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Version 4



**Firestone Site,
Wrexham Industrial Estate
Baseline Ecological Assessment
TEP Report Ref: 3544.001
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Version 4**

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EXECUTIVE SUMMARY

Broadway Malyan (of which TEP is part of the consulting team) was commissioned in July 2012 by Wrexham County Borough Council (WCBC) to assist in progressing the development of the former Firestone site on Wrexham Industrial Estate (WIE).

This report has the key objective of identifying which areas are most appropriate for development and which are more suited to ecological mitigation. TEP reviewed previous ecological reports, collected current desktop information and carried out field surveys in late summer 2012.

The former Firestone site is situated to the south-east of the WIE and comprises 44.6 hectares (110 acres) of brownfield land. The proposed development includes an area of approximately 23ha of employment units, including associated new roads and open spaces and an extension of the premises of F Lloyd (Penley), an employer currently operating from a site south of the Firestone site.

A review of relevant wildlife legislation, Wrexham County Borough Council planning policy and Local Planning Guidance Notes is presented.

Previous ecological work carried out on the Firestone site and the WIE as a whole in the mid-2000s (14 documents) was reviewed. The Firestone site was considered to be of high ecological value, due to the diversity of habitats present on site including unimproved neutral grassland, two ponds, dense and scattered scrub and scattered broadleaved trees. A small population of great crested newts was also present along with 35 species of bird (28 breeding), grizzled skipper and low levels of badger and bat activity. Plant species of note included grass vetchling *Lathyrus nissolia*, bee orchid *Ophrys apifera* and prickly lettuce *Lactuca serriola*.

The WIE ecological work focused on the importance of the area for the great crested newt population and discussed actions which could be taken to improve the favourable conservation status of this species at the landscape scale in the form of a great crested newt strategy and green wedge plans.

The closest statutory protected sites are the River Dee and Bala Lake SAC and the River Dee SSSI at 2.1km from the site. Three non-statutory sites are present within 1.5km of the Firestone site: Wrexham Industrial Estate Wildlife Site (WS); Cefn Park WS; and Peter's Dingle WS.

The 2012 desktop study indicates that 53 legally protected species or species of conservation concern have been recorded within 1.5km of the site. Fourteen species have been recorded within the site including great crested newt, grizzled skipper, dingy skipper and several other UKBAP butterflies and moths.

The 2012 Phase 1 habitat survey indicates that the site still comprises an intricate mosaic of species-rich modified (developed on post-industrial land) grassland interspersed with areas of dense continuous and scattered scrub and tall ruderal which creates a diverse range of habitats. Scrub cover has increased since the surveys of the mid-2000s and the two ponds have become degraded. A small area of the invasive species, Himalayan balsam (*Impatiens glandulifera*) was recorded on the site in the scrub on the embankment on the south-eastern boundary.

The butterfly food plant survey showed an abundance of grizzled skipper food plants, particularly creeping cinquefoil (*Potentilla reptans*) and bramble (*Rubus fruticosus*), with lesser amounts of dog-rose (*Rosa canina*), agrimony (*Agrimonia eupatoria*), and tormentil (*P.*

erecta). The dingy skipper food plant common bird's-foot trefoil (*Lotus corniculatus*) is distributed frequently throughout the site, while greater bird's-foot trefoil (*L. uliginosus*) was only recorded on the south-eastern boundary.

No clear signs of badger (only a potential badger path) and only a few trees with a low potential for bat roosts were recorded during the 2012 surveys. Other evidence suggests otters may forage on the site. Bat activity surveys indicated a low level of usage of the site by bats, generally along the south-eastern boundary of the site.

No reptiles were recorded during the reptile survey, although toads, smooth newts and great crested newts were recorded under the reptile 'tins' located around and between the two ponds and large ditch in the north-east of the site. The maximum number of great crested newts recorded at any one time was nine. Great crested newt tadpoles were also observed in the ditch which traverses the site in 2012.

Birds of conservation interest recorded on the site included barn owl and kestrel, both of which were observed hunting.

The Firestone site forms a valuable link between the River Clywedog corridor and the northern, western and eastern parts of the WIE.

This site was classed as outstanding in the Wrexham Borough Council Grassland Inventory and supports Local (derelict and industrial land, ponds) and UK Priority (open mosaic habitats on previously developed land, ponds) BAP habitats. In addition, the ponds can also be categorised as a habitat of principal importance under Section 42 of the NERC Act, coming under the 'Standing open waters and canals' definition. As such, this site is considered to be of high ecological value at the Local and National level.

The great crested newt population on the Firestone site is part of the wider WIE population which is considered to be exceptional and of international importance. Development of the site will result in the loss of foraging, hibernating and breeding habitat for great crested newt and may sever dispersal corridors to other parts of the WIE population. This is likely to cause an impact on the great crested newt population and appropriate mitigation must be put in place to ensure their favourable conservation status.

The Amphibian and Reptile Conservation Trust has carried out GIS-based research which maps the WIE in respect of how its open space network might be managed and enhanced to improve amphibian breeding and dispersal. The results of their research have been considered in the recommendations arising from this study.

The WIE grizzled skipper metapopulation is one of the most important in Wales, with the Firestone population being the most important of the WIE metapopulation. It could be considered to be of SSSI quality and therefore nationally important. Development of the site may impact on this population, although a key aim of siting the development is to avoid the butterfly colonies on the site. Any impacts are likely to be capable of mitigation through on-site habitat creation and management schemes.

The site supports good numbers of breeding birds and is also used for foraging and roosting. There will be an impact to the local bird population, several of which are of conservation concern, including the barn owl, due to loss of habitat from development of the site. The provision of additional tree and scrub habitat in the landscape plans for the development will help mitigate for these habitat losses. Site clearance will need to be undertaken outside the breeding season (March – September) to comply with The Wildlife and Countryside Act 1981 (as amended).

The local bat, badger, otter and reptile (if present) populations are unlikely to be impacted by development of the Firestone site.

The key issues for consideration in identifying the most appropriate land for development and ecological mitigation are:

- Maintenance of high quality BAP habitats with respect to ponds and open mosaic habitats on previously developed land;
- Maintenance of the great crested newt population at favourable conservation status;
- Maintenance of the locally threatened grizzled skipper population and its food plants;
- Maintenance of suitable breeding habitats for a variety of birds;
- Maintenance of the south-eastern corridor used by bats for commuting and foraging;
- Consideration given to all the species on site which are listed in Section 42 of the NERC Act 2006 and or included within the UKBAP or Wrexham LBAP with respect to conservation of biodiversity;
- Management of Himalayan balsam, ensuring that it does not spread to other areas of the site.

The area recommended for ecological mitigation covers approximately 50% of the site and includes a wedge along the south-eastern boundary and a wedge along the south-western boundary which is narrower at the southern end to accommodate the proposed F Lloyd (Penley) extension. This ecological mitigation area includes: the two ponds, ditch, scrub/grassland mosaic, all current great crested newt records, all grizzled skipper records, area used by bats and maintains a corridor with the River Clywedog up to the west and north of the WIE.

Enhancement opportunities to improve the nature conservation value of the mitigation area include:

- restoration and management of the ponds and ditch to improve their suitability for great crested newts;
- creation of new ponds;
- addition of hibernacula for great crested newts;
- addition of bat and bird boxes on suitable trees; and
- creation of suitable habitats to benefit grizzled skipper.

Enhancement opportunities to improve the nature conservation value of the development area include:

- creation of wildlife corridors;
- use of newt-friendly gully pots and wildlife friendly kerbs;
- installation of bird and bat boxes;
- use of sustainable urban drainage systems; and
- screening using native structure woodland planting.

1.0 INTRODUCTION

1.1 Broadway Malyan (of which TEP is part of the consulting team) was commissioned in July 2012 by Wrexham County Borough Council (WCBC) to assist in progressing the development of the former Firestone site on Wrexham Industrial Estate. The commission is divided into two parts: Part 1 requires the preparation of a development framework and indicative masterplan for the site, based on ground condition, utility capacity and ecology; and Part 2, which is conditional on WCBC taking the proposals forward, will comprise further detailed analysis of landscape and arboriculture and an outline planning application.

1.2 This report forms part of the Part 1 ecology requirements and has the following objectives:

- to review previous ecological assessment work undertaken in the mid 2000s;
- to update the ecological baseline by undertaking a new desktop study and extended Phase 1 habitat and protected species surveys;
- to describe the existing site vegetation and give an overview of the habitats present on the site;
- to identify whether there are any features of conservation value such as legally protected species or habitats of biodiversity importance;
- to identify and assess potential impacts; and
- to identify areas which are most appropriate for development and those more suited to ecological mitigation.

2.0 SITE DESCRIPTION

2.1 The former Firestone site is situated to the south-east of Wrexham Industrial Estate, adjacent to Bridge Road, and comprises 44.6 hectares (110 acres) of brownfield land. The site is bounded by Bridge Road to the north-west, industrial units to the south-west and north-east boundaries and by the River Clywedog floodplain to the south-east. The approximate central grid reference is SJ 378 489 (Figure 1).

Figure 1: Location of former Firestone site and surrounding area



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3.0 LEGISLATION AND PLANNING POLICY CONTEXT

Relevant Legislation

- 3.1 Statutory protection is afforded to wildlife sites and to particular species in England and Wales by EU Directives, various international conventions to which the UK is signatory and various Acts and Regulations of Parliament, principally the **Wildlife and Countryside Act 1981** as amended by various Statutory Instruments relevant to England and/or Wales (**WCA**).
- 3.2 Other relevant legislation includes the Conservation (Habitats &c) Regulations, 2010 (usually known as the **Habitats Regulations**). These Regulations translate the EU Habitats Directive into British Law, by requiring particular protection for European species and for European sites of nature conservation value.
- 3.3 The **Natural Environment and Rural Communities Act 2006 (NERC)** also introduces statutory obligations for public bodies to have regard to biodiversity in the exercise of their functions – in terms of planning, this includes decisions taken by Local Planning Authorities.

Statutory wildlife sites

- 3.4 In the UK there are many designations for giving protection to sites of national or international importance. The most commonly-encountered designations are summarised below:
- Special Area of Conservation (SAC): An area of land or water of international (European) conservation importance as designated by European Member States under the EU Habitats Directive (Directive 92/43/EC). In the UK, all SACs will also be designated as Sites of Special Scientific Interest (SSSI).
 - Special Protection Area (SPA): A site of international (European) conservation importance for birdlife as designated by European Member States under the Birds Directive (Directive 79/409/EC). In the UK, all SPAs will also be designated as SSSIs.
 - Ramsar site: A wetland of recognised international importance designated under the Ramsar Convention 1971. In the UK, all Ramsar sites will also be designated as SSSIs.
 - National Nature Reserve (NNR): A nationally important nature reserve designated by Countryside Council for Wales (CCW) or Natural England (NE) under the WCA and managed by CCW, NE or an approved body. NNRs will usually be designated as SSSIs.
 - Local Nature Reserve (LNR): A nature reserve on public land, established by a Local Authority under Section 21 of the National Parks and Access to the Countryside Act 1949. LNRs may or may not be Sites of Special Scientific Interest.
 - Site of Special Scientific Interest (SSSI): An area of land or water notified by CCW or NE under the WCA or the National Parks and Access to the Countryside Act

1949 as being of special nature conservation interest for its plant or animal communities, geological or landform features.

Statutorily protected species and their habitats

- 3.5 In most cases relevant to planning applications, protected species are those listed in Schedules 2 and 4 of the Habitats Regulations, in Schedule 1, 5 and 8 of the WCA (as amended) and in the **Protection of Badgers Act 1992 (PBA)**. The extent of legal protection varies between species and the protocols for development which affects such species also varies.
- 3.6 **European protected species** include great crested newts and native species of British bat. The full list of European species is in the Habitats Regulations, 2010.
- 3.7 The extent of legal protection covers both the species and its habitat. Any development proposal that would impact on either species or habitat is required to provide for conservation of the species and its habitat under licence from the relevant licensing authority (Welsh Government).
- 3.8 The licensing authority require the LPA to consider (1) the impact of the proposed development on the European species and their habitat; (2) the need for development; and (3) consideration of possible alternative development proposals, before determining planning applications that could affect European protected species.
- 3.9 The licensing authority will normally expect the planning situation to be fully resolved prior to determining a licence application.
- 3.10 The conservation scheme necessary to enable any development project will depend on the size of the population of the affected species, the locality and the impact of the proposed development. Usually an extended period of alternative habitat creation, trapping and movement of the animals is required, followed by a period of site management and monitoring. Relevant Articles from The Habitats Directive which require consideration include:
- Article 2.2 - maintain and restore the species at favourable conservation status;
 - Article 10 - provision of 'stepping stones' (e.g. ponds in the case of great crested newts);
 - Article 12 - strict protection and prevention of deterioration/ destruction to breeding and resting sites;
 - Article 15 – prevention of incidental capture and killing; and
 - Article 16 - derogation for imperative reasons of overriding public interest.
- 3.11 **Schedule 1** of the WCA lists a number of **birds** for which it is illegal to disturb or destroy the birds or nests. Some Schedule 1 species can be locally common, such as kingfisher or barn owl, but most are rare.
- 3.12 The WCA also makes it illegal to disturb the nests of **most British wild birds** while at the nest. In this sense a wild bird is defined as being any bird, other than a game bird, that is resident in or a visitor to Great Britain in a wild state.
- 3.13 For most UK wild birds there is no provision within the current legislative or licensing system to disturb nesting birds. Certain "pest" species are permissible to disturb

under licence from the relevant licensing authority. Legal advice may be needed to determine if a proposed nest disturbance or destruction is lawful. In some cases it will be, in other cases it may not be. Game birds are protected separately by the Game Acts that affords them full protection during the closed season.

- 3.14 **Schedule 5** of the WCA lists animals which are protected. Schedule 5 was most recently amended by Statutory Instrument 2008 No. 431, which increased the level of protection for certain species, including **water voles**, which now receive full protection of both animal and habitat. It is not possible to obtain a licence under the provisions of the WCA for the purposes of development.
- 3.15 All UK native **amphibians** and **reptiles** are protected to some degree. The rarer species and their habitats (great crested newt, natterjack toad, sand lizard and smooth snake) are protected under the WCA and are also European protected species, for which the licensing implications are discussed above.
- 3.16 The more common amphibian species are only protected against sale, which is not relevant to developments. The more common reptile species (adder, grass snake, slow worm and viviparous lizard) are protected only from killing and injury (and also sale). In practice, this requires a reptile protection scheme before implementing a planning permission, but no specific licence is required.
- 3.17 **Badgers** receive protection under the PBA, 1992. In terms of development, this means that any scheme which involves the destruction of a recently active sett (even if an outlier) requires a licence from the appropriate licensing authority.
- 3.18 **Schedule 8** of the WCA lists **plants** that are statutorily protected. In relation to development, these plants do tend to be very rare and not frequently encountered. The **bluebell** is scheduled, but this is intended to prohibit commercial bulb-picking from the wild rather than to prohibit development.
- 3.19 **Schedule 9** of the WCA lists **plants** which it is an offence to introduce to the wild. These include **Japanese knotweed**, which is frequently encountered on brownfield sites. Care is needed to avoid spreading the species around the site during earthworks, and to ensure that any removal of infested soils off-site is to a licensed tip. **Himalayan balsam** and **Giant hogweed** are also listed in this category of non-native invasive plant species.

Relevant Planning Policy

National Policy and Guidance

- 3.20 Planning Policy Wales Edition 5 November 2012 (PPW) sets out the land use planning policies of the Welsh Assembly Government. It is supplemented by a series of Technical Advice Notes (TANs). There are several national planning policy documents which are relevant to ecology. The main areas are:
- *PPW Chapter 5: Conserving and Improving the Natural Heritage and Coast (Edition 5, Nov 2011)* sets out the Welsh Assembly Government's objectives for the natural heritage and the land-use planning policies that support them. This chapter states that 'Local planning authorities must address biodiversity issues, insofar as they relate to land-use planning, in both development plans and development control decisions.' Local development plans must therefore establish a policy framework for the conservation and enhancement of the

- natural heritage specific to the local area, and include policies for coastal areas where relevant.
- *TAN 5: Nature, Conservation and Planning (2009)* which describes how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation. TAN5 identifies how planning authorities should comply with their duty under Natural Environment and Rural Communities Act (NERC) 2006. TAN5 should be used in parallel with Planning Policy Wales (2011) (PPW).

Regional Policy Guidance and Local Planning Policy

- 3.21 The Regional Policy Guidance (RPG) for North Wales was adopted in October 2002 by the North Wales Regional Planning Group consisting of elected members of Anglesey, Conwy, Denbighshire, Flintshire, Gwynedd and Wrexham Councils and the Snowdonia National Park Authority. This document sets strategic planning objectives and policies for specific areas and was used in the preparation of the Wales Spatial Plan by the Welsh Assembly Government. It provides a strategic context for the preparation of plans in North Wales. The guidance has been adopted by the constituent local authorities as Supplementary Planning Guidance and the authorities are expected to have regard to this document in preparing Local Development Plans. The following policies have been identified as being relevant to ecology:
- *Environmental Management – Paragraph 5.2* states that development should be guided away from sensitive areas. Where material factors are sufficient to override conservation considerations it should aim to benefit the rural economy and maintain or enhance the environment. Policies should seek the integration and management of local environmental and landscape features including local flora and fauna and the historic environment creating lasting benefits for existing and future generations and to minimise the extent of any change that may be caused.
 - *Development Sites – Paragraph 5.6* states Unitary Development Plans and their supporting advice, such as Supplementary Guidance, should seek to achieve high standards of built development. Its scale, design and nature should integrate well with the environment in which it is located; must respect local characteristics and use non-renewable resources as efficiently as possible. Every effort must be made to avoid environmental damage, where damage is unavoidable appropriate mitigation will be required.
- 3.22 Wrexham Unitary Development Plan (UDP) 1996 - 2011 was adopted by Wrexham County Borough Council on 14th February 2005. The plan seeks to safeguard the County Borough's natural environment and particularly those individual sites and habitats which have been identified as having specific ecological importance. The following policies are considered relevant:
- *Policy PS2 – The broad location of development:* Development must not materially detrimentally affect countryside, landscape/townscape character, open space, or the quality of the natural environment.
 - *Policy EC4 – Hedgerows, Trees and Woodlands:* Development proposals should provide for the conservation and management of hedgerows, trees, orchards, woodland, wildlife and other natural landscape and water features, and include new planting in order to enhance the character of the landscape. Development which results in the loss or significant damage to valuable trees, important hedgerows or ancient woodland sites will not be permitted.

- *Policy EC6 – Biodiversity Conservation:* Development close to sites of biodiversity interest are prevented, except where it can be demonstrated that no adverse effects will arise on the sites or that the need for the development outweighs the need to protect the intrinsic nature conservation value of the site. Where such developments are permitted, damage should be minimised and compensatory measures implemented. This policy relates, in order of importance, to internationally important sites, nationally important sites, locally important Wildlife Sites and other protected species and their habitats.

3.23 The *Wrexham Local Development Plan – Deposit Plan (June 2010)* has been prepared in accordance with the new development plan system, as summarised in the Welsh Assembly Government publication "Planning Your Community: A Guide to Local Development Plans". This plan aims to deliver sustainable development primarily through controlling the future development and use of land. This means an efficient use of land that helps meet local community aspirations for employment and new homes, regenerate communities and build safe and accessible places in which to live while also protecting and conserving the environment and natural resources. The draft plan defines a new set of policies and associated development allocations. Those relating to ecology and which are relevant to the site include:

- *Policy SP10 – Protecting and enhancing the natural environment.* Is concerned with protection of the environment. It requires that where development is appropriate it should mitigate for any potential damage and enhance the quality of natural environmental features. This policy notes that development will not be permitted that adversely or significantly affects certain areas and in specified circumstances.

Local Planning Guidance Notes

3.24 Wrexham County Borough Council has approved a series of Local Planning Guidance Notes which expand upon Development Plan policy. These apply to specific topics and geographic areas. Those of relevance to the former Firestone site are:

Local Planning Guidance Note 29 – Wrexham Industrial Estate: Employment Development and Nature Conservation:

3.25 This guidance relates expressly to Wrexham Industrial Estate and the species and habitats of nature conservation importance that occur there. The note advises developers and landowners on key ecological issues that they need to address before carrying out any development on the Estate (whether or not it requires planning permission) and the procedures that should be followed to gain planning permission and the necessary licences. It emphasises the need for ecological assessment of a site, where development is proposed the protection of habitats found in preference to mitigation or offsite compensation and the protection of the developable area of a site from colonisation by species.

3.26 The guidance note reiterates and explains the key pieces of European and UK legislation which protects many species found on the Estate. It also sets out the Council's approach to protecting and enhancing ecology on the Estate through a sequential approach of on-site protection, on-site mitigation (where it is advised that an equivalent area of land must be provided i.e. 50% of the site for mitigation unless it can be demonstrated that a smaller area of better quality would enhance the ecology of the site or wider area) and off-site compensation (where on-site mitigation is not appropriate and re-siting would enhance the ecology of the area).

Advice is provided regarding the design and management of land set aside for nature conservation. Basic information is provided regarding the protected species known to occur and their distribution. General examples of mitigation and compensation measures for different development activities are offered.

Local Planning Guidance Note 32 – Biodiversity and Development

- 3.27 This guidance provides further information pertaining to the requirements and expectations of UDP policies PS2, PS11, EC4 and EC6. The note outlines the steps a developer would need to take during a planning application to evaluate a site's biodiversity importance and to demonstrate how existing biodiversity would be maintained, mitigated or otherwise offset within the development. A framework of survey, assessment, avoidance, mitigation and compensation with new benefits is outlined, in addition to measures for monitoring, management and compliance.

4.0 METHODOLOGY

Review of Previous Ecological Work

- 4.1 An extensive amount of ecological work has been carried out on the Firestone site in particular and the Wrexham Industrial Estate as a whole in the mid 2000s. This was undertaken by Middlemarch Environmental Ltd on behalf of the Welsh Development Agency.
- 4.2 The following documentation were reviewed in order to inform this baseline report and identify gaps for additional surveys:
- The Firestone Site, Wrexham Industrial Estate – Method Statement with respect to Great Crested Newt. January 2005. Middlemarch Environmental Ltd;
 - Wrexham Industrial Estate – Great Crested Newt Licence Application. May 2005. Middlemarch Environmental Ltd;
 - Extended Phase 1 Habitat Survey – Former Firestone Site. May 2005. Middlemarch Environmental Ltd;
 - Phase 2 Surveys – Former Firestone Site. June 2005. Middlemarch Environmental Ltd;
 - Wrexham Industrial Estate - Badger Survey. June 2005. Middlemarch Environmental Ltd;
 - Wrexham Industrial Estate - Bird Survey. June 2005. Middlemarch Environmental Ltd;
 - Wrexham Industrial Estate - Great Crested Newt Survey. June 2005. Middlemarch Environmental Ltd;
 - Wrexham Industrial Estate - Reptile Survey. June 2005. Middlemarch Environmental Ltd;
 - Botanical Survey - (Firestone & 6 Other Sites). September 2005. Middlemarch Environmental Ltd;
 - Wrexham Industrial Estate – Master Planning Summary (Firestone & 6 Other Sites). September 2005. Middlemarch Environmental Ltd;
 - Wrexham Industrial Estate – Ecological Implications for Future Development. December 2005. Middlemarch Environmental Ltd;
 - Wrexham Industrial Estate – Great Crested Newt Strategy. July 2007. Middlemarch Environmental Ltd;
 - Wrexham Industrial Estate – Green Wedges with Emphasis on Great Crested Newt – Brief Letter and Drawings. September 2007. Middlemarch Environmental Ltd; and
 - Wrexham Industrial Estate – Review and Update of Great Crested Newt Maintenance Strategy. March 2008. Middlemarch Environmental Ltd.

Desktop Study

- 4.3 Information regarding historic species records and protected sites within a 1km radius of the site was requested/gathered from the sources listed in Table 1.

Table 1: Sources of Ecological Information

CONSULTEE/SOURCE OF INFORMATION	NATURE OF INFORMATION
Countryside Council for Wales	Designated sites
Cofnod – North Wales Ecological Records Centre	Protected/ UKBAP/ LBAP/ species and species of conservation concern records & non-statutory designated sites
Clwyd Badger Group	Badger records
FCC Environment/ Marches Ecology	Grizzled skipper and dingy skipper data
Wrexham County Borough Council Biodiversity Officer	Protected sites and species information

Extended Phase 1 Habitat Survey

- 4.4 The extended Phase 1 habitat survey for the former Firestone site was carried out by Anne Pritchard MIEEM on 23rd August 2012. The survey was carried out in accordance with the Phase 1 assessment methods (JNCC 2010) and gives an overview of key habitats and wildlife corridors and any likely sites for species of conservation concern.
- 4.5 During the Phase 1 survey, the habitats present were assessed for their potential to support species of conservation concern, particularly statutorily protected species or Biodiversity Action Plan (BAP) priority species. Any sightings, tracks and signs of fauna observed during the survey were recorded. Those species or features which were specifically searched for included badger, water vole, otter, and trees with the potential to support bat roosts. This part of the survey was undertaken by Linda Swankie CEnv MIEEM on 23rd August 2012.

Butterfly Food Plant Survey

- 4.6 Due to the known presence of dingy and grizzled skippers on the site, a survey for the presence and distribution of their preferred food plants was undertaken by Peter Gateley CEnv MIEEM on 21st and 22nd August 2012. The food plants searched for included bird's-foot trefoil (*Lotus corniculatus*), greater bird's-foot trefoil (*L. uliginosus*) and horseshoe vetch (*Hippocrepis comosa*) for dingy skipper and creeping cinquefoil (*Potentilla reptans*), tormentil (*P. erecta*), wild strawberry (*Fragaria vesca*), barren strawberry (*F. sterilis*), dog rose (*Rosa canina*), salad burnet (*Sanguisorba minor*) and wood avens (*Geum urbanum*) (WCBC LPGN 29). The locations of these species were recorded by GPS for accuracy.

Bat Activity Survey

- 4.7 The bat activity survey was undertaken on two evenings and involved walking a transect of the site (following existing paths) with 18 x 3 minute point counts from various locations.
- 4.8 The first survey visit was undertaken by Dr Mike Walker MIEEM and Nicola Glover using heterodyne and anabat bat detectors on the 22nd August 2012 between 20.12 and 23.06.
- 4.9 The second survey visit was undertaken on 10th September 2012 by Dr Mike Walker MIEEM and Anne Pritchard MIEEM between 19.15 and 22.00.

Reptile Survey

- 4.10 Refuge tins were constructed of 0.5m x 0.5m sheeting using a mix of corrugated onduline, roofing felt and carpet tiles as recommended by Froglife (1999) guidelines for reptile surveys. A total of 440 tins were placed along transects across the site (equating to approximately 10 per hectare) on 23rd August 2012 by experienced reptile surveyors Lee Greenhough, Mike Penney and Coral Hansom. They were locally sited in the most appropriate position for use by basking/sheltering reptiles. Tins were allowed to bed in for a week, prior to the first survey visit.
- 4.11 Seven survey visits were carried out during suitable weather conditions, to determine the presence/absence of reptile species on site. During each visit, the tins were checked visually from a distance to determine whether reptiles were basking on their surface. The tins were then carefully approached and lifted to check for reptiles sheltering beneath them. Weather during the seven visits was conducive to surveying for reptiles, being dry and warm or mild, although some days were overcast. Temperatures ranged from approximately 17°C to 21°C during the survey period. Froglife guidelines recommend that ideal temperatures for reptile surveys are between 9°C and 18°C.

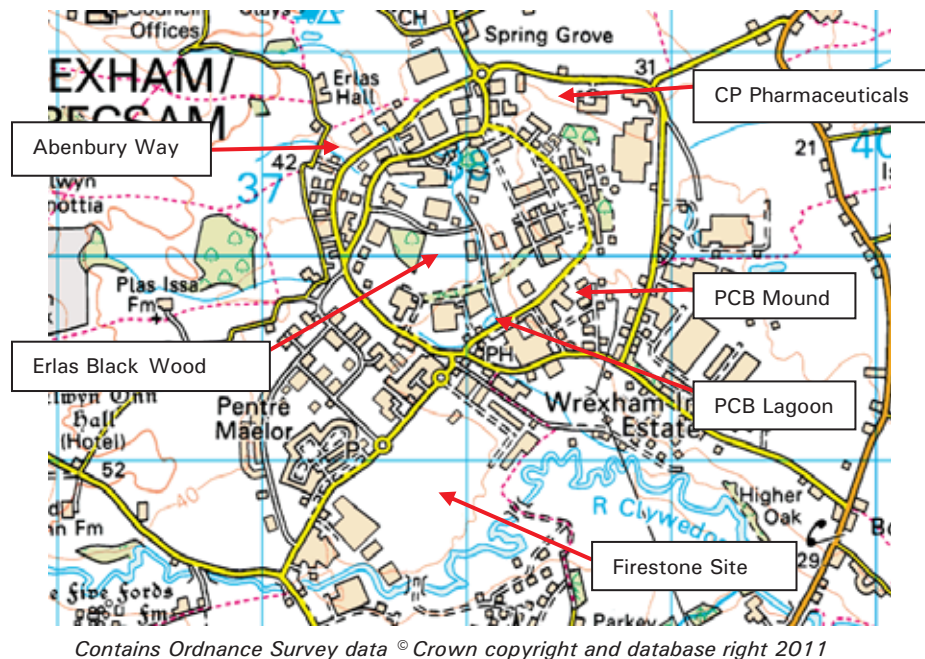
Survey Limitations

- 4.12 Due to the time of year of the commission, it was not possible to undertake surveys for breeding birds or great crested newts. However, ad hoc observations of birds and amphibians during the other surveys were noted to add to the baseline data set.
- 4.13 Access to some parts of the site was not possible due to the dense, impenetrable scrub which has developed.

5.0 REVIEW OF PREVIOUS ECOLOGICAL WORK

- 5.1 While some of the following reports which have been reviewed are specific to the former Firestone site and therefore directly relevant to current proposals, other reports relate to other sites within the Wrexham Industrial Estate and are included here to give context to the general area. The locations of the sites discussed are shown in Figure 2.

Figure 2. Locations of Previous Survey Areas within WIE



The Firestone Site, Wrexham Industrial Estate – Method Statement with respect to Great Crested Newt. January 2005. Middlemarch Environmental Ltd

- 5.2 This method statement was developed in order to safeguard great crested newts and appropriate habitats for great crested newts within the Firestone site during the installation of ditches at unauthorised access points and the repair of fences and associated concrete footings.

Wrexham Industrial Estate – Great Crested Newt Licence Application. May 2005. Middlemarch Environmental Ltd

- 5.3 This great crested newt licence application was made to allow ongoing management/ maintenance of the Firestone site in order to maintain the site in saleable condition on behalf of the WDA whilst ensuring the protection of the great crested newt population.

Extended Phase 1 Habitat Survey – Former Firestone Site. May 2005. Middlemarch Environmental Ltd

- 5.4 The extended Phase 1 habitat survey undertook a review of Middlemarch work on the Firestone site prior to 2005, a desktop study and the extended Phase 1 Habitat survey. Desktop study results indicated that no statutory protected sites were

present within a 2km radius of the site, while 11 non-statutory conservation sites were present within a 1km radius. Records for great crested newt and bats were known from within 1 km of the site.

- 5.5 The habitats recorded during the extended Phase 1 Habitat survey were: amenity grassland; bare ground; buildings; dense/ continuous scrub; dry ditch; fence; marshy grassland; other habitat (establishing vegetation); scattered broadleaved trees; scattered scrub; standing water; swamp; tall ruderal; unimproved neutral grassland; and wet ditch.
- 5.6 The fauna recorded during the survey were: sedge warbler; skylark; meadow pipit; kestrel; snipe; moorhen; curlew; great tit; pheasant; magpie; stonechat; blackbird; lapwing; badger; and common frog.
- 5.7 The habitats are valued as having low to high ecological value. The unimproved neutral grassland habitat is of high ecological value at the local and national level and can be considered as a Lowland Meadow Priority Habitat Type. The following habitats were considered to be of moderate value at a national level since they occur as Broad Habitat Types in the UKBAP: marshy grassland; standing water; swamp; and amenity grassland. The following habitats were considered to have moderate ecological value at the local level since the surrounding area is predominantly industrial and agricultural land: dense/continuous scrub; marshy grassland; scattered broadleaved trees; scattered scrub; standing water; and swamp.
- 5.8 Due to the high ecological value of parts of the site, further surveys were recommended prior to a full evaluation.

Phase 2 Surveys – Former Firestone Site. June 2005. Middlemarch Environmental Ltd

- 5.9 This report complements the initial extended Phase 1 Habitat survey of the Firestone site by providing data on the presence and distribution of badger, bats, reptiles, great crested newts and breeding birds. Legislation and survey methodologies are described.
- 5.10 Only minor badger activity was recorded from footprints found in the south-east corner of the site around the exit gate. There was no indication of a badger sett within the site and the lack of latrines also suggests that the site is not within a frequently or regularly used territory. Badgers are included in the Wrexham LBAP.
- 5.11 The initial ground level assessment of trees within and immediately adjacent to the site did not suggest optimal or highly suitable habitat for bat roosts. Seven trees were identified as having low or moderate value suitability. The scrub, grassland and open water habitats provide potential foraging areas. The remnant hedgerow with trees along the eastern site boundary provides a suitable commuting route for bats. No bat activity was identified around the trees identified as having moderate suitability for bats. Only two fly-pasts (one unidentified bat in south-east corner and one pipistrelle at pond 2) were recorded during the activity survey.
- 5.12 The site provides suitable foraging, basking and hibernating habitat for reptiles due to the mosaic of habitats present. However, despite suitable weather conditions, no reptiles were recorded on site. Several toads, frogs, small rodent nests and one female great crested newt were found under the reptile refugia.

- 5.13 The breeding bird survey recorded 35 species in total, 28 of which were recorded as breeding. These included: song thrush (UKBAP, LBAP, Red list); skylark, reed bunting and bullfinch (all UKBAP, Red list); grasshopper warbler (Red list); and cuckoo, dunnoek, green woodpecker, grey wagtail, kestrel, meadow pipit, lapwing, stock dove, stonechat and willow warbler (all Amber list). The site is regarded as being of high ecological value for nesting birds and also provides optimum habitat for passage and wintering bird species. Barn owl was amongst the species recorded on site but not thought to be breeding.

- 5.14 Two ponds are present on site, a shallow depression and a 'sluice' pond, which are particularly suitable for great crested newts. The areas of scrub, tall ruderal, rubble and grassland on site provide suitable site for hibernacula, while the grassland and scrub provides suitable foraging. Both male and female great crested newts were found in both ponds. Smooth newts were also found in both ponds. Fish were recorded in the sluice pond. Based on Langton, Beckett & Foster (2001) the survey results suggested a 'low' great crested newt population in the two ponds.

Wrexham Industrial Estate - Badger Survey. June 2005. Middlemarch Environmental Ltd

- 5.15 This report details the survey of the Abenbury Way site for badgers. There was evidence (snuffle holes and tracks) that badgers use the site for foraging, but not on a regular basis. No badger setts were recorded within the site.

Wrexham Industrial Estate - Bird Survey. June 2005. Middlemarch Environmental Ltd

- 5.16 This report details the results of breeding bird surveys undertaken at five sites on Wrexham Industrial Estate. At the Abbey Road site, five species were recorded of which only one, willow warbler (Amber list) is of note. Sixteen species were recorded at Abenbury Way including bullfinch and song thrush (both UKBAP, LBAP and Red listed) and dunnoek (Amber list). Fifteen species were recorded at the CP Pharmaceuticals site including song thrush (UKBAP, LBAP and Red listed) and dunnoek (Amber list). Twenty two species were recorded at Erlas Black Wood including song thrush (UKBAP, LBAP and Red listed) and dunnoek (Amber list). Eighteen species were recorded at the PCB Lagoon including dunnoek, willow warbler and kestrel (all Amber listed).

Wrexham Industrial Estate - Great Crested Newt Survey. June 2005. Middlemarch Environmental Ltd

- 5.17 This report details the results of great crested newt surveys at three sites within Wrexham Industrial Estate. The CP Pharmaceuticals site provides suitable habitat for foraging and hibernating, but the waterbody on site although initially appearing suitable, dried out during the survey period and as such no newts were recorded. The Erlas Black Wood site provided suitable breeding, foraging and hibernating habitats for great crested newt. Both male and female great crested newts and smooth newts were recorded on this site, but no eggs or juveniles. The PCB Lagoons site provided suitable breeding, foraging and hibernating habitats for great crested newt. However, no great crested newts were recorded on this site.

Wrexham Industrial Estate - Reptile Survey. June 2005. Middlemarch Environmental Ltd

- 5.18 This report details the results of reptile surveys undertaken at four sites within Wrexham Industrial Site, namely Abbey Road, CP Pharmaceuticals, Erlas Black Wood and the PCB Lagoon. Despite all these sites supporting suitable habitats and resources, no reptiles were recorded at any of the sites.

Botanical Survey - (Firestone & 6 Other Sites). September 2005. Middlemarch Environmental Ltd

- 5.19 This report details the results of NVC surveys at Firestone and six other sites on the Wrexham Industrial Estate. Only the Firestone site information is summarised here.
- 5.20 The Firestone site is a large site with a complex mosaic of vegetation communities, dominated by grassland, with other habitats including scrub, swamp and tall ruderals, creating a site of high botanical and ecological interest. Grass vetchling *Lathyrus nissolia* and bee orchid *Ophrys apifera* are both locally important species occurring within the grassland habitats of the site, along with Prickly lettuce *Lactuca serriola* a locally endangered species.
- 5.21 The grassland habitats form an intricate mosaic of several communities with no readily defined boundaries. The highly diverse areas have an association with MG5 *Cynosurus cristatus*-*Centaurea nigra* grassland while other areas are best described as MG1e *Arrhenatherum elatius* grassland *Centaurea nigra* sub-community. Other areas can be attributed to MG9 *Holcus lanatus*-*Deschampsia cespitosa* grassland.
- 5.22 There are three areas of swamp within the site: a pond in the north-east; a pond in the east; and a damp area in the south of the site. The first pond can be described as S12 *Typha latifolia* or S13 *Typha angustifolia* swamp which grades into S19 *Eleocharis palustris* swamp. The second pond can also be described as S12 *Typha latifolia* or S13 *Typha angustifolia* swamp with a *Potamogeton* spp. aquatic community. The damp area is again best described as S12 *Typha latifolia* or S13 *Typha angustifolia* swamp.
- 5.23 There are various scrub habitats which form intricate mosaics with each other across the site. They are described by the following communities depending on the dominant species: W21 *Crataegus monogyna*-*Hedera helix* scrub; W22 *Prunus spinosa*-*Rubus fruticosus* scrub; W23 *Ulex europaeus*-*Rubus fruticosus* scrub; and W24 *Rubus fruticosus*-*Holcus lanatus* scrub.

Wrexham Industrial Estate – Master Planning Summary (Firestone & 6 Other Sites). September 2005. Middlemarch Environmental Ltd

- 5.24 This report provides a summary of the master planning for the seven sites, drawing on all previous survey reports which have been undertaken. With respect to the Firestone site, the summary of 'development showstoppers' describes the site as being of high ecological value with the presence of great crested newts, for which a WAG great crested newt licence would be required prior to any works. Badgers and breeding birds are also likely to be an issue depending on timing of works and whether any setts are excavated by badgers prior to development. Grizzled skipper, a locally threatened species is also shown as being recorded on the site. The site is included in the Wrexham Borough Council draft grassland survey and also supports Local (ponds; derelict and industrial land) and National (neutral grassland; standing

water and canals; fen, marsh and swamp; improved grassland; and lowland grassland (Priority Habitat)) BAP habitats. Advisable precautions to consider during development include badgers, nesting birds, trees, waterbodies and connecting features.

- 5.25 The Wrexham LANDMAP study (Wrexham Borough Council & Countryside Commission for Wales, Consultation DRAFT 2003) identified the Wrexham Industrial Estate as a 'significant landscape (s) due to (it's) biodiversity, cultural, history & visual & sensory importance'. This study also provides management recommendations for the industrial estate.
- 5.26 Potential options for the future vision of development on the Firestone site include retaining the grassland/ scrub mosaic, on-site enhancement of great crested newt habitat, off-site habitat enhancement by the creation of an otter holt and Carr woodland and calcareous grassland grass roof creation within the development area.

Wrexham Industrial Estate – Ecological Implications for Future Development. December 2005. Middlemarch Environmental Ltd

- 5.27 This report summarises the information put forward in the previous report 'Wrexham Industrial Estate – Master Planning Summary (Firestone & 6 Other Sites). September 2005. Middlemarch Environmental Ltd', notes from meetings with CCW and WCBC ecologist and proposes a brief to develop an ecological strategy for WIE.
- 5.28 The meeting with the WCBC ecologist discussed the location of great crested newt breeding ponds within WIE and the potential for creation of a great crested newt reserve to the south of the Firestone site. At the meeting with Matthew Ellis (CCW), he outlined the position regarding GCNs and development at the industrial estate. He wanted to see a mitigation strategy based on: like for like compensation (by creation of a GCN reserve) for loss of any terrestrial habitat suitable for GCN within 500m of a breeding pond; creation of the reserve on the area south of the Firestone site if it is not within the 100 year floodplain, with the excavation of additional breeding pools; the mitigation strategy should account for all potential developments; connectivity between existing GCN sites should be maintained; any reserve should be leased/ sold to a conservation organisation to ensure its maintenance and longevity.
- 5.29 The ecological mitigation strategy must allow development of the WIE in a sustainable manner while ensuring protection and enhancement of the ecological issues. The brief to enable this is outlined in three stages and includes: 1) review of potential development areas and ecological surveys undertaken within WIE; presentation to the Industrial Estate Forum; consultation with CCW, EAW and WCBC ecologist; 2) survey of potential GCN ponds where required; Phase 1 habitat surveys where required; inventory of potential development sites; 3) identify potential ecological compensation areas and survey as required; produce strategy to facilitate sustainable development of WIE; and produce draft method statement for GCNs and future developments on WIE.

Wrexham Industrial Estate – Great Crested Newt Strategy. July 2007. Middlemarch Environmental Ltd

- 5.30 This report summarises previous ecological surveys and reports, taking into account the requirements of CCW in order to identify breeding ponds and populations sinks

for great crested newts alongside the overall ecological interest of WIE as a whole and of WAG owned sites. The review suggests that the south of WIE has greater ecological importance relative to the north, with the west and east having least ecological value.

- 5.31 The report then outlines the potential losses of great crested newt habitat to development and then outlines the mitigation strategy. The aims and requirements are discussed, followed by the proposed area for great crested newt reserves on each WAG site. Guidance is given on habitat creation and habitat management specifications.
- 5.32 At the Firestone site, a reserve area of 16.36 hectares is recommended which should consist of a rectangular area along the south-eastern boundary of the site. There would also be two narrow connective strips running NW-SE to connect to green space to the north-west of the site. The reserve would include a mixture of the existing habitats on site along with the creation of 13 new ponds and the installation of 13 hibernacula.

Wrexham Industrial Estate – Green Wedges with Emphasis on Great Crested Newt – Brief Letter and Drawings. September 2007. Middlemarch Environmental Ltd

- 5.33 This report provides a brief rationale on the development of green wedge plans for WIE with an emphasis on GCNs. It discusses the aquatic and terrestrial habitat requirements for GCNs during their life cycle and the favourable and unfavourable conditions likely to affect their presence in ponds. The permeability of habitats to GCNs is discussed, with an emphasis on the habitats found on WIE. Opportunities for habitat enhancement for GCNs within WIE are identified including the locations of the potential reserves on WAG owned sites as well as enhancing terrestrial habitats on verges and along other corridors to encourage GCN movement allowing an increase in gene flow and evolution of local populations.

Wrexham Industrial Estate – Review and Update of Great Crested Newt Maintenance Strategy. March 2008. Middlemarch Environmental Ltd

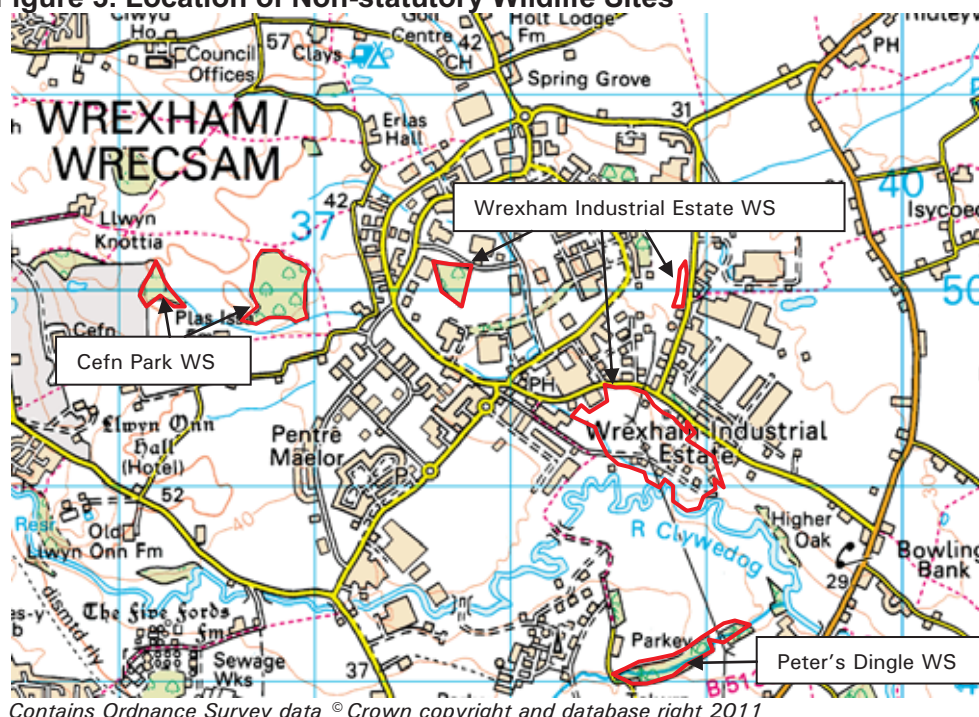
- 5.34 This report reviews and updates the landscape maintenance works and GCN licence at the Firestone site. It provides a summary of habitat maintenance works undertaken since 2004 and a summary of changes in the habitat since 2002, with details of the maintenance prescriptions for each compartment. An assessment of GCN populations concludes that the site was still suitable for breeding and foraging GCNs in 2008 although the sluice pond had degraded in suitability.
- 5.35 The revised maintenance strategy to bring the site back to the condition outlined in the existing GCN conservation licence Method Statements includes de-silting the sluice pond, increasing scrub clearance and implementing hedgerow management. The current management plan specifications can then be continued.

Desktop Study

- 5.36 Site and species data received during the desktop study are presented in Table 2 and Table 3 below. Desktop study maps and species records (Drawings G3544.001 and G3544.002) are presented in Appendix 1.

- 5.37 The closest statutory protected sites are the River Dee and Bala Lake SAC and the River Dee SSSI at 2.1km from the site.
- 5.38 Of the three non-statutory wildlife sites within 1.5km of the site, Wrexham Industrial Estate WS comprises three component parts, the closest to the Firestone site being an area of land known as Cefn Park which supports a mosaic of grassland, scrub and tall herb. A further grassland component site is located at Bryn Road, while the third site is ancient broad-leaved woodland at Erlas Black Wood. Cefn Park WS comprises a series of broad-leaved woodlands, Big Wood, is the largest component and is also the closest to the site. Peter's Dingle WS is also broad-leaved ash/ oak woodland, to the south-east of the site

Figure 3. Location of Non-statutory Wildlife Sites



- 5.39 There are 53 species recorded within 1.5km of the site which are legally protected and/ or of conservation concern. Fourteen of these are recorded within the site as shown in Table 2 below.

Table 2: Location specific desktop study results

Source	Protected/important species records, protected sites and UKBAP priority habitats within 1km of the site	Metres from site	Direction from site
Countryside Council for Wales	River Dee and Bala Lake SAC	2100	South-east
	River Dee SSSI	2100	South-east
Cofnod - sites	Cefn Park Wildlife Site (WS)	1235	North-west
	Wrexham Industrial Estate WS	627	North/ NE
	Peter's Dingle WS	1163	South-east
Cofnod - species	Grizzled skipper ^{4, 5, 6}	0	N/A
	Dingy skipper ^{4, 5}	0	N/A
	Cinnabar ^{4, 5}	0	N/A
	Latticed heath ^{4, 5}	0	N/A

Source	Protected/important species records, protected sites and UKBAP priority habitats within 1km of the site	Metres from site	Direction from site
	Small heath ^{4, 5}	0	N/A
	Wall ^{4, 5}	0	N/A
	Shaded broad-bar ^{4, 5}	0	N/A
	White-letter hairstreak ^{3, 4, 5}	0	N/A
	Hedgehog ^{4, 5}	0	N/A
	Skylark ^{5, 8, 10}	0	N/A
	Dittander ¹²	0	N/A
	Great crested newt ^{1, 3, 4, 5, 6, 11}	0	N/A
	Adder ^{3, 4, 5}	0	N/A
	Slow worm ^{3, 4, 5}	0	N/A
	Grasshopper warbler ^{4, 5, 7}	1120	North-east
	Common pipistrelle ^{1, 3, 5, 11}	830	South-east
	Pipistrelle species ³	135	North-east
	Whiskered bat ^{1, 3, 5, 11}	90	North/ NW
	Bee orchid ¹⁴	30	East
	Jacob's-ladder ¹²	665	East
	Prickly lettuce ¹³	620	North-east
	Rough hawk's-beard ¹³	630	North-east
	Oak hook-tip ^{4, 5}	440	North-east
	Eumerus ornatus (hoverfly) ¹²	440	North-east
	Small phoenix ^{4, 5}	440	North-east
	Small emerald ^{4, 5}	440	North-east
Clwyd Badger Group	Several badger ^{6, 9} setts present in the environs (distance given to the closest)	1350	North-west
	Otters ^{1, 3, 4, 5, 6, 11} known on R. Clywyd	50	South-east
FCC Environment/ Marches Ecology	10 Grizzled skipper ^{4, 5, 6} 25/5/09 8 Grizzled skipper ^{4, 5, 6} 1/6/09 37 Dingy skipper ^{4, 5} 1/6/09	0	N/A

¹ European Protected Species, ² Schedule 1 WCA 1981 (as amended), ³ Schedule 5 WCA 1981 (as amended), ⁴ S42 of NERC Act, ⁵ UKBAP, ⁶ Wrexham LBAP, ⁷ Red BoCC Wales (RSPB), ⁸ Amber BoCC Wales (RSPB), ⁹ Baggers Act, ¹⁰ Birds Directive, ¹¹ Habitats Directive, ¹² Red Data 2, ¹³ Locally threatened, ¹⁴ Locally important

Table 3: Desktop study results for records from 1km squares

Source	Protected/important species records, protected sites and UKBAP priority habitats within 1km of the site	Grid Square	Direction from site
Cofnod	Barn owl ^{2, 6, 8} Swallow ⁸ Kestrel ^{4, 7} Spotted flycatcher ^{4, 5, 7}	SJ3850	North
	Willow warbler ⁷ Swallow ⁸ Linnet ^{5, 7} Redstart ⁸ Herring Gull ^{7, 10}	SJ 3649	North-west

Source	Protected/important species records, protected sites and UKBAP priority habitats within 1km of the site	Grid Square	Direction from site
Cofnod	House Sparrow ^{4, 5, 8} Long-tailed Tit ⁸ Mallard ^{8, 10} Meadow Pipit ⁸ Lapwing ^{4, 5, 7, 10} Reed bunting ^{4, 5, 8} Song thrush ^{5, 6, 8, 10} Stock pigeon ¹⁰		
	Kestrel ^{4, 7} Cuckoo ^{4, 5, 7} Whitethroat ⁸ <i>Acanthiophilus helianthi</i> (fly) ¹² <i>Diplapion stolidum</i> (weevil) ¹² <i>Oxyna nebulosa</i> (picture-winged fly) ¹⁵ <i>Pseudorchestes pratensis</i> (beetle) ¹²	SJ3849	North-east
	Kestrel ^{4, 7}	SJ3949	North-east
	<i>Cyphon pubescens</i> (beetle) ¹² <i>Hydaticus seminiger</i> (water beetle) ¹² <i>Odontomyia tigrina</i> (fly) ¹² <i>Stenus formicatus</i> (rove beetle) ¹²	SJ3747	South

¹ European Protected Species, ² Schedule 1 WCA 1981 (as amended), ³ Schedule 5 WCA 1981 (as amended), ⁴ S42 of NERC Act, ⁵ UKBAP, ⁶ Wrexham LBAP, ⁷ Red BoCC Wales (RSPB), ⁸ Amber BoCC Wales (RSPB), ⁹ Baggers Act, ¹⁰ Birds Directive, ¹¹ Habitats Directive, ¹² Red Data 2, ¹³ Locally threatened, ¹⁴ Locally important, ¹⁵ Red Data 1

Habitats and Flora

- 5.40 The Phase 1 habitat map (Drawing G3544.003a) and target notes taken during the habitat survey are presented at Appendix 2.
- 5.41 The following habitats are present within, or adjoining, the site:
- Dense continuous scrub
 - Scattered scrub
 - Scattered broadleaved trees
 - Modified neutral grassland
 - Tall ruderal
 - Swamp
 - Standing water
 - Amenity grassland
 - Bare ground
 - Dry ditch
- 5.42 The majority of the site comprises an intricate mosaic of species-rich modified neutral grassland (modified neutral grassland is a new Phase 1 habitat survey category that was developed by TEP and agreed with JNCC in 2005 (P. Gateley, *pers. comm.*) to distinguish between grassland developing on post-industrial sites and the original Phase 1 habitat neutral grassland category which was originally intended for undisturbed pasture habitats), interspersed with areas of dense

continuous and scattered scrub and tall ruderal which creates a diverse range of habitats. The variation in substrate composition and drainage also adds to the range of vegetation communities present.

- 5.43 The majority of the grassland is tall and typically includes false oat-grass (*Arrhenatherum elatius*) and black knapweed (*Centaurea nigra*) with a range of other species being present in variable distributions such as ox-eye daisy (*Leucanthemum vulgare*), agrimony (*Agrimonia eupatoria*), common bird's-foot trefoil (*Lotus corniculatus*) and selfheal (*Prunella vulgaris*) along with several vetches (*Vicia* species) and clovers (*Trifolium* species) (Target Note 2, Photograph 1).

Photograph 1. Grassland (with abundant ox-eye daisy) and Scrub Mosaic



- 5.44 Damper areas of grassland support abundant tufted hair-grass (*Deschampsia cespitosa*) in association with black knapweed and a variety of sedges and rushes including common sedge (*Carex nigra*), glaucous sedge (*C. flacca*), soft rush (*Juncus effusus*), jointed rush (*J. articulatus*) and hard rush (*J. inflexus*) (Target Note 4).
- 5.45 Several areas were recorded where the sward was very short with patches of bare earth. These areas typically supported abundant bird's-foot trefoil and creeping cinquefoil (*Potentilla reptans*). Other areas with a short sward were associated with anthills and typically included fine grasses such as red fescue (*Festuca rubra*) and moss species, stunted oxeye daisy, white clover (*T. repens*), black medick (*Medicago lupulina*), common bird's-foot trefoil and creeping cinquefoil (Target Notes 8, 9, 12).
- 5.46 Species recorded in low densities across the site include the locally important grass vetchling along with common spotted orchid (*Dactylorhiza fuchsia*), yellow-wort (*Blackstonia perfoliata*), common centaury (*Centaureum erythraea*) and perforate St John's-wort (*Hypericum perforatum*) (Photograph 2).

Photograph 2. Grassland showing common spotted orchid



- 5.47 Scrub occurs across the whole site either in a scattered form as individuals or groups of species such as goat willow (*Salix caprea*), grey willow (*S. cinerea*), hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), gorse (*Ulex europaeus*) and dog rose (*Rosa canina*) (Target Notes 5, 7, 14). It also occurs, mainly as bramble (*Rubus fruticosus*) as impenetrable continuous patches of scrub across the site, particularly on the south-western and south-eastern (embankment) boundaries. In places these areas of bramble are associated with tall ruderals including great willowherb (*Epilobium hirsutum*), rosebay willowherb (*Chamerion angustifolium*) and nettle (*Urtica dioica*).
- 5.48 Mature trees are rare on the site. A group of grey poplars (*Populus x canescens*) are present to the south of the roundabout on Bridge Road around a seasonally inundated area (dry at the time of survey) (Target Note 11), while two balsam poplars (*P. candicans*) are present on the north-east boundary of the site, with two weeping willows (*S. x sepulcralis*) situated a small distance into the site from the northern corner of the site.
- 5.49 Other younger scattered trees occur on the site, generally around the boundaries and along former pathways. On the north-eastern and south-eastern managed boundaries groups of alder (*Alnus glutinosa*), Italian alder (*A. cordata*) and silver birch (*Betula pendula*) have been planted.
- 5.50 An area of bulrush (*Typha latifolia*) swamp is found in the southern part of the site and there are two ponds on the site. Pond 1 (Target Note 1a, Photograph 3) in the east of the site has very shallow banks and a small, shallow area of open water with dense patches of bulrush, common spike-rush (*Eleocharis palustris*) and false fox-sedge (*Carex otrubae*) swamp. The water level appeared to be low at the time of survey and there was evidence that the area is disturbed by off-road vehicles.

Photograph 3. Pond 1 and surroundings



- 5.51 Pond 2 (sluice pond) (Target Notes 2a, 3, Photograph 4), on the south-eastern boundary, has a dense cover of bulrush swamp and is almost dry, with only very shallow areas of water. The water is discoloured (milky) in the southern section with a chemical smell. Dense scrub surrounds this pond and comprises alder, goat willow, grey willow and osier, with some larger trees of white willow (*Salix alba*).

Photograph 4. Pond 2 (sluice pond)



- 5.52 Ditches ranging from deep to relatively shallow surround much of the north-east and north-western boundaries, which were created to prevent unauthorised access to the site. A large deep ditch also runs across the eastern part of the site. All of these were dry at the time of survey but may hold water during wetter times of the year. They generally support modified neutral grassland and in places are over-run with bramble scrub. Some false fox-sedge and bulrush is present in the ditch in the east of the site (Target Note 3a).
- 5.53 With respect to invasive species, only Himalayan balsam (*Impatiens glandulifera*) was recorded on the site in the scrub on the embankment on the south-eastern boundary (Target Note 1).

Butterfly Food Plants

- 5.54 Ten species of food plant for dingy skipper and grizzled skipper (as defined in Appendix 2 of the WCBC Local Planning Guidance Note 29) were searched for on the site, namely: common birds-foot-trefoil, greater birds-foot-trefoil (*Lotus uliginosus*), horseshoe vetch (*Hippocrepis comosa*), wild strawberry (*Fragaria vesca*), barren strawberry (*Potentilla sterilis*), creeping cinquefoil, dog rose, salad burnet (*Sanguisorba minor*), tormentil and wood avens (*Geum urbanum*).
- 5.55 Five of these species were recorded during the course of the field survey. These were: common birds-foot-trefoil and greater birds-foot-trefoil, both food plants of the dingy skipper, and creeping cinquefoil, tormentil and dog-rose, on which larvae of the grizzled skipper feed. Drawing G3544.004 (Appendix 2) shows the distribution of these species.
- 5.56 Of the three grizzled skipper food plants, creeping cinquefoil is by far the most widespread and abundant. Dense low patches of creeping cinquefoil are established amongst most of the areas of diverse grassland, particularly where the sward is short. It thins-out as invading scrub develops and forms a canopy and is also shaded out by tall dense grassland and ruderal herbs, as seen along the south-western edges and western corner of the site.
- 5.57 Dog-rose is one of the constituents of the natural regeneration of scrub across this unmanaged site and it is widely distributed across the site. Tormentil has a more restricted distribution, being mainly noted from the south-western edge of the site, where conditions are probably more acidic than the study area generally.
- 5.58 Common birds-foot-trefoil is distributed in grassland throughout the site and although frequent in places is not abundant. Greater birds-foot-trefoil was found in small numbers in the damper areas of the northern part of the south-eastern edge of the site.
- 5.59 The Butterfly Conservation factsheet for grizzled skipper also states that agrimony and bramble can be used as food plants. Although these were not specifically surveyed for, the Phase 1 habitat survey noted agrimony as present at many locations across the site, and bramble as abundant in many areas.

Fauna

- 5.60 There are many mammal trails across the site and fox droppings were recorded on a number of occasions. No signs of badger, water vole or otter were recorded on the site during the survey, although one possible badger path was recorded in an area of bramble and willow scrub (TN4a). The beginnings of a potential badger excavation (TN5a) and large holes under the roots of a large ash tree just outside the south-eastern site boundary in the adjacent field (TN6a) were also recorded. Otters are thought to forage for amphibians on the Firestone site (Emma Broad, WCBC, *pers. comm.*).

Potential Bat Roosts

- 5.61 The majority of trees within the site are immature and do not have any features of value to bats. A previous survey of the site indicated a number of trees, mostly along the southern site boundary, as having potential for roosting bats, but access was not possible due to the dense, impenetrable scrub. However, there was one dead tree close to the south-west corner of the site which did have some splits and small holes visible which could be used by bats (TN7a).

- 5.62 There was also a very large mature willow in the south western corner of the site which, again, could not be accessed. It could not be seen clearly with binoculars due to the dense foliage but due to its size and age it may contain features suitable for roosting bats (TN8a).
- 5.63 The stand of mature grey poplar south of the roundabout showed no features which could be of value to roosting bats.
- 5.64 Of the two mature weeping willow trees in the north-east of the site (TN10a), the eastern tree has one split and one hole which have a low potential for use as a bat roost. The western tree has one gap in which could be suitable for bats.
- 5.65 The previous survey identified a tree with bat roost potential between ponds 1 and 2. This area could not be fully accessed due to dense scrub although there was a large ash tree with a covering of ivy in this area which may be the tree referred to. It had a couple of small, dead limbs but no real features of value visible at the time of the survey (TN11a).

Bat Activity

- 5.66 Table 4 below lists the dates and findings during the bat activity surveys. A map (Drawing G3544.005a) of the transects walked and recording stations is shown in Appendix 2. Analysis of the Anabat data is also presented in Appendix 2.

Table 4. Results of the bat activity survey

Date	Activity	Time	Weather	Temp (°C)	Results (transect – species found)
22/08/12	Visit 1	20.12 – 23.06	Partial cloud cover, light breeze, dry	17°C	C – soprano & common pipistrelle D - soprano pipistrelle K – noctule (distant pass) K to L – common pipistrelle M – soprano pipistrelle and common pipistrelle social calls and feeding N – soprano pipistrelle P – soprano pipistrelle P to Q – soprano and common pipistrelle Q – soprano and common pipistrelle R – soprano and common pipistrelle After R - soprano and common pipistrelle
11/09/12	Visit 2	19.15 – 22.00	Initially clear, partially cloudy later, still, dry	10°C	I – soprano pipistrelle

- 5.67 There was a low level of bat activity on the first visit. All the activity was recorded along the south-eastern boundary of the site with the majority of activity taking place around a street lamp adjacent to the eastern corner of the site, by the Calypso factory. Activity on the second visit was very low with only soprano pipistrelles being recorded again, in the eastern corner of the site, by the Calypso factory.

Reptiles

- 5.68 Table 5 below lists the dates and findings during the reptile surveys. A map (Drawing G3544.006) of the transect locations is shown in Appendix 2.
- 5.69 No reptiles were recorded during the reptile survey, despite parts of the site providing suitable habitat. Amphibians and small mammals however, were found as shown in Table 5.

Table 5. Results of the reptile survey

Date	Activity	Time	Weather	Temp . (°C)	Results (transect – species found) ¹
29/08/12	Visit 1	12.25 – 14.30	Warm, humid, broken cloud, sunny spells, light shower around 2pm	21°C	C – 1 juvenile GCN D – 4 juvenile GCN, 2 female GCN E – 1 adult toad I – 2 female GCN, 1 female SN
04/09/12	Visit 2	10.45 - 12.45	Sunny spells, broken cloud, dry	18°C	D – 1 male GCN, 1 juvenile GCN E – 1 adult toad G – 1 adult toad H – 1 juvenile GCN, 1 juvenile SN I – 1 field vole, 1 male and 1 female GCN
05/09/12	Visit 3	12.25 – 15.35	Sunny, strong breeze, scattered cloud, dry	19°C	D – 1 adult toad, 2 juvenile SN, 3 juvenile GCN G – 2 field vole
12/09/12	Visit 4	13.10 – 15.10	Cloudy, Breezy, light rain in first hour	17°C	E – 1 field vole G – 1 field vole
18/09/12	Visit 5	11.40 – 13.25	Sunny, calm, little cloud	14°C	D – 1 field vole J – 1 juvenile SN F – 1 field vole
21/09/12	Visit 6	14.00 - 16.00	Not available	15°C	D – 1 juvenile GCN, 1 juvenile newt (species indeterminate) I – 2 female GCN
27/09/12	Visit 7	13.00- 15.00	Bright, sunny, broken cloud, slight breeze	14°C	C – 1 shrew, 1 field vole D – 1 adult toad G – 1 shrew I – 1 female GCN J – 1 female GCN K – 3 field vole R – 1 shrew

1: GCN – great crested newt; SN – smooth newt

Amphibians

5.70 Although no formal surveying was undertaken for amphibians, adult and juvenile great crested newts were recorded under the reptile survey tins in transects C, D, H, I and J (see Table 5 and Drawing G3544.006). These transects were located around the north-easternmost pond and by the ditch which crosses the site. The maximum number recorded at any one time was nine. Great crested newt tadpoles were observed in the ditch which traverses the site in 2012 (Emma Broad, WCBC, *pers. comm.*).

5.71 Several toads were recorded under the reptile survey tins in transects D, E and G (see Table 5 and Drawing G3544.006) as were several adult and juvenile smooth newts in transects D, I, H and J. These records are all located around the two ponds present on the site.

Birds

5.72 Birds were recorded on an ad hoc basis during other surveys. Green woodpecker was recorded frequently throughout the site, while greater-spotted woodpecker was recorded just outside the site by the Calypso factory.

5.73 Many small passerines were present within the scrub on site and include long-tailed tit, blue tit and great tit. Blackbird was also recorded.

- 5.74 Kestrel was recorded hunting over the site during the day, while a barn owl was recorded hunting over the site during the first bat activity survey.

Connectivity with the wider landscape

- 5.75 The former Firestone site is adjacent to the River Clywedog corridor (approximately 10m away at its closest point) and forms a valuable link between the River and the north and western parts of WIE. It provides links to the north-west of the WIE via the semi-natural habitats around the Pentre Maelor residential area, and to the north towards Erlas Black Wood and beyond via a series of stepping stone habitats and green corridors around the junction of Bridge Road, Coed Aben Road, Bridge Road North and Redwither Road. To the east, the site links with the Cefn Park component of the Wrexham Industrial Estate WS via a green corridor running between the Calypso site and the River Clywedog.

6.0 ASSESSMENT

- 6.1 The site is botanically diverse and comprises an intricate mosaic of a wide range of habitats, predominantly different communities of species-rich modified neutral grassland interspersed with areas of dense continuous and scattered scrub. Comparison with previous surveys undertaken by Middlemarch Environmental Ltd suggest that the range of habitats is broadly similar but that the abundance and distribution of scrub has generally increased and the two ponds have become degraded. One of the ponds suffers from adverse water quality, although the source and cause of this is not known and, despite investigations at the time of this study, has not been tracked down. There is also an area where land has subsided around a surface water pipe outfall, near the degraded pond.
- 6.2 This site was classed as outstanding in the Wrexham Borough Council Grassland Inventory and supports Local (derelict and industrial land, ponds) and UK Priority (open mosaic habitats on previously developed land, ponds) BAP habitats. In addition, the ponds can also be categorised as a habitat of principal importance under Section 42 of the NERC Act, coming under the 'Standing open waters and canals' definition. As such, this site is considered to be of high ecological value at the Local and National level.
- 6.3 Himalayan balsam is present at a low density on the northern part of the embankment which forms the south-eastern boundary of the site (Target Note 1, G3544.003a). Consideration should be given to establishing a management programme to ensure that this species does not spread further into the site.
- 6.4 Table 6 shows the legally protected species which have been found to be present on the site, based on the previous reports, desktop study and 2012 surveys. While the NERC Act does not offer strict protection from killing or injury for individual animals, it requires Local Planning Authorities to 'have regard' to the conservation of species of principal importance in the exercise of their functions (such as the granting of planning permission and attaching conditions).
- 6.5 Table 7 shows those additional species which have been found to be present on the site, based on the previous reports, desktop study and 2012 surveys, which are of local importance or locally threatened.
- 6.6 The Phase 2 survey undertaken by Middlemarch Environment Ltd (2005) found a 'low' population of great crested newts in the two ponds on site, and one great crested newt during their reptile survey. Although no pond survey for great crested newts was undertaken in the current suite of surveys, great crested newts have been recorded during the reptile survey, with a peak daily total of nine being recorded, and great crested newt tadpoles were observed in the ditch which crosses the site. The population on the Firestone site is part of the wider WIE great crested newt population within which connectivity should be maintained. The WIE Road Improvement Scheme and other surveys not taken into account in this report have assessed the great crested newt population of WIE and environs as being exceptional and it should therefore be regarded as nationally important (Matthew Ellis, CCW, *pers. comm.*). Development of the site will lead to the loss of up to half of the Firestone site and its associated available foraging and hibernating habitat for great crested newts. Development of the site may also sever dispersal corridors. A WG great crested newt licence will be required to facilitate development of the site

and appropriate mitigation must be put in place to ensure the continued favourable conservation status of this species.

- 6.7 The charity, Amphibian and Reptile Conservation have undertaken spatial modelling work on great crested newts in the area around Wrexham Industrial Estate to provide information on the most suitable sites for pond creation in order to maintain and enhance connectivity for this species in the region. The preliminary results are presented in Appendix 3 and indicate that the most suitable areas would be to the south and east of the Firestone site.

Table 6. Legally protected species recorded on the former Firestone site

Legislation	Species
The Conservation of Habitats and Species Regulations 2010 Schedule 2 (European Protected Species of Animal)	Great Crested Newt Bats (common pipstrelle, soprano pipstrelle, <i>Myotis</i> sp.) Otter (possible)
The Wildlife and Countryside Act, 1981 (as amended) + Schedules 1 (Birds), 5/6 (Animals)	Great Crested Newt Bats (common pipstrelle, soprano pipstrelle, <i>Myotis</i> sp.) Otter (possible) Breeding birds Barn Owl Adder Slow worm
The Protection of Badgers Act 1992	Badger (probable)
The Natural Environment and Rural Communities Act Section 42 species of principal importance and UKBAP	Great Crested Newt Bats (common pipstrelle, soprano pipstrelle, <i>Myotis</i> sp.) Otter Adder Slow worm Grizzled Skipper Dingy Skipper Cinnabar Latticed Heath Small Heath Wall Shaded Broad-bar White-letter Hairstreak Hedgehog Kestrel Song Thrush Skylark Reed Bunting Bullfinch Grasshopper Warbler Cuckoo Dunnock Lapwing Common Toad

Table 7. Species of local importance recorded on the former Firestone site

Classification	Species
Local Biodiversity Action Plan	Badger Barn Owl Bullfinch Cuckoo Grasshopper Warbler Green Woodpecker Kestrel Lapwing Reed Bunting Skylark Song Thrush Toad Great crested Newt Smooth Newt Adder Slow Worm Grizzled Skipper Prickly Lettuce
Locally Important	Grass Vetchling Bee Orchid

- 6.8 The potential for bat roosts in trees on the site is low as the tree stock is generally of a young age. The few mature trees present have been checked and show only a low potential for use as bat roosts. Despite the habitat being suitable for foraging bats, only low numbers were recorded using the site, along the south-eastern side of the site and mainly around a street lamp near the Calypso factory. The south-eastern boundary appears to be a corridor for bat activity and should be maintained in any development. Bat usage of the site is low and they are unlikely to be impacted by development of the site. Enhancement measures within the future development may improve suitability of the site for bat usage.
- 6.9 Otters are known to be present on the River Clywedog and may forage on the site for amphibians (Emma Broad, WCBC, *pers. comm.*). No signs were recorded during the present survey. The local otter population will not be impacted by development of the site.
- 6.10 The Middlemarch Environmental Phase 2 survey (2005) undertook a breeding bird survey of the Firestone site and recorded 28 species of breeding birds including song thrush, skylark, reed bunting and bullfinch (all UKBAP, with song thrush also LBAP). The site is still likely to support good numbers of breeding birds and as such, site clearance will need to be undertaken outside of the breeding season (March – September) in order to comply with The Wildlife and Countryside Act 1981 (as amended). There will be loss of breeding, foraging and roosting habitat for a number of birds, several of which are listed in Section 42 of the NERC Act 2006, are UKBAP species or Wrexham LBAP species. Consideration will need to be given to ensuring that suitable habitat is available within the WIE to enable the continued presence of these species.
- 6.11 Barn owl nest sites will not be impacted by development of the site, however, the loss of potentially half of the site will reduce foraging habitat available to barn owls and other birds of prey (kestrel has also been recorded on site).
- 6.12 Adder and slow worm have been recorded on the site in the past. Although no reptiles were recorded in the most recent survey, there is the potential that they may

be present on the site and reasonable avoidance measures will need to be employed during site clearance to safely remove them to the on-site mitigation area.

- 6.13 It is likely that badgers use the site for foraging, but no signs of badger, including setts, were recorded during the recent survey. The local population will not be impacted by development of the site.
- 6.14 With respect to grizzled skipper there are only five populations in Wales, with the WIE population being one of the most important, and the former Firestone site population being the most important of the WIE metapopulation (Russell Hobson, Butterfly Conservation North Wales, *pers. comm.*) and could be considered to be of SSSI quality and therefore nationally important (Matthew Ellis, CCW *pers. comm.*). Development of the site may impact on this population, although a key aim of siting the development is to avoid the butterfly colonies on the site. Any impacts are likely to be capable of mitigation through on-site habitat creation and management schemes.
- 6.15 The remainder of species found on the site which are included in the tables above all require consideration with respect to the conservation of biodiversity and their requirements will need to be taken into account during mitigation and development.
- 6.16 The former Firestone site occupies an important position within the WIE and provides an important wildlife and habitat link between the River Clywedog and wider countryside to the south with all other areas of the WIE. It will be important that these links are maintained to enable free passage of wildlife throughout the area and maintain genetic diversity.

Summary

- 6.17 In summary the key issues for consideration in identifying the most appropriate land for development and ecological mitigation are:
- Maintenance of high quality BAP habitats with respect to ponds and open mosaic habitats on previously developed land;
 - Maintenance of the great crested newt population at favourable conservation status;
 - Maintenance of the locally threatened grizzled skipper population and its food plants;
 - Maintenance of suitable breeding habitats for a variety of birds;
 - Maintenance of the south-eastern corridor used by bats for commuting and foraging;
 - Consideration given to all the species on site which are listed in Section 42 of the NERC Act 2006 and or included within the UKBAP or Wrexham LBAP with respect to conservation of biodiversity;
 - Management of Himalayan balsam, ensuring that it does not spread to other areas of the site.

7.0 RECOMMENDATIONS FOR MITIGATION

- 7.1 The former Firestone site is of high ecological value for its habitats and species, particularly the internationally protected great crested newt and nationally important grizzled skipper.
- 7.2 The area put forward for ecological mitigation covers approximately 50% of the site, is illustrated in Drawing G3544.007b and is believed to be optimal for the site for the reasons discussed below. It is also noted that a proportion of the development area can include part of the 50% requirement for ecological mitigation in the form of native structure woodland planting and wildlife corridors (discussed further in paragraphs 7.8 and 7.9).
- 7.3 The quality of habitats varies over the site and is generally of higher quality and diversity in the south-western and south-eastern quarters. These areas include the two ponds on the south-eastern boundary, the southern part of the ditch which crosses the site, tall species-rich grassland interspersed with scattered scrub (bramble, gorse and trees including hawthorn, blackthorn and willow species), short turf areas and bare ground, continuous scrub and scattered trees (mainly young, but with a small number of mature trees along the south-eastern boundary). This area is also contiguous with the River Clywedog corridor.
- 7.4 The ponds and ditch support the great crested newt breeding population. The proposed mitigation area also includes all the grizzled skipper data records. This area would also include all records for other butterflies and moths of conservation importance namely, dingy skipper, white-letter hairstreak, small heath and wall. A high proportion of records for cinnabar, latticed heath and shaded broad-bar are also included in this area.
- 7.5 A key consideration with respect to great crested newts is the maintenance of their favourable conservation status on the former Firestone site and within the WIE as a whole. Data from surveys undertaken for the WIE Road Improvement Scheme clearly showed a deterioration of the great crested newt population in the area (Matthew Ellis, CCW *pers. comm.*). CCW would want to ensure that the great crested newt population on the site was maintained in favourable condition and that their habitats were enhanced to facilitate this and ensure compliance *The Habitats Directive 1992*.
- 7.6 This area also contains the diversity of habitats which could support a range of breeding birds and would maintain the area where all the bat activity was recorded.
- 7.7 While the proposed ecological mitigation area is already of a high value, there are various opportunities for enhancement which could improve its nature conservation value such as:
- restoration and management of the ponds and ditch to improve their suitability for great crested newts (although it may need to be accepted that the problems of adverse water quality in one of the ponds may not be capable of isolation and resolution, which may then require additional habitat creation measures);
 - creation of new ponds;
 - addition of hibernacula for great crested newts;

- addition of bat and bird boxes on suitable trees; and
 - creation of suitable habitats to benefit grizzled skipper.
- 7.8 Potential enhancements within the development site should include creation of wildlife corridors in order to maintain connectivity to other parts of the WIE particularly for great crested newts. These can include the swales, butterfly banks, specifically planted up to benefit grizzled skipper, and hedgerows. Newt-friendly gully pots and wildlife friendly kerbs should also be included in the development design. Bird and bat boxes can be included within landscaped areas of the development site. Sustainable Urban Drainage Systems could be installed to feed the ponds, ditch and swales in the wildlife corridors and the mitigation area.
- 7.9 Screening will be required to reduce the views of the developed area from the countryside. This would comprise native woodland planting of between 10 – 20m width predominantly on the south-eastern boundary. This planting would also mitigate for the loss of scrub to the development and provide additional nesting and foraging habitat for birds. Careful siting would be required to ensure avoidance of grassland areas of importance.
- 7.10 Other considerations for the mitigation of the site which are addressed in more detail in the Ecological Method Statement and Management Plan report (TEP Doc. Ref: 3544.006) include:
- Timing of site clearance;
 - Phasing of the development and the potential for advance habitat creation, restoration and management;
 - The need for financing for the long-term management of the mitigation area;
 - Interpretation and management of public access through the mitigation area; and
 - Monitoring and compliance within the mitigation area.
- 7.11 Recent plans for expansion by a company (F Lloyd (Penley)) occupying an adjacent plot will lead to part of the proposed mitigation area in the south-west of the site being developed. The habitats in the proposed development area are of relatively low ecological value being predominantly dense continuous scrub and tall ruderal herbs. This development also avoids all records of great crested newt and grizzled skipper.
- 7.12 This development could be accommodated along with the main new development, , providing that a suitable wildlife corridor (at least 20m) is retained within the mitigation area running between the two developed areas. Drawing G3544.013a in Appendix 4 provides an alternative option for the layout of the development area and mitigation area, taking into account the proposed F Lloyd (Penley) extension layout.
- 7.13 Referral back to Local Planning Guidance Notes 29 and 32 concludes that the proposals set out in this report have taken account of the guidance in order to provide a positive way forward for redevelopment of the Firestone site while balancing this with the requirements for biodiversity.

8.0 REFERENCES & FURTHER READING

JOINT NATURE CONSERVATION COMMITTEE (2010) *Phase 1 Habitat Survey*. JNCC.
Peterborough

ENGLISH NATURE (2001) *Great Crested Newt Mitigation Guidelines*. English Nature.
Peterborough

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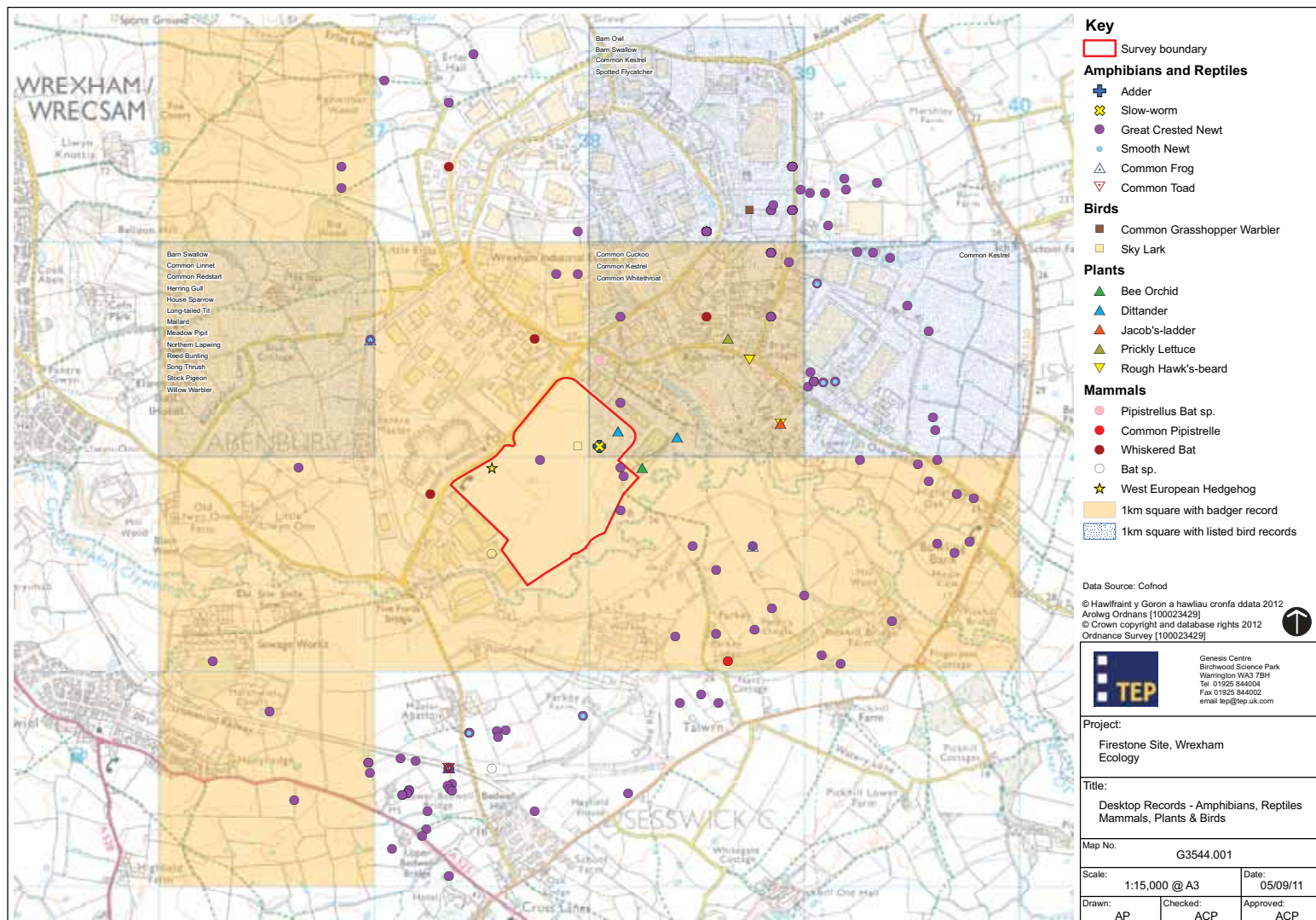
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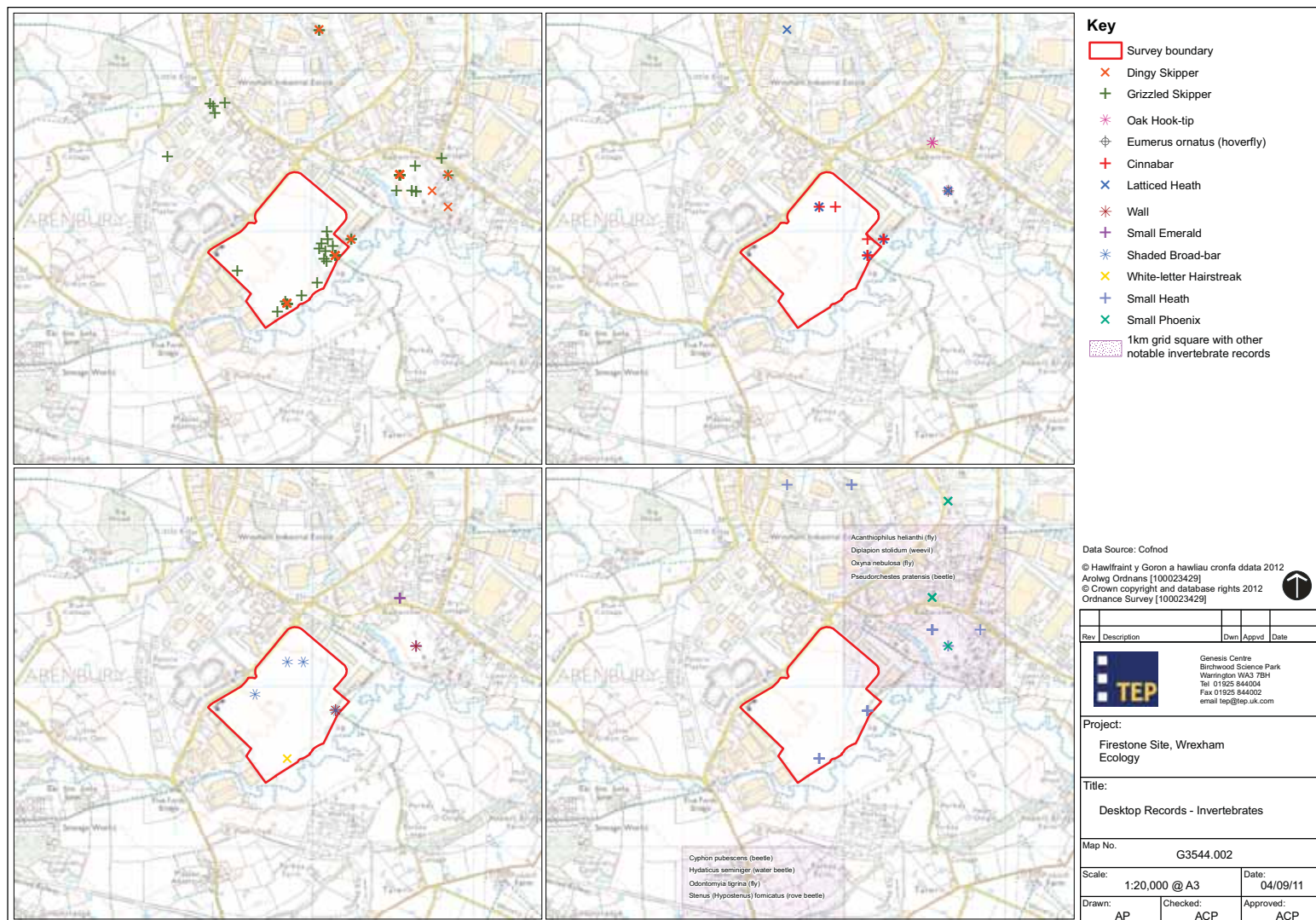
FROGLIFE (1999) *Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. Froglife Advice Sheet 10. Froglife, Halesworth

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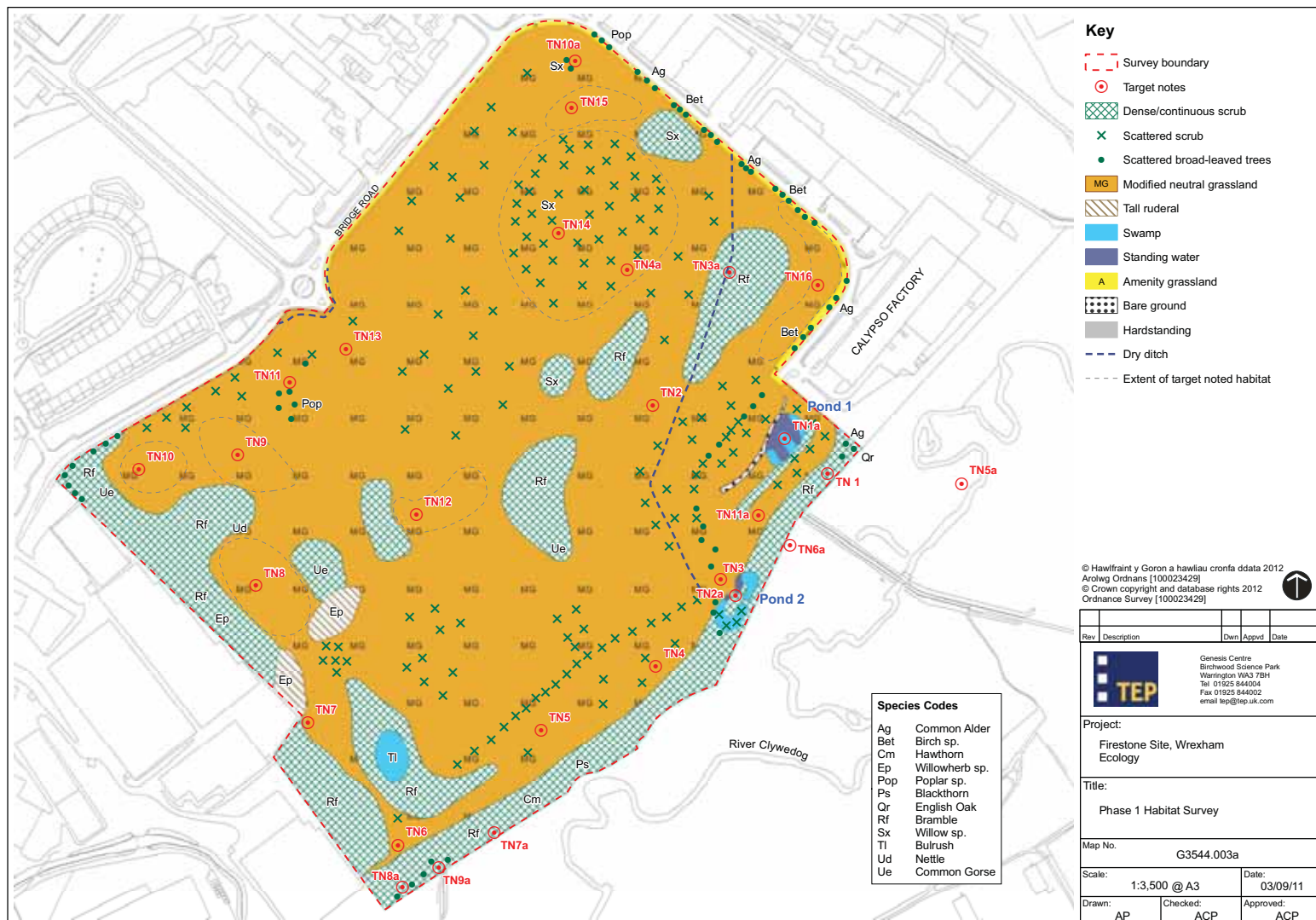
UK Biodiversity Action Plan. <http://jncc.defra.gov.uk/page-5155>

APPENDIX 1: Desktop Study Information





APPENDIX 2: Baseline Survey Information



Target Notes Report

FIRESTON

Target Note FIRESTONT001

Embankment on south-east facing boundary which is predominantly continuous scrub with tall ruderals and occasional trees

<i>Urtica dioica</i>	Nettle	A
<i>Rubus fruticosus</i> agg.	Bramble	A
<i>Rosa canina</i> agg.	Dog Rose	F
<i>Epilobium hirsutum</i>	Great Willowherb	O
<i>Chamerion angustifolium</i>	Rosebay Willowherb	O
<i>Heracleum sphondylium</i>	Hogweed	O
<i>Cirsium arvense</i>	Creeping Thistle	O
<i>Impatiens glandulifera</i>	Himalayan Balsam	R
<i>Rumex acetosa</i>	Common Sorrel	R
<i>Phleum pratense</i>	Timothy	R
<i>Juncus effusus</i>	Soft Rush	R
<i>Dactylis glomerata</i>	Cock's-foot	R
<i>Rumex obtusifolius</i>	Broad-leaved Dock	R
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Note FIRESTONT002

Species-rich modified grassland which has developed over twenty years on the site. These species have been recorded within this general grassland type from the whole site although some species are only found in restricted areas. Grassland areas differing from this type are also target noted.

<i>Centaurea nigra</i>	Knapweed	A
<i>Arrhenatherum elatius</i>	False Oat-grass	A
<i>Agrimonia eupatoria</i>	Agrimony	F
<i>Achillea millefolium</i>	Yarrow	O
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	O
<i>Leucanthemum vulgare</i>	Oxeye daisy	O
<i>Ranunculus repens</i>	Creeping Buttercup	O
<i>Potentilla anserina</i>	Silverweed	R
<i>Ononis repens</i>	Restharrow	R
<i>Linaria vulgaris</i>	Common Toadflax	R
<i>Filipendula ulmaria</i>	Meadowsweet	R
<i>Equisetum arvense</i>	Field Horsetail	R
<i>Vicia cracca</i>	Tufted Vetch	R
<i>Trifolium pratense</i>	Red Clover	R
<i>Hypericum perforatum</i>	Perforate St John's-wort	R
<i>Medicago lupulina</i>	Black Medick	R
<i>Prunella vulgaris</i>	Selfheal	R
<i>Dipsacus fullonum</i>	Teasel	R
<i>Trifolium repens</i>	White Clover	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Note FIRESTONT003

Open water with swamp vegetation and mixture of willows.

<i>Typha angustifolia</i>	Small Reedmace	A
<i>Salix caprea</i>	Goat Willow	F
<i>Salix cinerea</i> ssp. <i>cinerea</i>	Grey Willow	F
<i>Salix viminalis</i>	Osier	O
<i>Alnus glutinosa</i>	Alder	O
<i>Alnus cordata</i>	Italian Alder	O

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Notes Report Cont...

Target Note FIRESTONT004

Area of modified grassland, growing on a different substrate and in wetter conditions due to the presence of sedges and the stunted growth of some species.

<i>Festuca rubra</i>	Red Fescue	A
<i>Potentilla reptans</i>	Creeping Cinquefoil	A
<i>Cynosurus cristatus</i>	Crested Dog's-tail	F
<i>Rumex obtusifolius</i>	Broad-leaved Dock	F
<i>Deschampsia cespitosa</i>	Tufted Hair-grass	F
<i>Arrhenatherum elatius</i>	False Oat-grass	F
<i>Centaurea nigra</i>	Knapweed	F
<i>Dactylorhiza fuchsii</i>	Common Spotted-orchid	O
<i>Prunella vulgaris</i>	Selfheal	O
<i>Vicia hirsuta</i>	Hairy Tare	O
<i>Holcus lanatus</i>	Yorkshire-fog	O
<i>Epilobium hirsutum</i>	Great Willowherb	O
<i>Rubus fruticosus</i> agg.	Bramble	O
<i>Carex nigra</i>	Common Sedge	R
<i>Carex flacca</i>	Glaucous Sedge	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Note FIRESTONT005

Scattered gorse scrub in mosaic with tufted hair grass grassland.

<i>Deschampsia cespitosa</i>	Tufted Hair-grass	A
<i>Centaurea nigra</i>	Knapweed	F
<i>Ulex europaeus</i>	Gorse	F
<i>Crataegus monogyna</i>	Hawthorn	F
<i>Rosa canina</i> agg.	Dog Rose	F
<i>Salix cinerea</i> ssp. <i>cinerea</i>	Grey Willow	F
<i>Rumex obtusifolius</i>	Broad-leaved Dock	O
<i>Agrimonia eupatoria</i>	Agrimony	O
<i>Trifolium repens</i>	White Clover	O
<i>Crepis capillaris</i>	Smooth Hawk's-beard	R
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	R
<i>Ranunculus acris</i>	Meadow Buttercup	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Note FIRESTONT006

Damp area of grassland within the scrub/grassland mosaic typified by sedges and rushes.

<i>Juncus inflexus</i>	Hard Rush	A
<i>Deschampsia cespitosa</i>	Tufted Hair-grass	A
<i>Centaurea nigra</i>	Knapweed	A
<i>Cirsium arvense</i>	Creeping Thistle	F
<i>Galium palustre</i>	Marsh Bedstraw	F
<i>Rumex obtusifolius</i>	Broad-leaved Dock	F
<i>Potentilla reptans</i>	Creeping Cinquefoil	F
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	F
<i>Carex flacca</i>	Glaucous Sedge	F
<i>Juncus effusus</i>	Soft Rush	O
<i>Agrimonia eupatoria</i>	Agrimony	O
<i>Epilobium hirsutum</i>	Great Willowherb	O
<i>Senecio erucifolius</i>	Hoary Ragwort	R
<i>Dactylorhiza fuchsii</i>	Common Spotted-orchid	R
<i>Carex otrubae</i>	False Fox-sedge	R
<i>Prunella vulgaris</i>	Selfheal	R
<i>Festuca rubra</i>	Red Fescue	R
<i>Stellaria media</i>	Chickweed	R

Target Notes Report Cont...

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Note FIRESTONT007

Area of tall grassland and scrub with different species composition.

<i>Deschampsia cespitosa</i>	Tufted Hair-grass	A
<i>Rumex obtusifolius</i>	Broad-leaved Dock	F
<i>Centaurea nigra</i>	Knapweed	F
<i>Dysenterica pulicaria</i>	Fleabane	F
<i>Salix caprea</i>	Goat Willow	F
<i>Ulex europaeus</i>	Gorse	O
<i>Carex otrubae</i>	False Fox-sedge	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Note FIRESTONT008

Area of short/ stunted sward dominated by forbs with patches of bare earth, very little grass cover and scattered small goat willow saplings. Approximately 20m x 30m.

<i>Potentilla reptans</i>	Creeping Cinquefoil	A
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	A
<i>Carex nigra</i>	Common Sedge	A
<i>Juncus inflexus</i>	Hard Rush	F
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Trifolium pratense</i>	Red Clover	F
<i>Hypericum perforatum</i>	Perforate St John's-wort	F
<i>Trifolium repens</i>	White Clover	F
<i>Leontodon saxatilis</i>	Lesser Hawkbit	O
<i>Dactylorhiza fuchsii</i>	Common Spotted-orchid	O
<i>Centaurea nigra</i>	Knapweed	O
<i>Achillea millefolium</i>	Yarrow	O
<i>Juncus conglomeratus</i>	Compact Rush	O
<i>Juncus articulatus</i>	Jointed Rush	O
<i>Blackstonia perfoliata</i>	Yellow-wort	R
<i>Centaureum erythraea</i>	Common Centaury	R
<i>Stellaria media</i>	Chickweed	R
<i>Salix caprea</i>	Goat Willow	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Note FIRESTONT009

Open area with short, stunted sward dominated by forbs and occasional patches of bare ground. Deep tyre ruts across this area create a damper microhabitat for rushes. Approx. 20m x 30m in size.

<i>Lotus corniculatus</i>	Bird's-foot Trefoil	A
<i>Carex nigra</i>	Common Sedge	A
<i>Leucanthemum vulgare</i>	Oxeye daisy	F
<i>Dactylorhiza fuchsii</i>	Common Spotted-orchid	O
<i>Leontodon saxatilis</i>	Lesser Hawkbit	O
<i>Juncus inflexus</i>	Hard Rush	O
<i>Juncus conglomeratus</i>	Compact Rush	O
<i>Centaurea nigra</i>	Knapweed	O
<i>Prunella vulgaris</i>	Selfheal	R
<i>Anagallis arvensis</i>	Scarlet Pimpernel	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Note FIRESTONT010

Area approx. 15m x 15m with anthill hummocks, short sward dominated by forbs (some showing stunted growth) and very little bare ground.

<i>Carex nigra</i>	Common Sedge	D
<i>Leucanthemum vulgare</i>	Oxeye daisy	A

Target Notes Report Cont...

<i>Lotus corniculatus</i>	Bird's-foot Trefoil	A
<i>Potentilla reptans</i>	Creeping Cinquefoil	F
<i>Moss sp.</i>	Moss species	F
<i>Holcus lanatus</i>	Yorkshire-fog	O
<i>Hypericum perforatum</i>	Perforate St John's-wort	O
<i>Prunella vulgaris</i>	Selfheal	O
<i>Cynosurus cristatus</i>	Crested Dog's-tail	O
<i>Agrimonia eupatoria</i>	Agrimony	R
<i>Centaurea nigra</i>	Knapweed	R
<i>Centaureum erythraea</i>	Common Centaury	R
<i>Trifolium pratense</i>	Red Clover	R
<i>Dactylorhiza fuchsii</i>	Common Spotted-orchid	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Note FIRESTONT011

Low-lying area surrounded by mature grey poplars and their suckers which looks to be seasonally inundated. Ground cover beneath the trees in the inundation area very sparse, mainly moss species.

Grass vetchling recorded in the grassland in this area.

Small group of young white poplars to the north-east of the grey poplars.

<i>Moss sp.</i>	Moss species	A
<i>Populus x canescens</i>	Grey Poplar	A
<i>Populus alba</i>	White Poplar	O
<i>Phleum pratense</i>	Timothy	O

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Note FIRESTONT012

Area of dense short sward combining fine grasses with forbs and occasional anthills amongst the tall Arrhenatherum grassland and gorse and hawthorn scrub.

<i>Moss sp.</i>	Moss species	A
<i>Festuca rubra</i>	Red Fescue	A
<i>Trifolium repens</i>	White Clover	F
<i>Leucanthemum vulgare</i>	Oxeye daisy	F
<i>Medicago lupulina</i>	Black Medick	F
<i>Holcus lanatus</i>	Yorkshire-fog	F
<i>Potentilla reptans</i>	Creeping Cinquefoil	F
<i>Achillea millefolium</i>	Yarrow	O
<i>Prunella vulgaris</i>	Selfheal	O
<i>Hypericum perforatum</i>	Perforate St John's-wort	O
<i>Centaurea nigra</i>	Knapweed	O
<i>Trifolium pratense</i>	Red Clover	O
<i>Centaureum erythraea</i>	Common Centaury	R
<i>Cruciata laevipes</i>	Crosswort	R
<i>Potentilla erecta</i>	Tormentil	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Note FIRESTONT013

Small dipped, damp area with distinct vegetation community.

<i>Equisetum arvense</i>	Field Horsetail	D
<i>Dysenterica pulicaria</i>	Fleabane	A
<i>Centaurea nigra</i>	Knapweed	F
<i>Deschampsia cespitosa</i>	Tufted Hair-grass	F
<i>Moss sp.</i>	Moss species	F
<i>Juncus inflexus</i>	Hard Rush	F
<i>Carex nigra</i>	Common Sedge	F

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Notes Report Cont...

Target Note FIRESTONT014

Large damp area which is likely to be seasonally wet, with various willow species being the dominant scattered scrub at 3 - 4m in height, with the associated ground layer being a short sward dominated by sedges and rushes.

<i>Carex flacca</i>	Glaucous Sedge	A
<i>Moss sp.</i>	Moss species	A
<i>Dactylorhiza fuchsii</i>	Common Spotted-orchid	F
<i>Salix caprea</i>	Goat Willow	F
<i>Salix cinerea ssp. cinerea</i>	Grey Willow	F
<i>Juncus articulatus</i>	Jointed Rush	O
<i>Festuca rubra</i>	Red Fescue	O
<i>Eleocharis palustris</i>	Common Spike-rush	O
<i>Leontodon saxatilis</i>	Lesser Hawkbit	O
<i>Salix viminalis</i>	Osier	O
<i>Dysenterica pulicaria</i>	Fleabane	O
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	O
<i>Deschampsia cespitosa</i>	Tufted Hair-grass	O
<i>Juncus inflexus</i>	Hard Rush	O
<i>Carex otrubae</i>	False Fox-sedge	O
<i>Leucanthemum vulgare</i>	Oxeye daisy	O
<i>Petasites hybridus</i>	Butterbur	R
<i>Blackstonia perfoliata</i>	Yellow-wort	R

D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Note FIRESTONT015

Medium height grassland sward dominated by oxeye daisy. Very little grass cover present.

<i>Leucanthemum vulgare</i>	Oxeye daisy	D
<i>Plantago lanceolata</i>	Ribwort Plantain	A
<i>Trifolium repens</i>	White Clover	A
<i>Anthyllis vulneraria</i>	Kidney Vetch	F
<i>Moss sp.</i>	Moss species	F
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	F
<i>Linum catharticum</i>	Purging Flax	O
<i>Carex flacca</i>	Glaucous Sedge	O
<i>Primula veris</i>	Cowslip	R
<i>Centaureum erythraea</i>	Common Centaury	R
<i>Blackstonia perfoliata</i>	Yellow-wort	R

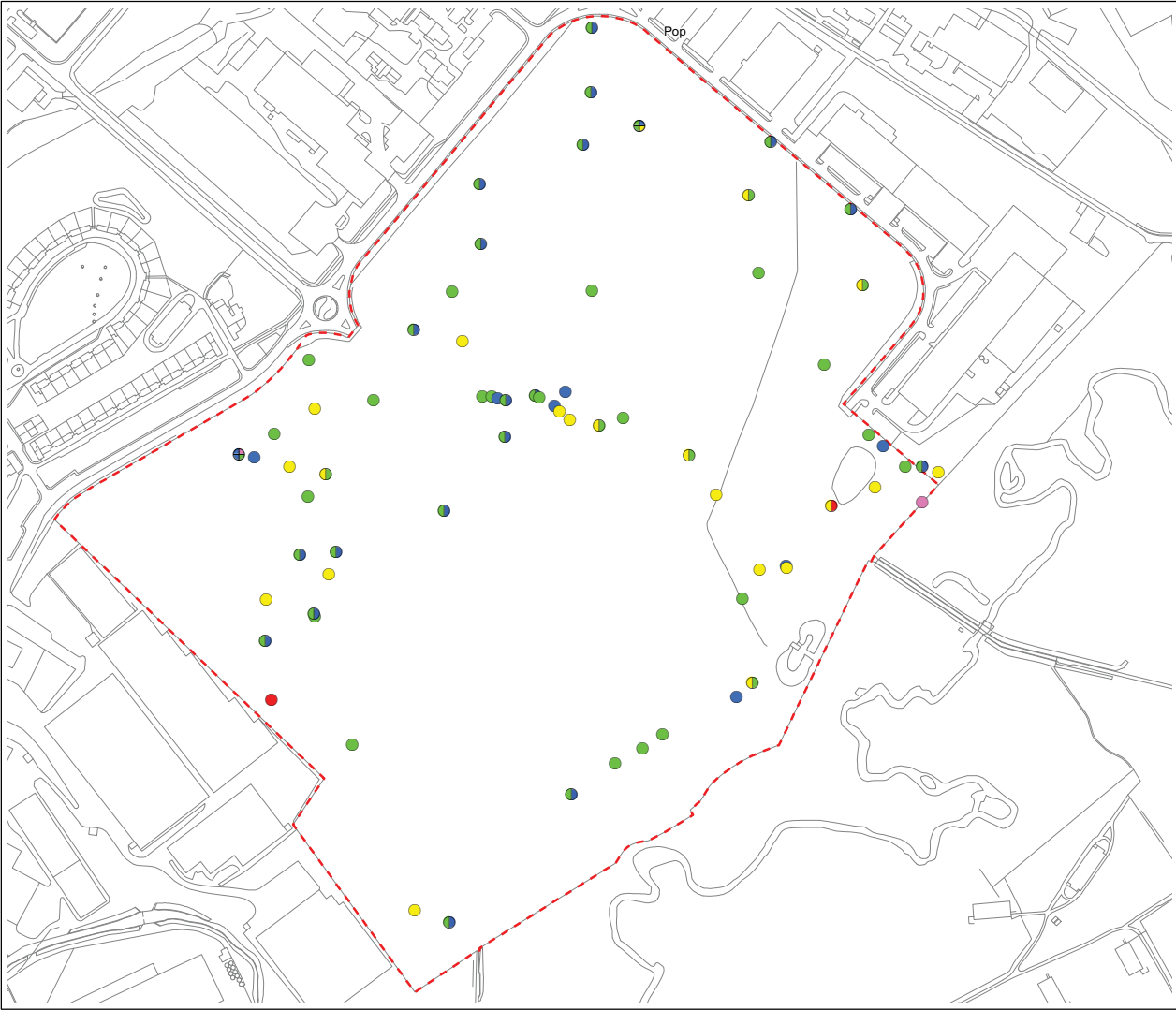
D = Dominant, A = Abundant, F = Frequent, O = Occasional, R = Rare (within the target note area).

Target Note FIRESTONT016

Area of species-rich modified grassland with abundant hedge bedstraw.

<i>Centaurea nigra</i>	Knapweed	A
<i>Galium mollugo</i>	Hedge Bedstraw	A
<i>Daucus carota</i>	Wild Carrot	F
<i>Deschampsia cespitosa</i>	Tufted Hair-grass	F
<i>Potentilla reptans</i>	Creeping Cinquefoil	F
<i>Arrhenatherum elatius</i>	False Oat-grass	F
<i>Senecio erucifolius</i>	Hoary Ragwort	O
<i>Lathyrus nissolia</i>	Grass Vetchling	R
<i>Vicia sativa</i>	Common Vetch	R

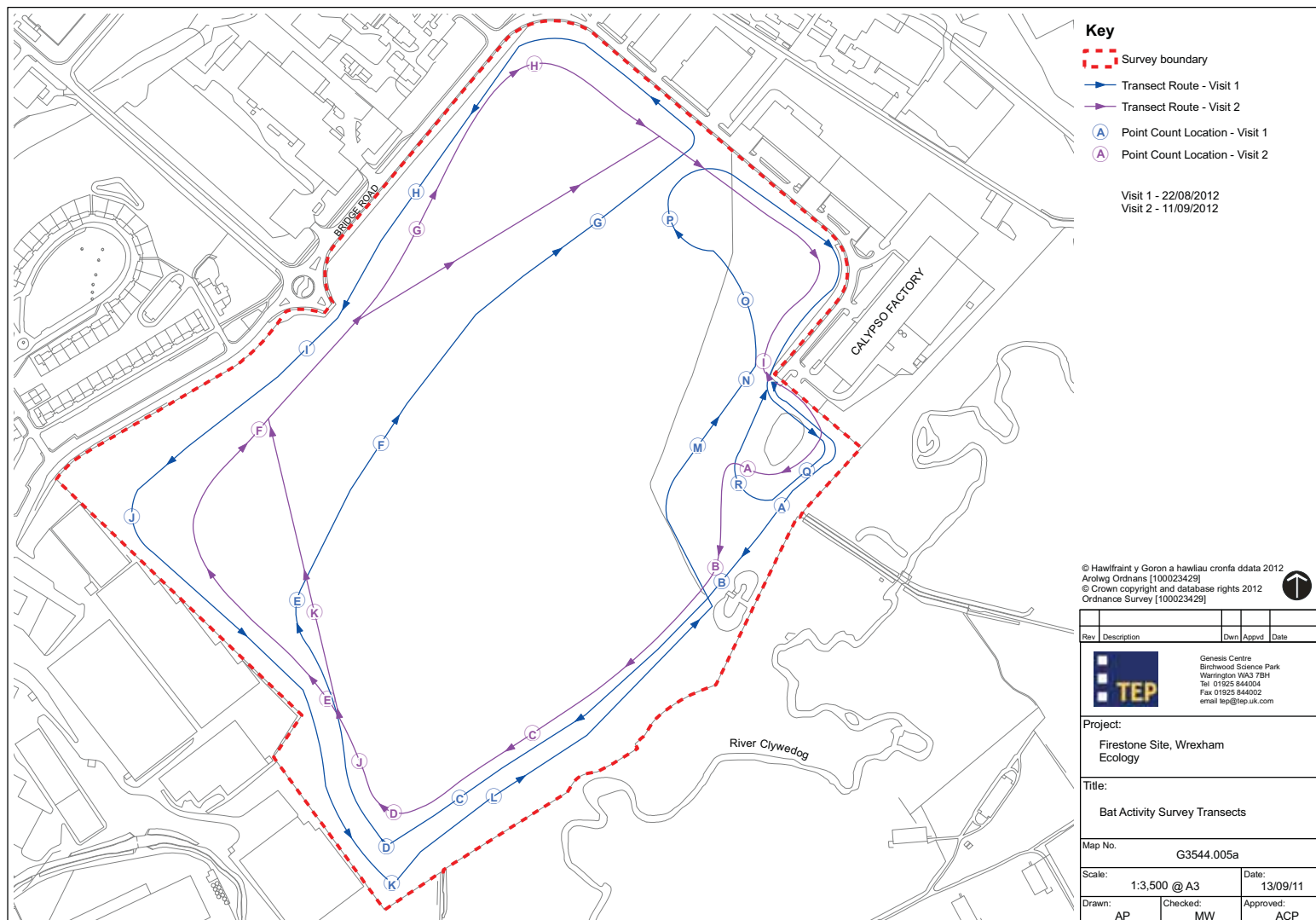
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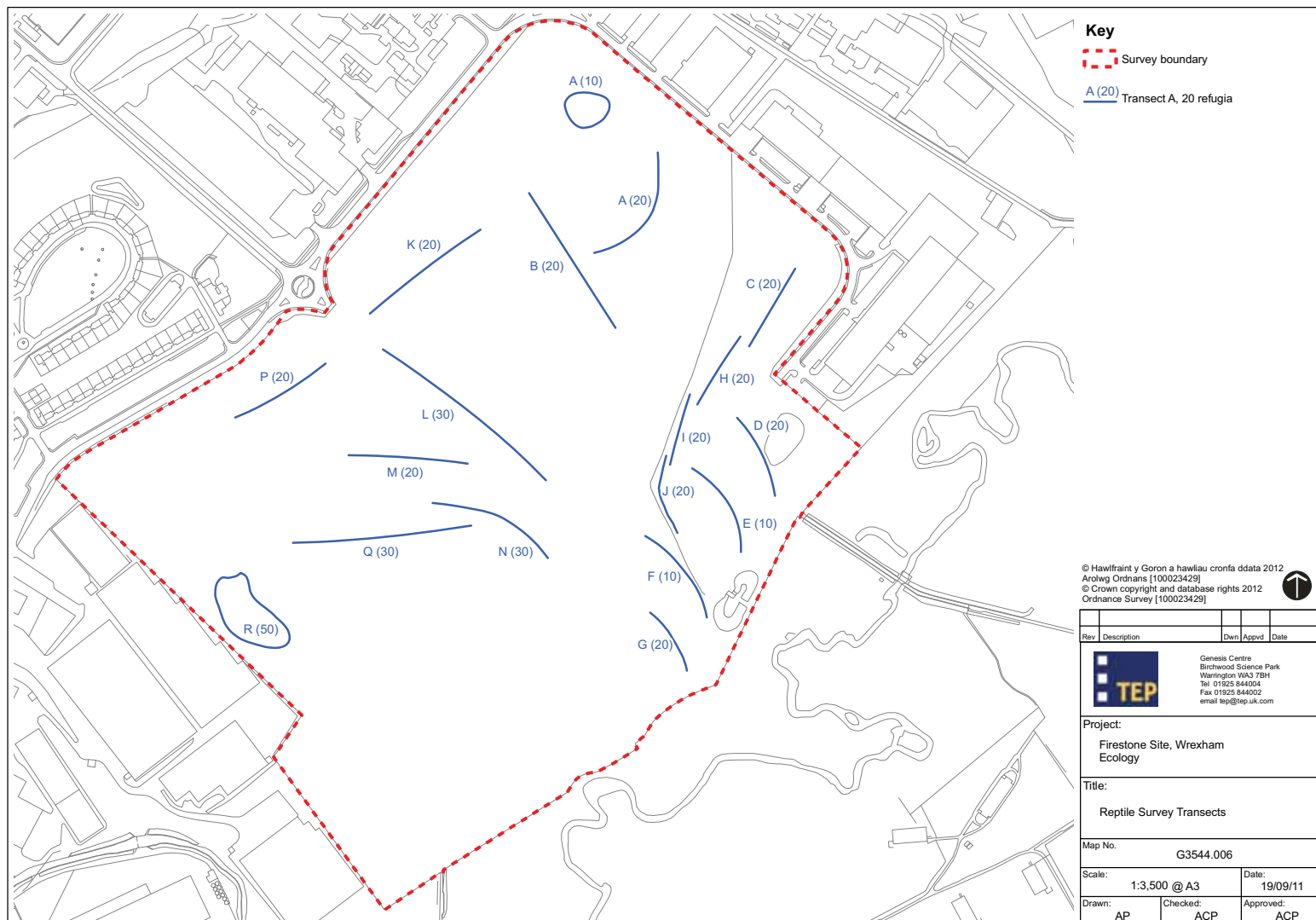


- Key**
- Survey boundary
- Plant Species**
- Bird's-foot trefoil
 - Bird's-foot trefoil, Greater bird's-foot trefoil and Creeping cinquefoil
 - Greater bird's-foot trefoil
 - Creeping cinquefoil
 - Creeping cinquefoil and Bird's-foot trefoil
 - Creeping cinquefoil, Bird's-foot trefoil and Dog rose
 - Dog rose
 - Dog rose and Creeping cinquefoil
 - Dog rose and Tormentil
 - Tormentil

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Ordnance Survey [100023429]

Rev	Description	Dwn	Appvd	Date
TEP Genesis Centre Birchwood Science Park Warrington WA3 7BH Tel 01925 844004 Fax 01925 844002 email tep@tep.uk.com				
Project: Firestone Site, Wrexham Ecology				
Title: Butterfly Food Plants				
Map No.		G3544.004		
Scale:		1:3,500 @ A3	Date:	
Drawn:		AP	Checked:	
			Approved:	
			ACP	





APPENDIX 3

Amphibian and Reptile Conservation Pilot Connectivity Assessment

Pilot connectivity assessment to inform mitigation on Wrexham Industrial Estate

Andy Arnell and Dr. John Wilkinson Amphibian and Reptile Conservation (ARC)

Background

The work we have done and are trialling involves using a habitat suitability (from MaxEnt modelling) to inform creation of a resistance to movement layer. This enables predicting least cost paths between occupied ponds and the cost distances along these can then be used with further graph theory software (Conefor) to measure overall connectivity indices – on theory allowing us to predict the importance of each occupied pond on metapopulation connectivity.

Approach

We limited analyses to a 2km buffer area around the development and potential pond creation areas nearby to save processing time. We refer to occupied ponds as recent records by water bodies (from 1990 - 2011). This is the best we can do from the available information - some records may be terrestrial where, from manual inspection using aerial imagery, it was hard tell if small or temporary water bodies may exist. Some ponds may also have been removed from previous developments in this area. In addition, many more ponds could be occupied but have no records recorded for them. Future steps may include looking at the pondscape as a whole.

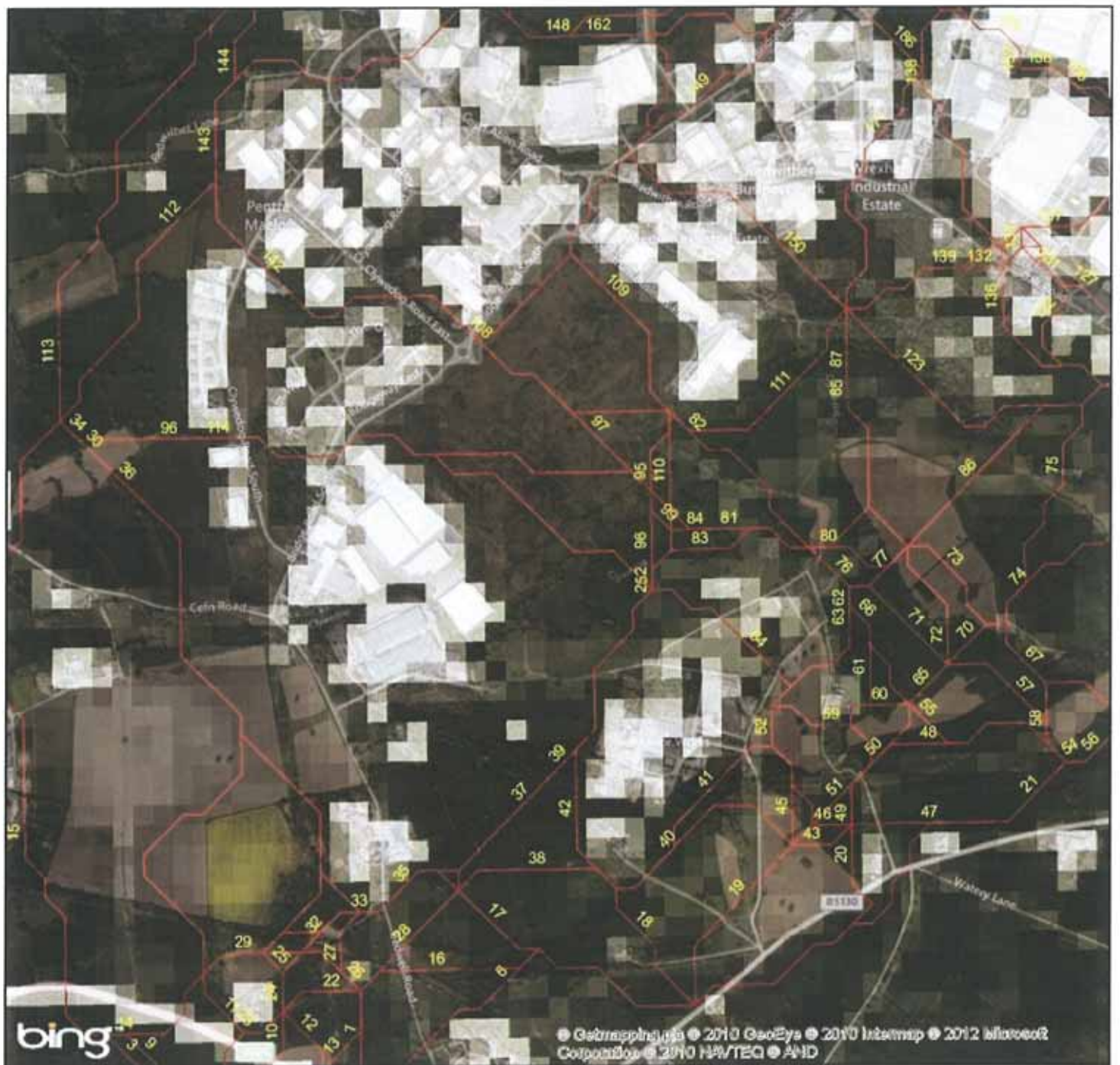
Preliminary results

The Figures 1a and 1b show how development may potentially impact least cost paths between occupied ponds. Our original modelling suggested pond creation targets according to habitat suitability, pond density and Unitary Development Plan (UDP) layers (shown in shades of purple on Figs. 2a). We tried adding new ponds in these areas (see Fig. 2b - ponds labelled 790, 791, or 794) as these may reduce the dependence on the existing ponds. The overall size of the pie chart is the predicted importance of adding the new ponds (assuming they are GCN friendly) for metapopulation connectivity as a whole. The model adds in each one in turn and assesses the change in connectivity of the entire metapopulation. Comparing 2a and 2b each of these appears to be as important to metapopulation connectivity as the existing ponds 196 and 200.

We also trialled adding alternative ponds (792 and 793) further away to the north east (see Fig. 2c). These fall outside the areas we had originally targeted for pond creation from our original modelling primarily because the pond density (according to OS MasterMap pond data) in this area is above our threshold of 3 per km sq. We chose these ponds as alternatives, after looking at Unitary Development Plan (UDP) layers (see pinkage overlay in Fig 2c), where the extent designated for the industrial estate extends further to the east by a few hundred metres. This could potentially wipe many ponds out and so it may make sense to start to build up this area in advance. From the size of the pie-chart the alternative ponds appear to be more important for metapopulation connectivity than the previous options, however, habitat improvement in this area on existing ponds may be just as useful.

Next steps

A little further work needs to be done as the process is still new and in this analysis the number of least cost paths from each occupied pond was limited to a select number of adjacent occupied ponds. The overall pictures for connectivity may therefore change when this is corrected for.



Legend

Least cost paths between records

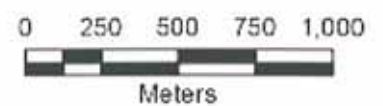
Resistance to movement

Value

High : 501

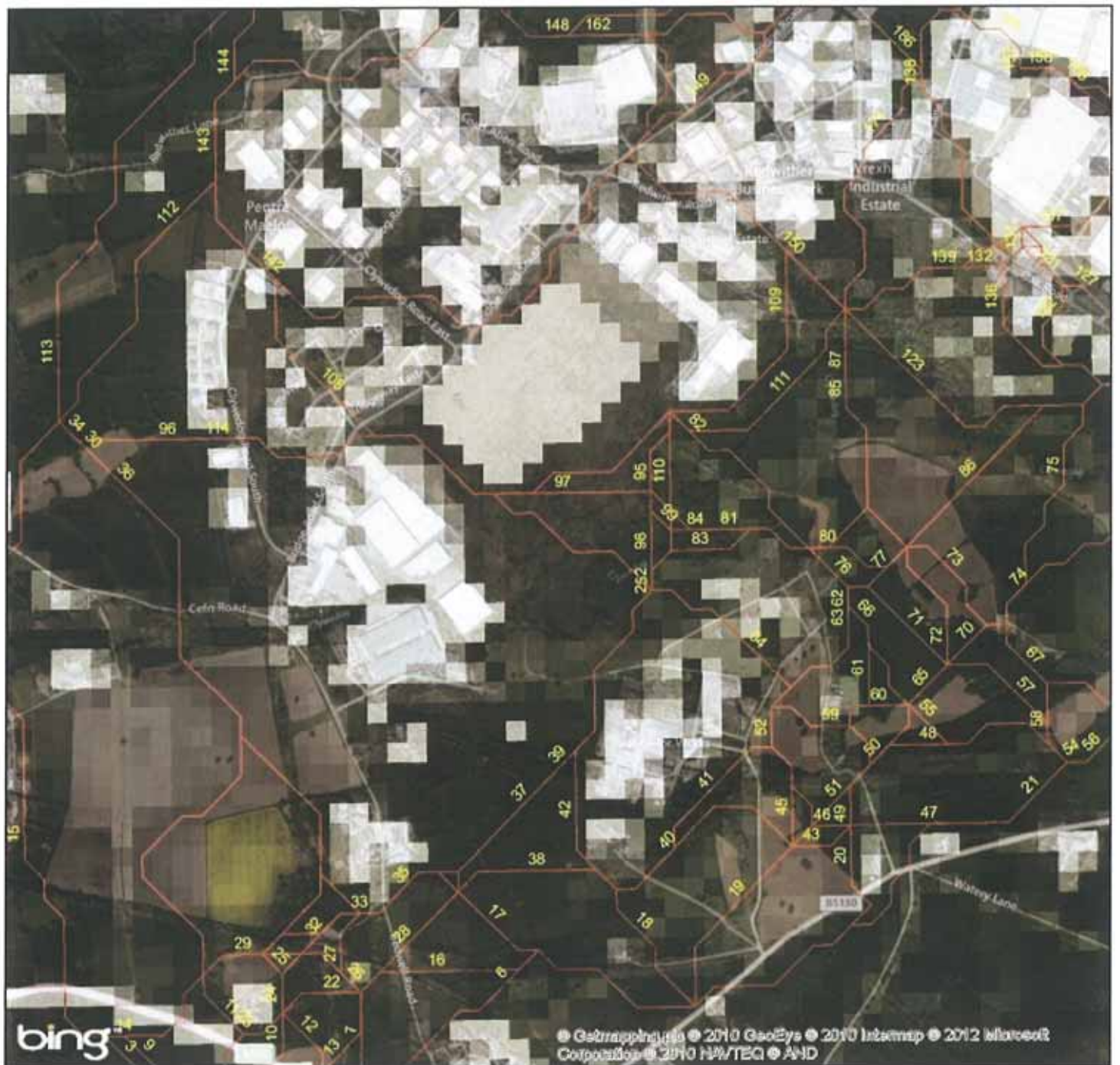


Low : 2



Pre-development

Fig 1a



Legend

Least cost paths between records

Resistance to movement

Value

High : 501



Low : 2



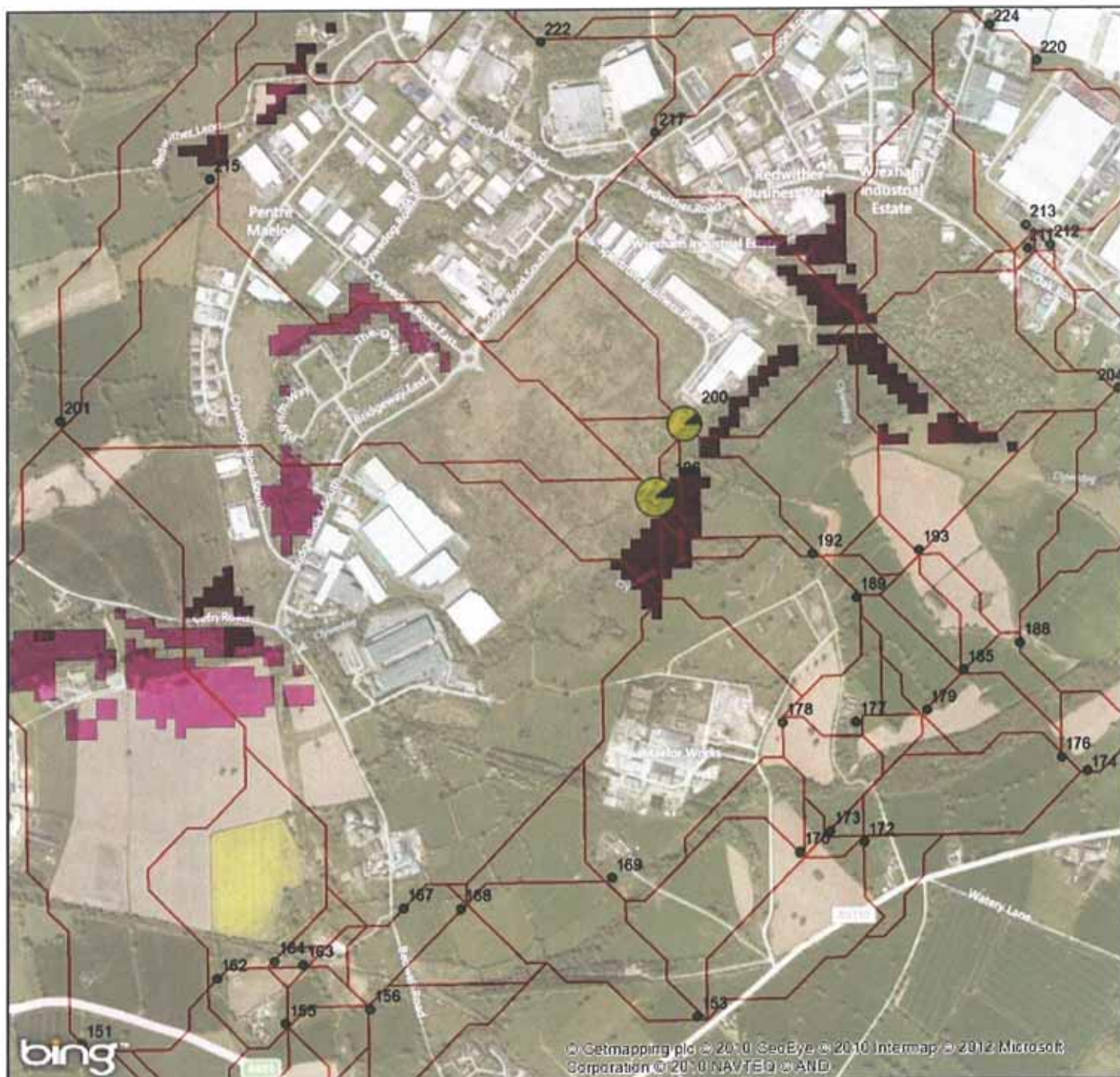
0 250 500 750 1,000



Meters

Post-development

Fig 1b



Legend

Other records

- Other records

Target ponds according to connectivity indices

Sum of Fields



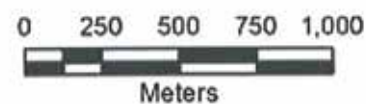
- varPCintra
- varPCflux
- varPCconne

Least cost paths between records



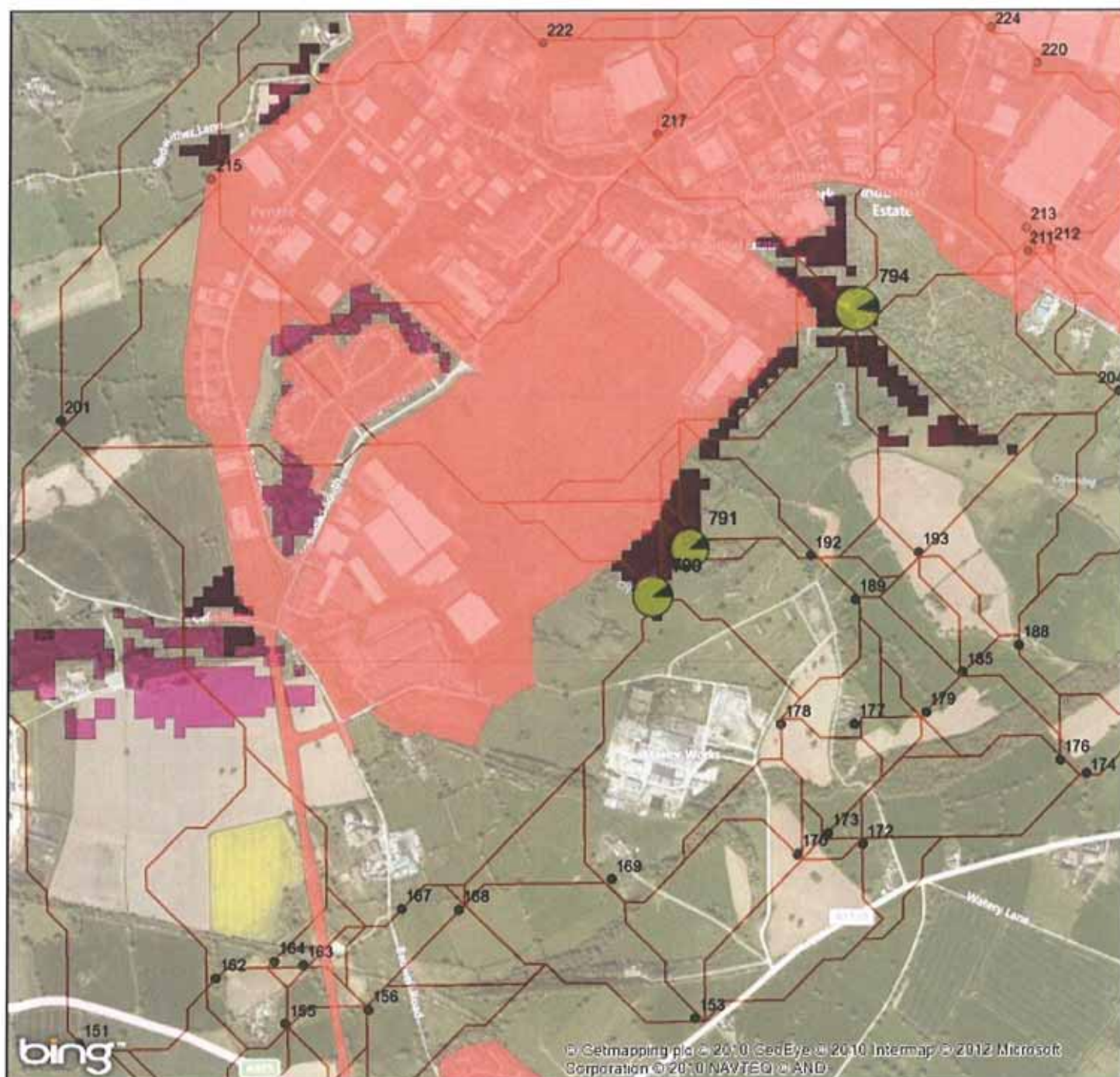
Pond creation target areas in corridors

- Low priority
- High priority



Pre-development

Fig 2a.



Legend

Wrexham UDP designation

Poor prospects for pond creation

Target ponds according to connectivity indices

Sum of Fields



varPCint_1

varPCflu_1

varPCcon_1

Least cost paths between records

Other records

Other records

Pond creation target areas in corridors

Low priority

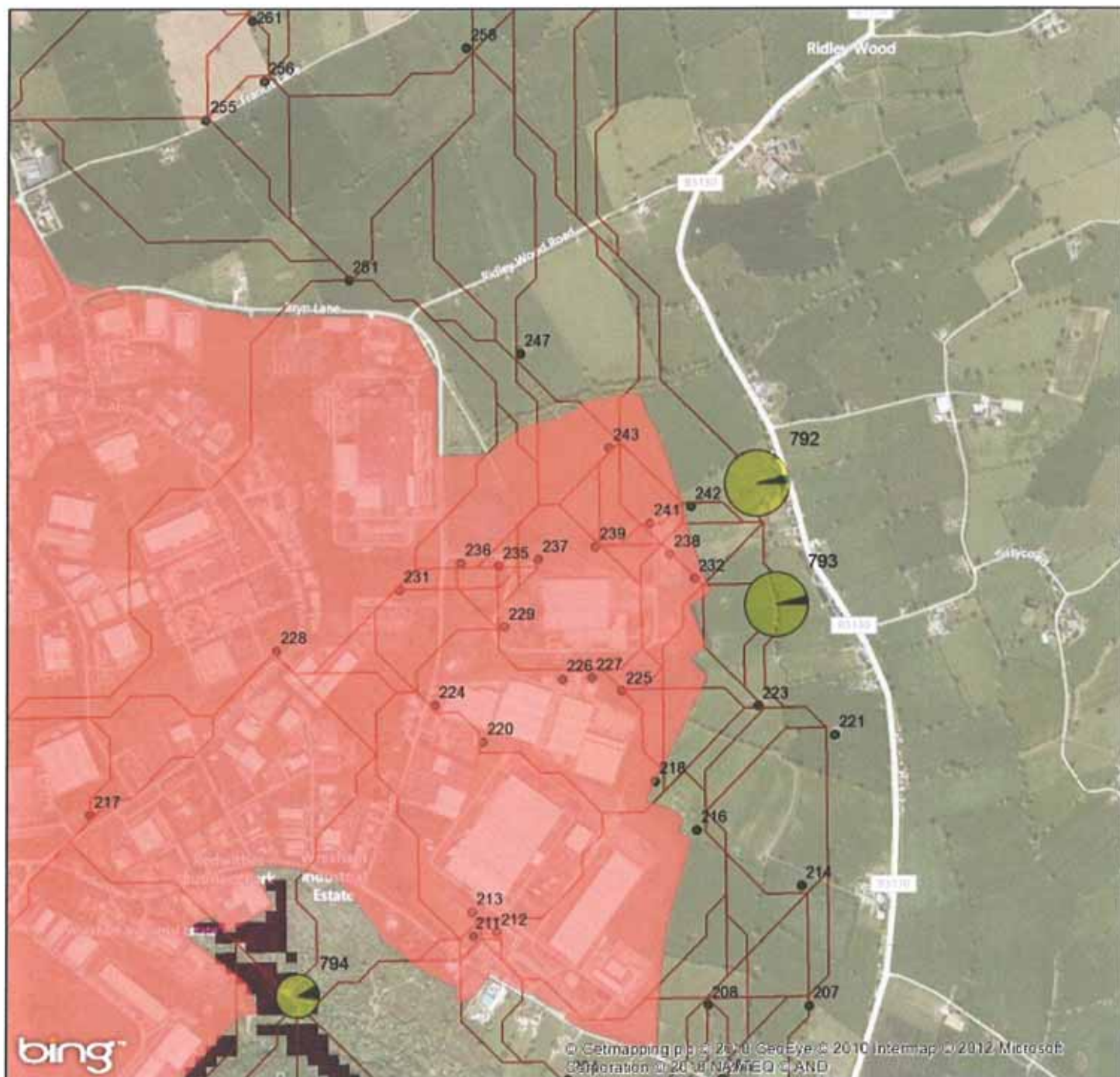
High priority



0 250 500 750 1,000
Meters

Pre-development

Rg 2b



Legend

Wrexham UDP designation

Poor prospects for pond creation

Target ponds according to connectivity indices

Sum of Fields



varPCint_1

varPCflu_1

varPCcon_1

Least cost paths between records

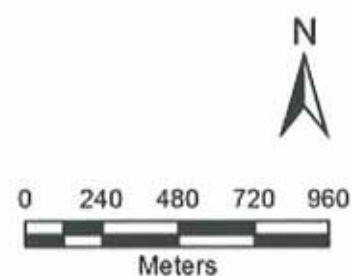
Other records

Other records

Pond creation target areas in corridors

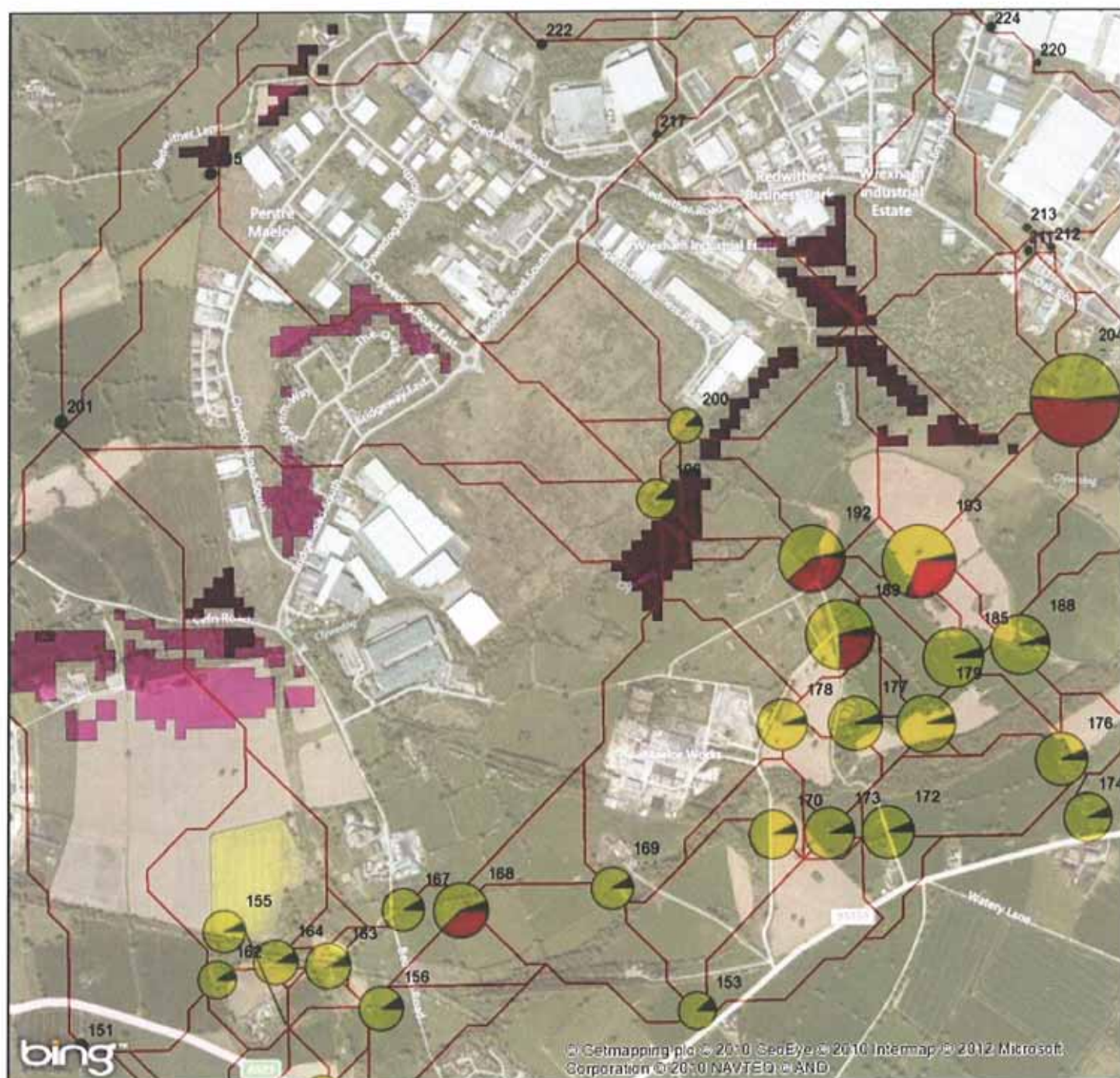
Low priority

High priority



Post-development

Fig 2c



Legend

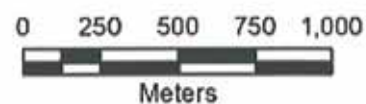
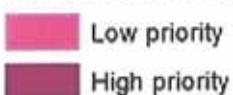
Records by connectivity indices (varPC)

Sum of Fields



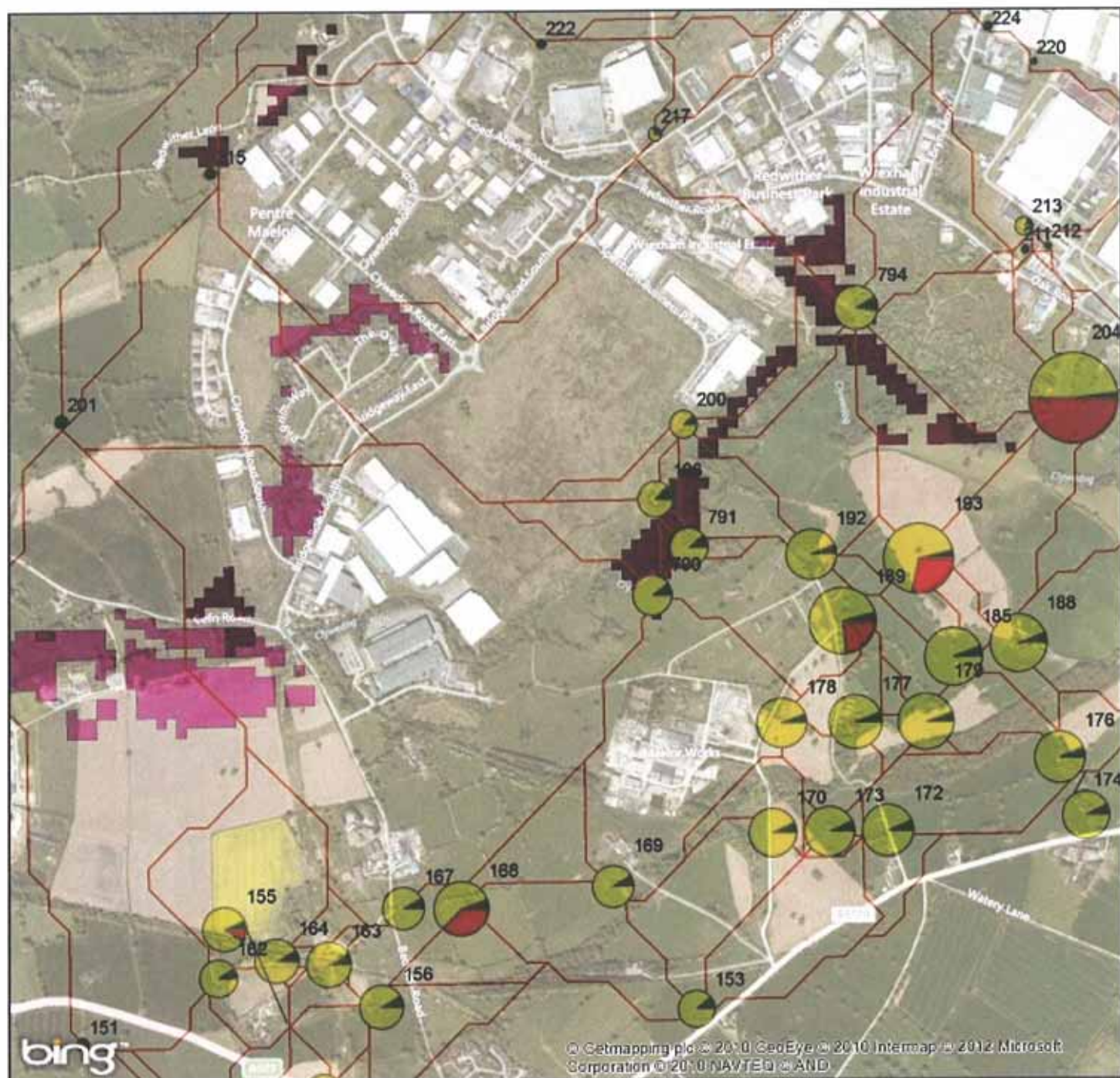
Least cost paths between records

Pond creation target areas in corridors



Pre-development

Fig 3a



Legend

Records by connectivity indices

Sum of Fields



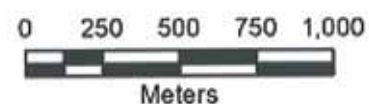
-  varPCint_1
-  varPCflu_1
-  varPCcon_1

Least cost paths between records



Pond creation target areas in corridors

-  Low priority
-  High priority

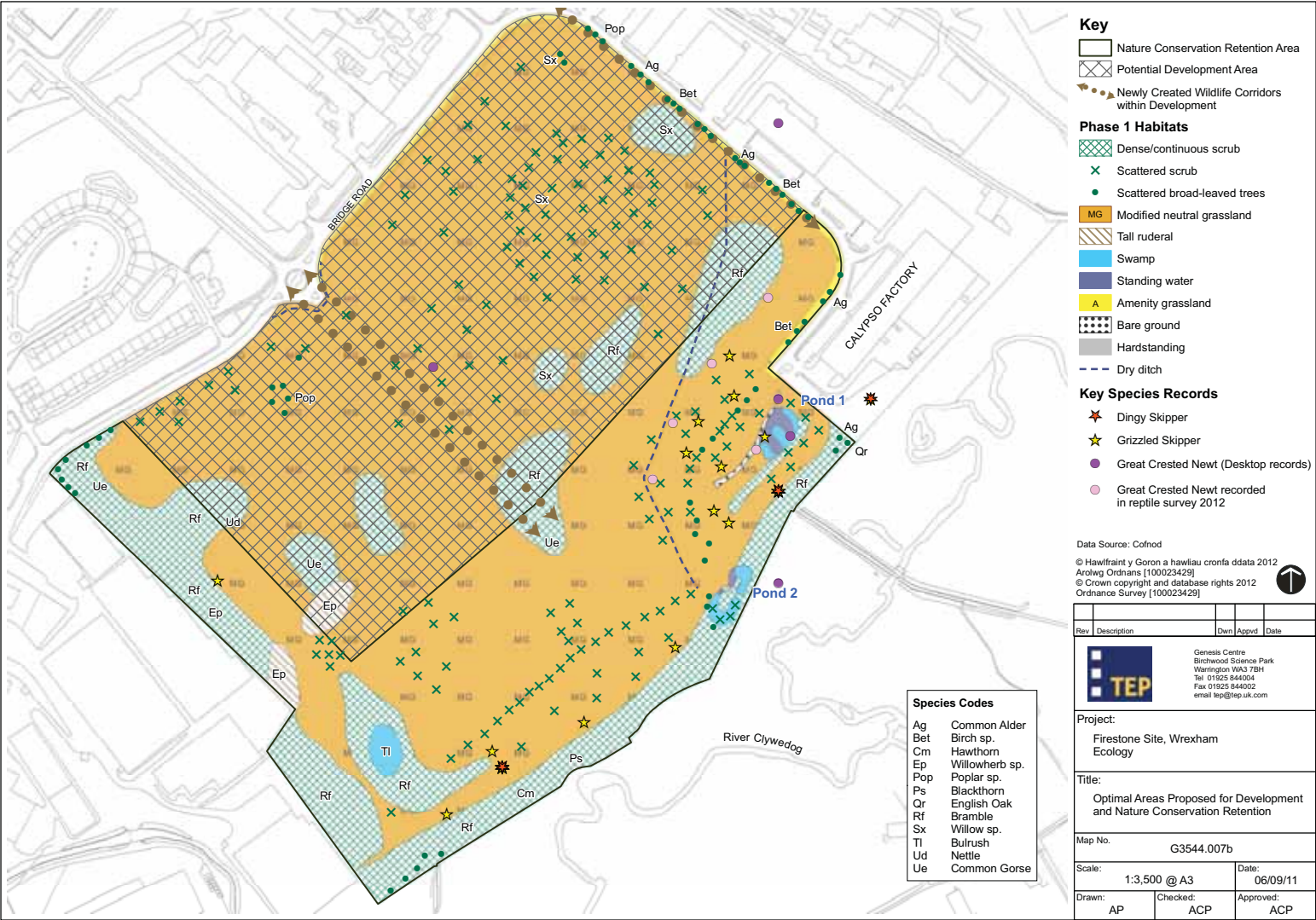


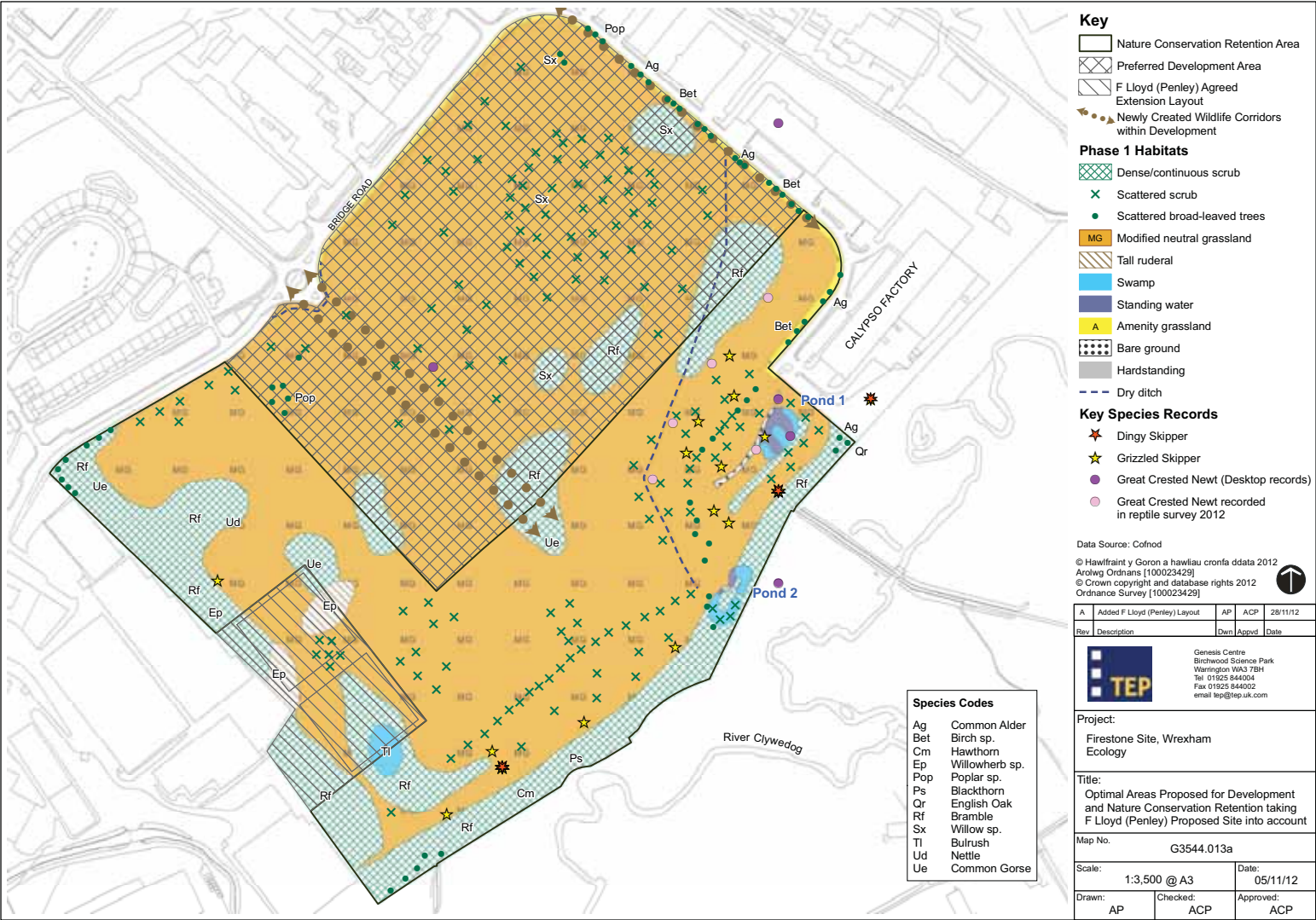
Post-development

Fig 3b

APPENDIX 4

Land for Ecological Mitigation Options





Key

Nature Conservation Retention Area

Preferred Development Area

F Lloyd (Penley) Agreed Extension Layout

Newly Created Wildlife Corridors within Development

Phase 1 Habitats

Dense/continuous scrub

Scattered scrub

Scattered broad-leaved trees

MG

 Modified neutral grassland

Tall ruderal

Swamp

Standing water

A

 Amenity grassland

Bare ground

Hardstanding

Dry ditch

Key Species Records

Dingy Skipper

Grizzled Skipper

Great Crested Newt (Desktop records)

Great Crested Newt recorded in reptile survey 2012

Data Source: Cofnod

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A	Added F Lloyd (Penley) Layout	AP	ACP	28/11/12
Rev	Description	Draw	Appov	Date
Genesis Centre Birchwood Science Park Warrington WA3 7BH Tel: 01925 844004 Fax: 01925 844002 email tep@tep.uk.com				
Project: Firestone Site, Wrexham Ecology				
Title: Optimal Areas Proposed for Development and Nature Conservation Retention taking F Lloyd (Penley) Proposed Site into account				
Map No. G3544.013a				
Scale: 1:3,500 @ A3		Date: 05/11/12		
Drawn: AP	Checked: ACP	Approved: ACP		