submerged plants.

Other cues may also provide information about water quality. For example, ponds subject to agricultural inputs are likely to have poor water quality.

Factor 5. Shade



Estimate percentage pond perimeter shaded, to at least 1m from the shore. Shading is usually from trees, but can include buildings. Shading should not include emergent pond vegetation. The estimate should be made during the period from May to the end of September.

Factor 6. Waterfowl

This factor is concerned with the impact of waterfowl upon the pond and newts. At high densities, as created when waterfowl are encouraged to use a pond by provision of food, the birds can remove all aquatic vegetation, pollute water and persistently stir sediments. Some waterfowl may also actively hunt adult newts and their larvae. Score as one of three categories.

Category	SI	Criteria
Absent	1	No evidence of waterfowl impact (moorhens may be present).
Minor	0.67	Waterfowl present, but little indication of impact on pond vegetation. Pond still supports submerged plants and banks are not denuded of vegetation.
Major	0.01	Severe impact of waterfowl. Little or no evidence of submerged plants, water turbid, pond banks showing patches where vegetation removed, evidence of provisioning waterfowl.

'Waterfowl' includes most water birds, such as ducks, geese and swans. Moorhens should be excluded because almost every pond has at least one or two.

Factor 7. Fish

Information on fish should be gleaned from local knowledge and the surveyor's own observations. Pond owners will usually be aware of stocking with fish for commercial or aesthetic reasons. However, stickleback (which can be significant predators of great crested newt larvae, when present in large numbers) are unlikely to be deliberately introduced to a pond, but may arrive through other means. Netting is useful in detecting smaller fish, such as sticklebacks, or the fry of larger species.

Category	SI	Criteria
Absent	1	No records of fish stocking and no fish revealed by netting or observed by torchlight.
Possible	0.67	No evidence of fish, but local conditions suggest that they may be present.
Minor	0.33	Small numbers of crucian carp, goldfish or stickleback known to be present.
Major	0.01	Dense populations of fish known to be present.

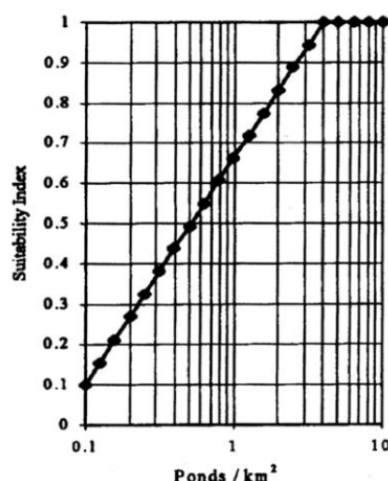
Factor 8. Pond count

This is the number of ponds occurring within 1 km of survey pond. Do not count the survey pond itself. Ponds on the far side of major barriers, such as main roads, should not be counted. Use 1:25,000 scale O.S. data, such as Explorer maps, GIS or web-based mapping sources, such as:

Getamap www.ordnancesurvey.co.uk/oswebsite/getamap/
 Magic www.magic.gov.uk/site_map.html
 Digimap edina.ac.uk/digimap/

Pond counts can be carried out by a survey coordinator and so do not necessarily have to be performed by surveyors.

Divide the number of ponds by π (3.14) to calculate the density of ponds per km² and read off the SI value from graph.



Factor 9. Terrestrial habitat

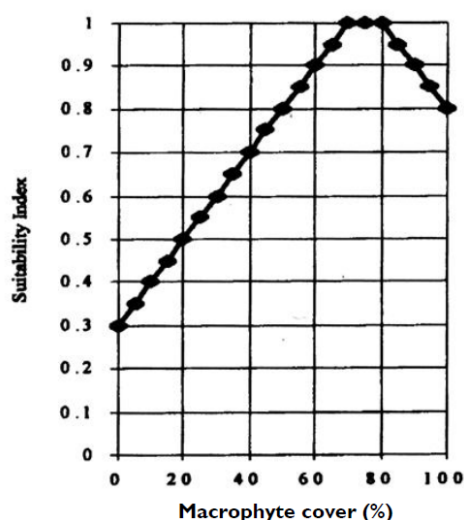
Scoring terrestrial habitat depends on the surveyor's understanding of newt habitat quality. Good terrestrial habitat offers cover and foraging opportunities and includes meadow, rough grassland with tall sward height, scrub, woodland or mature gardens. Terrestrial habitat should be considered within approximately 250 m from the pond, but only on the near side of any major barriers to dispersal (e.g. main roads or large expanses of bare habitat).

Category	SI	Criteria
Good	1	Habitat that offers good opportunities for foraging and shelter (e.g. most semi-natural environments, such as rough grassland, scrub or woodland, also brownfield sites and low intensity farmland) covers more than 75% of available area.
Moderate	0.67	Habitat offers opportunities for foraging and shelter but may not be extensive (25-75%) of available area.
Poor	0.33	Habitat with poor structure (e.g. amenity grassland, improved pasture and arable) that offers limited opportunities (less than 25% of available area) for foraging and shelter.
None	0.01	No suitable habitat around pond (e.g. centre of arable field or large expanse of bare habitat).

Great crested newts do not have specific terrestrial habitat requirements. However, good quality terrestrial habitat has structure. The presence of hedges, ditches, stone walls, old farm buildings, piles of loose stone or rock, rabbit burrows and small mammal holes all contribute towards 'good' terrestrial habitat. Note that it is rare to encounter a pond falling within the terrestrial habitat category of 'none'.

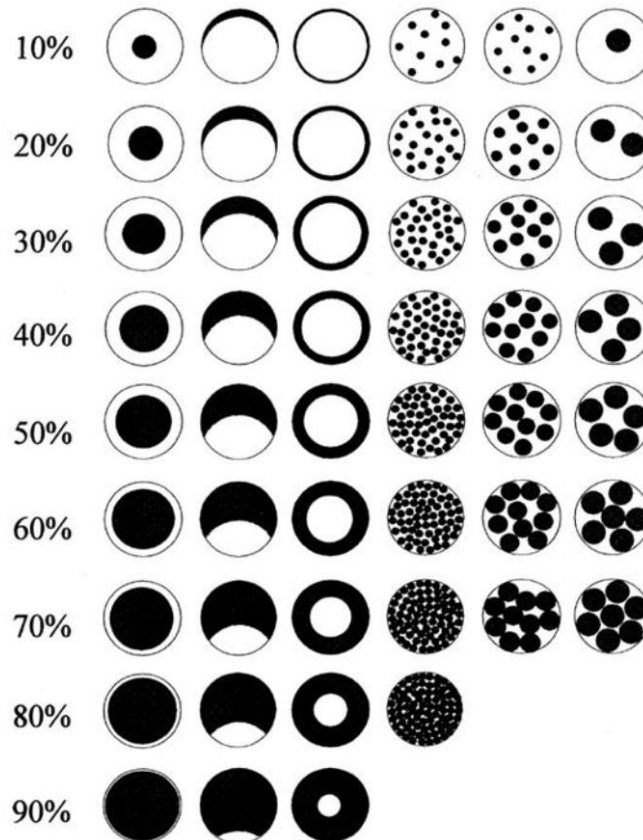
Factor 10. Macrophytes

Estimate the percentage of the pond surface area occupied by macrophyte cover. This includes emergents, floating plants (excluding duckweed) and submerged plants reaching the surface. Make an estimate between March and the end of September. Read off the SI value from graph.



Guide for assessment of macrophyte cover in a pond

The areas of dark shading simulate a variety of vegetation dispersion patterns.



Reference

Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). *Herpetological Journal* 10(4), 143-155.

This Advice Note is an output from a workshop held at the Herpetofauna Workers' Meeting in January 2007. ARG UK is grateful to Lee Brady, Rob Oldham, David Sewell and John Baker for leading the workshop and/or contributing to this note, and workshop participants for providing useful suggestions. ARG UK is also grateful to the British Herpetological Society for permission to use graphics from the original paper on HSI, published in the *Herpetological Journal*.

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ARG UK is the network of volunteer conservation groups concerned with the native amphibians and reptiles of the UK.



**amphibian and reptile
conservation**



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Summary of scoring system

SI₁ Location

Field score	SI
A (optimal)	1
B (marginal)	0.5
C (unsuitable)	0.01

SI₂ Pond area

Field score	SI
Measure pond surface area (m ²) and round to nearest 50 m ²	Read off graph.

SI₃ Pond drying

Field score	SI	Criteria
Never	0.9	Never dries
Rarely	1.0	Dries no more than two years in ten or only in drought.
Sometimes	0.5	Dries between three years in ten to most years
Annually	0.1	Dries annually

SI₄ Water quality

Field score	SI	Criteria
Good	1.0	Abundant and diverse invertebrate community.
Moderate	0.67	Moderate invertebrate diversity
Poor	0.33	Low invertebrate diversity, few submerged plants
Bad	0.01	Clearly polluted, only pollution-tolerant invertebrates, no submerged plants.

SI₅ Shade

Field score	SI
Estimate percentage perimeter shaded to a least 1 m from shore.	Read off graph.

SI₆ Fowl

Field score	SI	Criteria
Absent	1	No evidence of water fowl (although moorhen may be present)
Minor	0.67	Waterfowl present, but little sign of impacts
Major	0.01	Severe impact of waterfowl

SI₇ Fish

Category	SI	Criteria
Absent	1	No records of fish stocking and no fish revealed during survey.
Possible	0.67	No evidence of fish, but local conditions suggest that they may be present.
Minor	0.33	Small numbers of crucian carp, goldfish or stickleback known to be present.
Major	0.01	Dense populations of fish known to be present.

SI₈ Pond count

Field score	SI
Count the number of ponds within 1 km of the survey pond (not separated by major barriers) and divide by 3.14. This can be done from maps rather than in the field.	Read off graph.

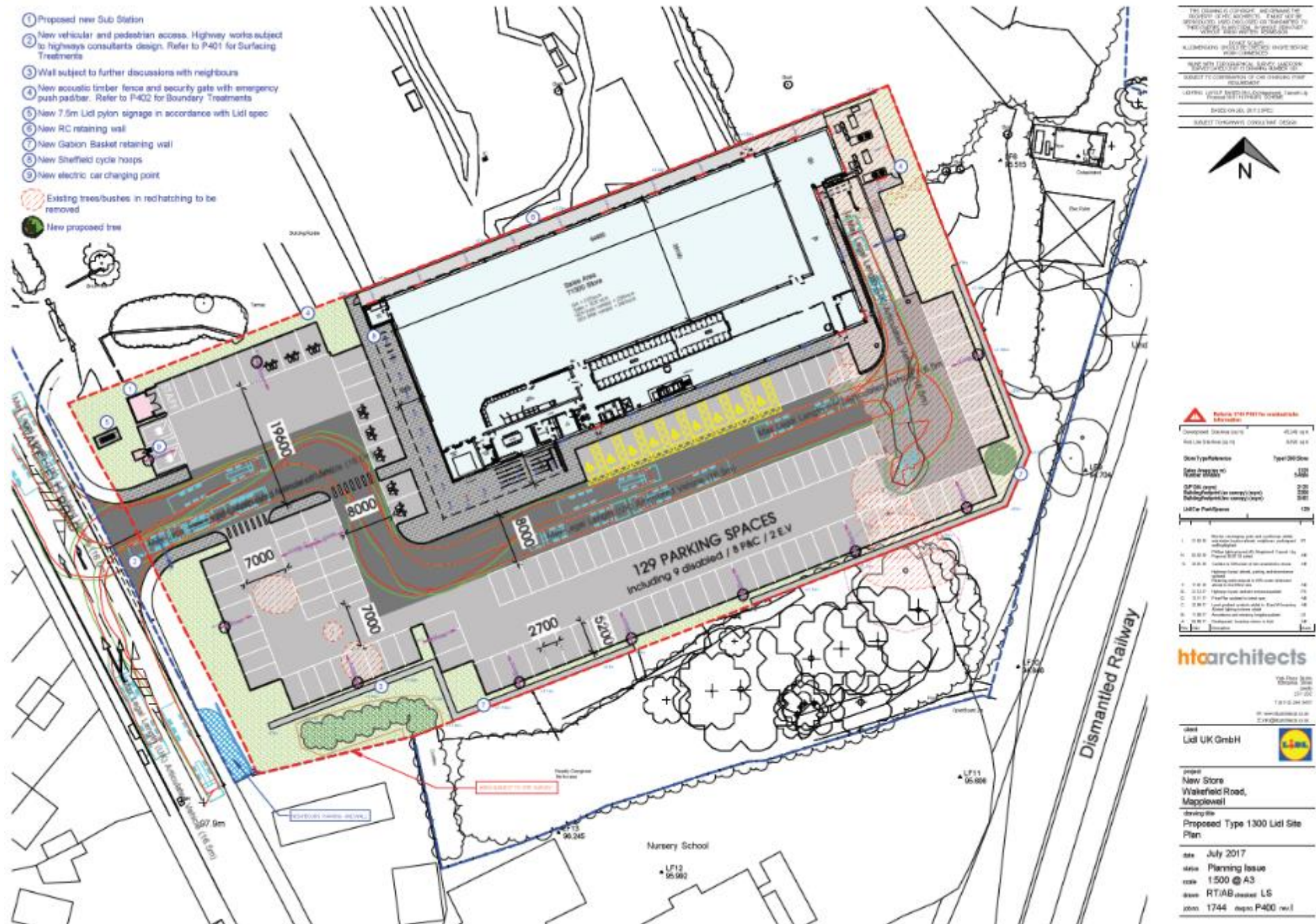
SI₉ Terrestrial habitat

Category	SI
Good	1
Moderate	0.67
Poor	0.33
None	0.01

SI₁₀ Macrophytes

Field score	SI
Estimate the percentage of the pond surface area occupied by macrophyte cover (between May and the end of September)	Read off graph.

Appendix VII. DEVELOPMENT PLAN.



Appendix VIII. SITE MASTERPLAN PLAN.



Toolbox Talk: Amphibians

Whitcher Wildlife Ltd

Ecological Consultants



Identification: Smooth Newts.

Smooth newts can grow to around 10cm in length. They are usually brown in colour, often with visible black spots on the upper body. Their belly is pale orange with black spots fading away to the sides. The males have a wavy crest running from head to tail, although this can sometimes only be visible in water.



Other Amphibians.

In addition to the common amphibians listed adjacent there are also three other species present in the UK, those being great crested newts, natterjack toads and pool frogs. These species are less common.

The species are also afforded a higher level of protection because they are European Protected Species.

Identification: Palmate Newts.

Palmate newts are very similar to smooth newts but are usually smaller, to around 9cm. Their throat is usually pink and unspotted. The males often have webbed back feet and a fine filament at the end of the tail during the breeding season.



Habitat.

Amphibians predominantly live on land but breed in ponds. The aquatic requirements for each species vary slightly although the presence of one species does not rule out the potential presence of the other species.

When not in their ponds amphibians require a variety of refugia for shelter and can therefore be found under log piles, in rubble, under tree roots or within areas of scrub or rough grassland. Amphibians hibernate, spending the winter in burrows or under logs protected from the cold and predators.

Identification: Common Frogs.

Common frogs are one of the more common amphibians in the UK. They have smooth skin with a distinctive patch behind their eyes. They are predominantly green or brown with black patches although their colour can vary through orange, red or black.



Identification: Common Toads.

Common toads are a Species of Principal Importance in the UK.

Common toads have rough warty skin with two distinctive lumps behind the eyes. When disturbed they have a tendency to remain still, when moving they crawl rather than hopping.



Legislation.

The common amphibians listed above are protected only by Section 9(5) of the Wildlife and Countryside Act 1981. This section prohibits sale, barter, exchange, transporting for sale and advertising to sell or to buy. Collection and keeping of these amphibians is not an offence.

The common toad is also listed as a Species of Principal Importance in the UK.

If amphibians are identified during works, allow them to move away of their own accord.

If large numbers or amphibians (5+) are identified stop works and contact Whitcher Wildlife Ltd directly on 01226 753271 or at info@whitcher-wildlife.co.uk

Toolbox Talk: Reptiles

Whitcher Wildlife Ltd

Ecological Consultants



Identification: Grass Snakes.

The grass snake can be up to 120cm long. It is generally dark green in colour but may occasionally appear grey with vertical black bars and spots that run along its sides. There is usually a yellow marking around the neck.



Other Reptiles.

In addition to the reptiles outlined on this document there are also two other reptile species in Great Britain, the smooth snakes and the sand lizard. These reptiles are a lot less common than the four species covered with the smooth snake being predominantly found on heathland in southern England and the sand lizard found throughout Great Britain in coastal dune areas.

These species are also afforded a higher level of protection because they are European Protected Species.

Identification: Adders.

The adder is the only native species that is venomous, but it is rarely harmful to humans. Adult adders are generally up to 66cm long. Back ground colouration is a light shade of grey or brown with a back zig-zag marking along the length of the back. As with all reptiles, colouration varies and becomes duller as sloughing (skin shedding) approaches.



Habitat.

Maintaining the right body temperature is vital to reptiles' survival. In the morning they find a warm basking site to heat up their bodies and then later they may move back into the shade so as not to overheat. Hence, reptiles require a habitat that provides a range of suitable refugia for shelter such as dense vegetation, rubble or log piles, or crevices and open areas for basking such as bare ground, rocks or railway ballast shoulders. During hot summers reptiles may be found in damper, cooler sites. Reptiles hibernate, spending the winter in burrows or under logs protected from the cold and predators.

Identification: Slow Worms.

Slow worms grow to around 45cm in length. The males and females display a marked difference in colour when fully grown. In general, the species displays colouring that varies from light brown, dark brown, grey, bronze or brick red with the females often displaying a dark vertebral stripe and both males and females displaying occasional markings on the flanks.



Identification: Common Lizards.

Common lizards grow to around 16cm. They are grey brown to dark brown, often with a darker streak that may run the entire length of the spine. A continuous dark band bordered by light yellow or white spots is often seen on either side of the body. The underside of the males is egg yolk yellow to orange spotted with black. Females are yellowish grey.



When disturbed in their natural habitat reptiles will usually move away quickly.

Legislation.

Reptiles are protected under Schedule 5 of the Wildlife and Countryside Act 1981. They received greater protection following reviews of the schedules published in 1988 and 1991. This means they are protected against intentional or recklessly killing and injuring and against sale or transporting for sale.

If reptiles are identified during works, stop all works and contact Whitcher Wildlife Ltd directly on 01226 753271 or at info@whitcher-wildlife.co.uk