Ashfield Land Management and Gazeley GLP Northampton s.à.r.l

Annex B: Phase 1 Habitat Survey Report

Rail Central

855950

FEBRUARY 2018

RSK GENERAL NOTES

Project No.: 855950

Title: Rail Central Phase 1 Habitat Survey Report

Client: Ashfield Land Management Limited and Gazeley GLP Northampton s.à.r.l

Date: 8 February 2018

Office: Coventry

Status: Final

Author	Richard Carter	**Technical reviewer**	Roberta Epps
Signature		Signature	
Date:	8 February 2018	Date:	8 February 2018
Project Manager	Tom Coyne	**Quality reviewer**	Roberta Epps
Signature		Signature	
Date:	8 February 2018	Date:	8 February 2018

CONTENTS

EXECUTIVE SUMMARY

1. This report presents the results of ecological field surveys undertaken in connection with a proposed development known as Rail Central, at Milton Malsor, Northamptonshire (Ordnance Survey Grid reference: SP 73363 54488).

2. Two sites; the main SRFI site and the Junction 15a Site have been surveyed to date. A third collection of sites, which features areas associated with other highways junction improvements, has not yet been surveyed and will require a separate scoping survey. The locations and boundaries of the survey areas are shown in *Figure B1.1 & B1.2*.

3. An extended Phase 1 Habitat survey including assessment for protected vertebrates was carried out in spring 2015, summer 2016 and spring 2017 following the *Guidelines for Preliminary Ecological Appraisal* (CIEEM 2012).

4. Habitats on the main SRFI site comprise arable fields, improved agricultural grassland, semi-improved or unimproved neutral agricultural grassland, rough grassland, amenity-turf, broad-leaved woodland, broad-leaved semi-natural woodland, recent broad-leaved plantation woodland, scrub and incipient secondary woodland, scattered broad-leaved and coniferous trees, hedgerows, nettle-bed and other tall ruderal vegetation, ephemeral vegetation, streams, ditches, dry ditches and ponds. No non-native invasive plants were recorded on the site although a comprehensive survey was not undertaken for these.

5. Habitats on the junction 15a site comprise arable field, improved grassland, rough grassland, amenity-turf, broad-leaved wet woodland, broad-leaved plantation, scattered trees, hedgerows, scrub, tall ruderals, ornamental planting, ditches, brooks, a canal, swamp, and ornamental and bare ground. No non-native invasive plants were recorded except for small amounts of the waterwed *Elodea nuttallii* (Nuttall's Waterweed) in the canal - although a comprehensive survey was not undertaken for these.

6. There are habitats on the Main SRFI site with the potential to support Badgers, bats, Great Crested Newts, invertebrates, nesting birds (including barn owls), reptiles, Water Voles, White-Clawed Crayfish, and wintering birds

7. There are habitats on the Junction 15a site with the potential to support Badgers, bats, Great Crested Newts, invertebrates, nesting birds, otters, reptiles, Water Voles, and White-clawed Crayfish.

1 INTRODUCTION

Purpose of this Report

This report presents the results of an extended Phase 1 habitat survey carried out on land south of Milton Malsor, Northamptonshire, as well as land off Junction 15a of the M1 just North-west of Milton Malsor, in connection with the development of a strategic rail freight interchange. To serve broad purposes in the early stages of project option appraisal, planning and design - and also to identify potential requirements for further survey – it describes the principal habitat types in the area and scopes their suitability for protected species.

[Other junction improvements will require small areas of land-take and separate scoping surveys will be necessary at these locations.]

The locations of the Main SRFI Site and the Junction 15a Site are shown in ***Figure B1.1 & B1.2***. Central Ordnance Survey Grid References are SP 73363 54488 for the Main SRFI Site and SP 72700 57162 for Junction 15a.

Each section of this document has been split to cover the Main SRFI Site, Junction 15a, and Other Junction Improvements.

Ecological Context

Main SRFI Site

The Main SRFI site occupies gently undulating land on more-or-less neutral loams south of Milton Malsor in Northamptonshire. Like the surrounding area the site has an intensively farmed landscape with most fields under arable or improved grass in approximately equal proportions. A few fields in the south-western part of the site have semi-improved (or perhaps unimproved) agricultural grassland. Boundaries are mostly marked by species-poor *Crataegus monogyna* (Hawthorn) hedges, many of which have large ditches or small streams.

The village of Milton Malsor lies to the north of the site and there are houses, commercial premises and light industrial premises along Towcester Road which bisects the site from north to south. There is also an industrial estate adjacent to the north-western corner of the site. Otherwise, there are scattered houses, farms and plant nurseries in the local vicinity, as well as a disused dual-carriageway service area. Railways largely bound the site to the east and the south, and the A43 dual-carriageway main road bounds the site to the east; all of these actually have some parts of the site lying beyond them. Adjacent to the south-western corner of the site is the canal and marina complex of Blisworth junction, and towpaths border the site in some locations.

Junction 15a

The junction 15a site is located slightly to the north-west of the main site. The centre of the site is covered by the M1, A43 and associated services. These are immediately bordered by roadside verges and mixed planted trees to form screens for the roads. This site comprises mostly a mixture of arable field and pasture land border by hedgerows and scattered mature trees. The Grand Union canal runs north to south through the middle of the site and is surrounded by tree rows and areas of swamp and wet scrub. The rest of the site and landscape to the South and East is dominated by both pastoral, grazed by sheep and horses, and arable land, and the village of Milton Malsor is situated just to the South-east of the site. The landscape to the West of the site is dominated by large areas of industrial estate and large swathes of suburban housing are found to the North, which form the outskirts of Northampton.

Other Junction Improvements

[There are 8 additional junctions in the surrounding area which will be subject to improvement works to facilitate improved access and traffic flow to and around the site. Further details of these junction works will be added as more information and plans are made available.]

Structure of this Report

The remainder of this report is structured as follows:

- *Section 2* describes the survey and assessment methods;
- *Section 3* presents the survey results;
- *Section 4* evaluates the results; and
- *Section 5* lists the references;

Appendix A provides tables of botanical data (grouped together);
Appendix B provides target notes in relation to *Figure B2.1;*
Appendix C lists the relevant protected species legislation; and
Appendix D provides the figures

2 METHODS

Main Site

Surveys of the Main SRFI site were undertaken on the 23 and 24 March 2015; and 7-10 March 2016, by experienced RSK ecologists David Coote, Jan Skuriat, and Richard Carter. Further visits were made incidentally during hedgerow surveys in summer 2016, and during further wlakover surveys in summer 2017 by Richard Carter and Jan Skuriat.

The majority of the habitat mapping and botanical recording on the Main SRFI Site was carried out by RSK Director Dr Richard Carter. He is an expert botanist with over 25 years' consultancy experience, a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM), and a Chartered Environmentalist. He is also a visiting lecturer in vegetation studies at the University of Reading and a Botanical Society of Britain and Ireland (BSBI) vice-county recorder and taxonomic referee.

Junction 15a

Surveys of the junction 15a site were carried out on 3 and 26 April and 26 June 2017 by experienced RSK Principal Ecologist Jan Skuriat.

Jan has over 15 years' experience in ecological consultancy and holds Natural England licenses for several species. He is a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM).

Other Junction Improvements

[Surveys of the additional other junction improvements are yet to be carried out, but will follow the same methods outlined below.]

General

So far as access permissions allowed, habitat survey was carried out within the survey area and any immediately adjacent areas if possible.
Refer to the stand-alone Background Data Search reports (January 2018) (*Annex A*) for supporting information regarding nearby statutory designated sites of nature conservation importance, non-statutory (local) sites of nature conservation interest, and records of protected and notable species.

Extended Phase 1 Habitat Survey

The habitat survey was based on the Phase 1 Habitat Survey approach (Joint Nature Conservation Committee 2010) as extended for use in Environmental Impact Assessments (Institute of Environmental Assessment 1995). This involves the following elements:

- Habitat mapping using a set of standard colour codes to indicate habitat types on a Phase 1 Habitat Map (see *Figure B2.1 & B2.2*); and

- Description of features of possible ecological or nature conservation interest in notes relating to numbered locations on the Phase 1 Habitat Map, called 'Target Notes'. These are provided in *Appendix B*.

Due to the total size (area) of the sites this report focuses exclusively on features of botanical interest and habitats present rather than the suitability of the site for specific animal species groups. Specific 'Animal Notes' are therefore not included in the Target Notes on the map (*Figure B2.1 & B2.2*). The suitability of particular habitats for animal species is discussed in this report, but for full details regarding specific species groups the reader should refer to *Annexes E – M*.

Basic Phase 1 Habitat Survey methods are described in detail in Joint Nature Conservation Committee (JNCC 2010). Limits to the achievable reliability of the method are discussed in Cherrill & McClean (1999). A list of plant species (see *Appendix A*) was compiled while walking around the site **(though some parts of the J15a site were not accessible)**. This gives an indication of the botanical character of the site, but by no means should this list be considered exhaustive. Subjective estimates of the relative abundance of species were added to the plant species list using a modified DAFOR scale. This ranks species according to their relative abundance in a given parcel of land as: d – dominant, a – abundant, f – frequent, o – occasional, r – rare. In addition, the following prefixes are used: l – locally, v – very. The terms 'abundant' and 'rare' are used by convention, and apply only to relative-abundance within the recorded area. It does not mean that species are 'rare' in the district or the UK at large.

Nomenclature

Plant nomenclature in this report follows Stace (2010) for native and naturalised species of vascular plant. Introduced species and garden varieties were identified using the relevant texts. Plant names in the text are given with English names first, followed by the scientific name in brackets. Where applicable, doubtful identifications are preceded by 'cf.' placed before the specific epithet where the plant is very probably the species indicated, but it is impossible to distinguish it from similar members of the genus with certainty. Nomenclature for any mosses and liverworts follow Hill et al. (2008). Names of National Vegetation Classification (NVC) communities and sub-communities follow Rodwell (1991, 1992, 2000).

Invasive Plant Species

The presence of invasive plant species listed on Schedule 9 of The Wildlife and Countryside Act 1981 (as amended) was also noted, if apparent, such as Japanese knotweed (*Fallopia japonica*), giant hogweed (*Heracleum mantegazzianum*), Indian balsam (*Impatiens glandulifera*) and some *Cotoneaster* species. Note that the extended Phase 1 survey did not constitute a full survey for invasive plant species.

Considerations

Constraints

Many of the hedges on the Main SRFI Site had been recently trimmed making the woody species almost impossible to assess, at least comprehensively. Again woody species are likely to be overlooked in a March walkover survey of the Phase 1 kind (though they could be recorded in a painstaking survey). Broad conclusions about the generality of the hedges are likely to be correct, but some dismissed here as species-poor could turn out on closer inspection to be of greater nature conservation value than appeared.

Note, as above, that access for survey was not available in some areas of the site in 2015 and 2016, and two areas remained inaccessible in 2017 (see *Figure B2.1 & 2.2*).

Further Surveys

Further plant species listing and more detailed surveys of key habitats of both the Main SRFI Site and Junction 15a were carried out between April - July 2017, **[although surveys are still on-going at the Junction 15a Site]**. These surveys focused especially on grassland, using the methods of the National Vegetation Classification (NVC).

Main SRFI Site

A specific walkover was carried out between 24 - 25 April 2017, and 27 - 29 June 2017 to assess the botanical importance of the stream that runs through the Main SRFI Site.

Junction 15a

A detailed survey of the wet area adjacent to the canal was undertaken on 25 May 2017, to establish the botanical significance of this area. The results of all further botanical surveys beyond the scope of Phase 1 will be reported in separate Annexed reports.

Habitat Assessment for Protected Vertebrates

General

The sites were assessed for their suitability for protected vertebrate species. Taking into account the location of the proposed route and the habitats alongside it, assessments were made for the likelihood of:

- Badgers;
- Bats (foraging and roosting);
- Dormice;
- Great Crested Newts (and other amphibians);
- nesting birds;
- Otter and Water Vole;
- reptiles; and
- White-Clawed Crayfish;

Further details of the assessment methods are given below. Methods for all species can be considered the same for all three areas; the Main SRFI Site, Junction 15a, and other junctions.

Badger

An initial assessment of the site and immediately surrounding areas was carried out to identify badger (*Meles meles*) activity, including commuting, foraging and sett-building. Field signs of badgers that may indicate their presence nearby include setts, tracks, footprints, hair on barbed wire fences, feeding signs and dung pits.

Badgers can occupy a range of habitats, including woodland, pasture, arable fields and suburban gardens, as well as disused ground and embankments along railway lines and water courses.

Bats

The habitats on each site were assessed for their general suitability for roosting, foraging and commuting bats. Different bat species have different roost preferences and habitat niches, but generally they roost in trees, buildings and other structures, and forage and commute within woodland, along tree lines, watercourses and hedgerows, as well as over water features, scrub and grassland, especially in sheltered areas or where the grassland is species-rich or rough.

Dormouse

The habitats on each site were assessed for their suitability for dormouse (*Muscardinus avellanarius*). This involved consideration of a number of factors including the presence of historic records of dormice, habitat fragmentation, the geographical location of the site, the habitat structure and the presence of plant species favoured by dormice such as hazel (*Corylus avellana*l) and honeysuckle (*Lonicera*) species. Dormice generally use areas of dense woody vegetation cover, and are more likely to be found where there is a wide diversity of woody species contributing to three-dimensional habitat complexity, a number of food sources, plants suitable for nest-building material, and good connectivity to other areas of suitable habitat. The greatest numbers of dormice can be found in the south and west; to the north and particularly the north-east the numbers of sites occupied by populations of dormice diminish. Habitat fragmentation plays a role in a site's suitability as dormice are reluctant to cross open ground. As a result, sites with lots of features such as roads, railways and canals or rivers are less suitable for this species.

Great Crested Newt (and other amphibians)

Aquatic habitats on and within 500m of each site were assessed for their suitability for amphibians, particularly great crested newts (*Triturus cristatus*), where access was available. Although standing water is essential for their breeding, great crested newts are terrestrial for most of the year and can often be found up to 500m from their breeding ponds. Therefore, terrestrial habitat within 500m of a suitable pond was also assessed during the field surveys, particularly any habitat-connectivity between suitable bodies of water.

Suitable terrestrial habitats for great crested newts usually comprise woodland, scrub and rough and tussocky grassland, although they can be found in a broad range of sub-optimal habitats as well.

Nesting Birds

The potential value of habitats within each site for use by nesting birds was assessed taking account of a range of factors including:

- habitat types and features present;
- potential food sources and nesting sites (including presence of nests);
- diversity and interrelations between habitats;
- management practices; and
- disturbance.

Birds nest in a wide variety of habitats including scrub, woodland, hedgerows and trees, as well as on open ground. Therefore, this assessment considered the relative potential value of habitats in relation to typical species assemblages and key species, in particular 'Species of Principal Importance' (SoPI) under *The Natural Environment and Rural Communities (NERC) Act* (2006), *Birds of Conservation Concern* (Eaton *et. al*, 2015) and those protected under *Schedule 1 of The Wildlife and Countryside Act* 1981 (as amended).

Otter and Water Vole

Otter

An initial assessment was made of the habitats on each site for their suitability for otter (*Lutra lutra*). This elusive species is typically, although not exclusively, associated with riparian habitats such as watercourses, water bodies, areas of wetland and their adjacent habitats. The field surveys included a basic assessment of water depth, water quality, abundance of vegetation and cover, and whether these may create suitable habitat for commuting, foraging or sheltering otters. They use aquatic linear habitats such as rivers streams, canals, and ditches to access the wider environment. They are largely dependent on fish as prey but will eat a wide range of other species including anything from invertebrates such as crayfish species to birds and small mammals. Otter territories are large with male otters ranging up to 10km in sub-optimal habitat. Otter signs include footprints and slides, feeding remains, holts and couches (resting places) and spraint (droppings).

Water Vole

Habitat was assessed for water vole (*Arvicola amphibius*) according to subjective criteria, which were then used to categorise habitat according to suitability for the species. The following habitat factors are taken into consideration:

- water quality;
- water-level regime;
- channel dimensions;

- bank type and material;
- vegetation for cover and food sources;
- shading;
- predation and competition; and
- habitat management.

Classification of habitat suitability was made as follows.

- Suitable – habitat that has all the elements required for water voles certainly in the summer, and probably through most winters.
- Suitable (Sub-optimal) – habitat that has some of the habitat features that are suitable for water vole, but with some constraints so that suitability throughout the year is not certain.
- Unsuitable – habitat lacking one or more crucial element for use by water voles. This category does not necessarily preclude the habitat being used by commuting water voles, but it would not be able to support a resident population.

As part of the extended Phase 1 survey water vole field signs were sought including: burrows; feeding platforms and evidence of feeding; food remains; latrines and footprints.

Reptiles

Each site was also assessed for its potential for one or more of the four 'common' reptile species – see below - with particular attention paid to those features that may provide suitable basking areas in warmer weather (e.g. south-facing slopes), refugia for hibernation in colder weather (e.g. banks, walls, piles of rotting vegetation) and opportunities for foraging (e.g. rough grassland and scrub).

Although their specific habitat requirements differ, sites were assessed for their general suitability to support: common lizard (*Zootoca vivipara*), slow-worm (*Anguis fragilis*), grass snake (*Natrix natrix*) and adder (*Vipera berus*). Common lizards use a variety of habitats from woodland glades to walls and pastures, although one of their favoured habitats is rough grassland. slow-worms use similar habitats to common lizards, and are often found in rank grassland, gardens and derelict land. Grass snakes have broadly similar requirements to common lizards with a greater reliance on ponds and wetlands, where they prey on common frogs (*Rana temporaria*). Adders use a range of fairly open habitats with some cover, but are most often found in dry heath (Beebee & Griffiths 2000).

White-Clawed Crayfish

All aquatic habitat on each site was initially assessed with regard to its suitability for White-Clawed Crayfish (*Austropotamobius pallipes*). This included a small stream on the Main SRFI Site (Milton Malsor Brook). In particular, this included consideration of the following features within watercourses: water depth, water flow (crayfish are absent if there is very fast flow), water cleanliness, trophic state, and the suitability of the substrate within the channel for crayfish (e.g. whether there are refuges etc.).

3 RESULTS

Habitats

Main SRFI Site

The habitat types and target notes are mapped in *Figure B2.1.* A plant species list is given in *Appendix A* and the detail of the habitat description summarised here is given in the form of target notes in *Appendix B*. The site contains the following broad habitat and vegetation types:

- arable fields;
- improved agricultural grassland;
- semi-improved or perhaps unimproved neutral agricultural grassland;
- rough grassland;
- amenity-turf;
- broad-leaved woodland;
- broad-leaved semi-natural woodland, probably of plantation origin;
- recent broad-leaved plantation woodland;
- scrub and incipient secondary woodland;
- scattered broad-leaved and coniferous trees;
- hedgerows;
- nettle-bed and other tall ruderal vegetation;
- ephemeral vegetation;
- streams;
- ditches and dry ditches; and
- ponds.

Arable Farmland

Arable farmland is the dominant habitat on the site. There may well be arable weed vegetation types in field corners, but they were little developed in March.

Improved agricultural grassland strongly dominated by the grass *Lolium perenne* (Perennial Rye-grass) together with *Trifolium repens* (White Clover) and referable to the NVC type **MG7a *Lolium perenne* leys and related grasslands, *Lolium perenne-Trifolium repens* leys** is widespread on the site. JNCC (2010) permits this to be mapped as arable; here it is mapped as improved grassland where the sward seems well established, and as arable where it looked recently sown at the time of the survey,

but this should be interpreted with circumspection as it is very subjective, and arable and improved grassland are likely to be interchangeable crops in any given field.

Amenity-turf is very scarce within the survey area, but was recorded in a few places.

Semi-improved Grassland

Semi-improved grassland containing *Lolium perenne* (Perennial Rye-grass) together with other grasses including *Agrostis capillaris* (Common Bent), *Festuca rubra* (Red Fescue) and *Holcus lanatus* (Yorkshire-fog) and common grassland forbs including *Cerastium fontanum* (Common Mouse-ear), *Ranunculus repens* (Creeping Buttercup) and *Trifolium repens* (White Clover) is frequent mostly in the south-western part of the survey area (including *Target Notes 64*, *68*, *72*, *74*, *77*, *90*, *91*, *94* and *121, Figure B2.1*). The swards are probably referable to the NVC type **MG6a *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community** but they were hard to assess in March and some lacked permission for access, so that other NVC types of greater nature conservation value could be present.

In a few places such as fields at *Target Notes 76* and *121* (*Figure B2.1*) swards of this kind have grown rank and tussocky and feature grasses such as *Deschampsia cespitosa* (Tufted Hair-grass) and taller grassland forbs such as *Centuarea debeauxii* (Chalk Knapweed).

Rough grassland and Nettle-bed Vegetation

Rough grassland on road verges tends to be dominated by the grasses *Arrhenatherum elatius* (False Oat-grass), *Dactylis glomerata* (Cock's-foot) and *Elytrigia repens* (Common Couch) occasionally with *Schedonorus arundinaceus* (Tall Fescue) in the eastern part of the survey area. Grassland forbs such as *Ranunculus repens* (Creeping Buttercup) and *Vicia sativa* ssp. *segetalis* (Common Vetch) are scattered, while tall semi-ruderal herbs are frequent, especially *Urtica dioica* (Common Nettle). The swards are referable to the NVC type **MG1a *Arrhenatherum elatius* grassland, *Festuca rubra* sub-community** or – more commonly – where the tall semi-ruderal herbs rise to prominence to **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community**. Where the tall semi-ruderal herbs become dominant there is a transition to nettle-bed vegetation referable to the NVC type **OV24a *Urtica dioica-Galium aparine* community, typical sub-community**. These NVC types commonly occur in mosaic and transition with one another.

Pure stands of *Galium aparine* (Cleavers) and *Urtica dioica* (Common Nettle) referable to OV24a often occur on their own in field corners too. In such situations they are often highly eutrophic, and then *Conium maculatum* (Hemlock) is often abundant. Again these stands often contain scattered *Rubus fruticosus* agg. (Bramble) and as this rises to prominence there is a transition from OV24a (or MG1b) to **OV24b *Urtica dioica-***

***Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* sub-community** and with further increase in the *Rubus fruticosus* agg. (Bramble) to the point of dominance there is an ongoing transition from OV24b to **W24a *Rubus fruticosus-Holcus lanatus* underscrub, *Cirsium arvense-Cirsium vulgare* sub-community**. This kind of mosaic and transition is common on the railways bounding the site where there may also be tall-herb vegetation containing *Chamerion angustifolium* (Rosebay Willowherb) referable to the NVC type **OV27b *Epilobium angustifolium* community, *Urtica dioica-Cirsium arvense* sub-community** which in the survey area is confined to the railways.

Scrub and Woodland

Thorn scrub variously consisting of *Crataegus monogyna* (Hawthorn), *Prunus spinosa* (Blackthorn) and *Sambucus nigra* (Elder) occurs in several places, most extensively on the railway embankments, but also around field corner pits and ponds. It is mostly referable to the NVC types **W21a *Crataegus monogyna-Hedera helix* scrub, *Hedera helix-Urtica dioica* sub-community** or **W22a *Prunus spinosa-Rubus fruticosus* scrub, *Hedera helix-Silene dioica* sub-community** but more ruderal scrub may be referable to the proposed NVC type ***Sambucus nigra-Urtica dioica* community** (Rodwell *et al.* 2000).

Secondary woodland is very scarce and confined to roadside strips or areas where there was no permission for access. Such as was seen mostly consists of *Acer pseudoplatanus* (Sycamore) and *Fraxinus excelsior* (Ash) with common shade-tolerant plants in the field-layer. Owing to its fragmentary character its NVC affinities would be hard to assess.

The banks of the A43 dual-carriageway main road have planted woodland mostly consisting of *Acer campestre* (Field Maple) and *Salix* cf. ×*fragilis* (Crack Willow) though other species are almost certainly present (hard to assess without access in March).

Hedges

Nearly all hedges in the survey area are species-poor hedges of *Crataegus monogyna* (Hawthorn) with small amounts of *Sambucus nigra* (Elder). Only a few have other species, mainly *Prunus spinosa* (Blackthorn), *Rosa canina* (Dog-rose) and *Ulmus procera* (English Elm). Most of the hedges are trimmed but some have grown tall. Many have ditches but few have appreciable banks.

A few hedges, mostly close to Towcester Road, are more species-rich and do qualify as Important Hedges under *The Hedgerows Regulations 1997*. Full details of hedges are given in the Hedge Survey Report (December 2016) (See *Annex D* Hedgerow Survey).

Ditches, Streams and Ponds

Many hedgerows and other field boundaries have large ditches or small streams with flowing water. Where they are wooded the banks may have shade-tolerant species such as *Alliaria petiolata* (Garlic Mustard), *Arum maculatum* (Lords-and-Ladies) and *Geum urbanum* (Wood Avens), but more often they have rough grassland referable to the NVC type **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community** or nettle-bed vegetation referable to the NVC type **OV24a *Urtica dioica-Galium aparine* community, typical sub-community** or **OV24b *Urtica dioica-Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* sub-community**. Where the nettle-bed vegetation includes *Epilobium hirsutum* (Great Willowherb) it may be referable to the NVC type **OV26e *Epilobium angustifolium* community, *Urtica dioica-Cirsium arvense* sub-community**.

Fragmentary aquatic vegetation mostly consists of rooted and emergent aquatics. Where these are relatively small species including the grass *Glyceria fluitans* (Floating Sweet-grass) and broad-leaved herbs including *Apium nodiflorum* (Fool's Water-cress), *Myosotis scorpioides* (Water Forget-me-not), *Nasturtium officinale* (Water-cress) and *Veronica beccabunga* (Brooklime) the vegetation may be loosely referable to the NVC type **S23 Other water margin vegetation**. Elsewhere taller grasses including *Phalaris arundinacea* (Reed Canary-grass) and *Phragmites australis* (Common Reed) may lead to other communities but they are fragmentary and scarce.

The very few ponds in the survey area have rather similar aquatic vegetation but it tends to feature more shade-tolerant species as all the pond are surrounded by scrub.

Other Habitats

In a few places, brick structures – mainly blue-brick structures along the railways and the canals – have a species-rich assemblage of plants growing from cracks. Mostly these are just outside the site boundary or part of the railway infrastructure. Species present include the ferns *Asplenium adiantum-nigrum* (Black Spleenwort), *Asplenium ruta-muraria* (Wall-rue), *Asplenium trichomanes* (Maidenhair Spleenwort) and *Asplenium scolopendrium* (Hart's-tongue). Others are the grass *Poa angustifolia* (Narrow-leaved Meadow-grass) and broad-leaved herbs including *Fragaria vesca* (Wild Strawberry) and *Inula conyzae* (Ploughman's-spikenard).

There must be assemblages of ruderals but these would not have been well-developed in March. The disused A43 service area may be especially rich.

Junction 15a

The habitat types and target notes are mapped in *Figure B2.2.* A plant species list is given in *Appendix A* **[yet to be completed as surveys are still ongoing]** and the detail of the

habitat description summarised here is given in the form of Target Notes in *Appendix B*.
The site contains the following broad habitat and vegetation types:

The following habitats are present on the site:

- Amenity grassland
- Arable Land with improved grassland
- Canal and Associated Vegetation
- Hedgerows;
- Marshy grassland/ Tall herb swamp
- Mixed plantation woodland;
- Planted Shrubs;
- Rough grassland;
- Running Water;
- Scrub; and
- Tall ruderals.

Amenity Grassland

Amenity grassland occurs adjacent to the towpath of the canal, which runs north-south through the site. This habitat is intensively managed by mowing and contains a range of common grasses, including Creeping Bent (*Agrostis stolonifera*), Cock's foot (*Dactylis glomerata*), and Red Fescue (*Festuca rubra*). Herbs include those typical of moist eutrophic conditions including Ground-elder (*Aegopodium podagraria*), Daisy (*Bellis perennis*), Meadowsweet (*Filipendula ulmaria*), and Creeping Buttercup (*Ranunculus repens*).

Arable Farmland with Improved Grassland

This habitat can be found in relatively large parcels located to the east and west of the site. The field to the west has been planted with a bio fuel crop with *Miscanthus ×giganteus* (Giant Miscanthus). The crop had been harvested several days before the survey ready for subsequent re-growth. There are a number of weed species present including both grasses and herbs. Grasses include *Agrostis capillaris* (Common Bent), and *Poa trivialis* (Rough Meadow-grass) and the gramminoid *Juncus inflexus* (Hard Rush). Herbs include typical agricultural weeds and common grassland forbs. Weedy species include *Arctium minus* (Lesser Burdock), and *Helminthotheca echioides* (Bristly Ox-tongue). Species more typical of grasslands include *Cerastium fontanum* (Common Mouse-ear), and *Leucanthemum vulgare* (Oxeye Daisy).

The parcel along the east of the site follows the A43 and consists of fallow/ stubble fields, with some rank herb species including *Rumex acetosa* (Common Sorrel) and *Rumex obtusifolius* (Broad-leaved Dock). The northern section is sheep-grazed grassland dominated by *Lolium perenne* (Perennial Rye-grass), with a modest range of other grasses and grassland forbs at low levels of abundance.

Canal and Associated Vegetation

The water in the canal was slightly turbid probably due to suspended fine sediment and algae. There is a slight flow which can be seen most clearly at the canal locks. In paces the banks are hard lined (generally no more than 0.3 m high) and backfilled with earth. The channel was clear of vegetation, but in pounds towards the north there are extensive and zoned stands of water-margin vegetation. The bank tops are covered in amenity grassland as described in the Target Note 301 *(Figure B2.2)*. The habitat is suitable for Otter and offers some suitability for Freshwater White-clawed Crayfish (*Austropotamobius pallipes*), although canals are better associated with non-native Signal crayfish *(Pacifastacus leniusculus).*

Water margin vegetation in the canal includes a mixture of graminoids and tall herbs. Gramminoids include *Carex riparia* (Greater Pond-sedge), *Glyceria maxima* (Reed Sweet-grass) and *Phalaris arundinacea* (Reed Canary-grass). Tall herbs include *Epilobium hirsutum* (Great Willowherb), *Filipendula ulmaria* (Meadowsweet), and *Heracleum sphondylium* (Hogweed). The habitat at the canal margins is suitable for some reptile species, such as Grass Snake, and Water Voles.

Hedgerows

There are species-poor hedgerows alongside the A43 and the canal, as well as parts of the arable field to the west. All are dominated by *Crataegus monogyna* (Hawthorn) and to a lesser extent *Prunus spinosa* (Blackthorn) in most cases. A small number of other species were also observed. *Fraxinus excelsior* (Ash) trees were patchily distributed along the length of some hedges. Those hedges growing adjacent to the road are of relatively recent origin and were likely to have been planted following road works.

Marshy Grassland/ Tall Herb Swamp

There is an area of tall-herb swamp and scrub – a Potential Wildlife Site (PWS) - between the canal and the arable field to the west. The scrub lies in the northern part, where it is dominated by *Salix cinerea* (Grey Willow) together with other willows, *e.g. Salix fragilis* (Crack-willow). There swamp is mostly strongly dominated by tall herbs, especially *Epilobium hirsutum* (Great Willowherb), *Angelica sylvestris* (Wild Angelica) and *Filipendula ulmaria* (Meadowsweet). Locally there are clonal patches of tall graminoids such as *Carex riparia* (Greater Pond-sedge), *Glyceria maxima* (Reed Sweet-grass, *Phalaris arundinacea* (Reed Canary-grass) and *Typha latifolia* (Bulrush), probably in wetter depressions. The rushes *Juncus inflexus* (Hard Rush) and *Juncus effusus* (Soft-rush) are scattered throughout and become abundant in the drier places, and the grass *Poa trivialis* (Rough Meadow-grass) has a similar role. Towards the west the ground is probably marginally drier and tall semi-ruderal herbs, especially *Cirsium arvense* (Creeping Thistle) and *Urtica dioica* (Common Nettle) occur in association with the species described above, , *Phalaris arundinacea* (Reed Canary-grass) and *Typha latifolia* (Bulrush) in smaller patches. This vegetation grades into the a large stand of *Chamerion angustifolium* (Rosebay Willowherb) on drier land.

Mixed plantation woodland

There is a small area of woodland adjacent to the canal and tall herb swamp. This woodland is of recent origin with self sown *Fraxinus excelsior* (Ash) trees to 12 m tall. There are a limited number of tree species mainly *Fraxinus excelsior* (Ash), infrequent *Sambucus nigra* (Elder) and a single *Quercus robur* (Pedunculate Oak). The field layer is mostly grassy and dominated by *Poa trivialis* (Rough Meadow-grass), though in places it floods and species such as *Iris pseudacorus* (Yellow Iris) are abundant. Other species present are typically shade tolerant and include *Angelica sylvestris* (Wild Angelica), *Arum maculatum* (Lords-and-Ladies), and *Glechoma hederacea* (Ground-ivy).

There is a double row of planted trees along the northern edge of the arable field to the west of the site, which includes *Pinus sylvestris* (Scots Pine), and shrub species cut as a hedge on one side. Other woody species include *Crataegus monogyna* (Hawthorn), *Sambucus nigra* (Elder), *Ulmus procera* (English Elm). There are tall herbs, many of which are resistant to Rabbit grazing and include *Bryonia dioica* (White Bryony), *Cirsium arvense* (Creeping Thistle), and *Conium maculatum* (Hemlock).

Planted Shrubs

Amenity planting of native shrubs occurs in small parcels across the site, including on the slip road, the roundabout, and at the edges of the western arable field. It includes species such as *Acer campestre* (Field Maple), *Corylus avellana* (Hazel), *Crataegus monogyna* (Hawthorn) and *Rosa canina* (Dog-rose)

Rough grassland

Rough grassland exists along both sides of the canal and on the A43 roundabout. Alongside the canal the grassland is infrequently mown and in places is a mosaic of tall herbs with semi-improved grassland. It has a tussocky appearance and contains a range of coarse grasses and herbs, including some with an aquatic habitat preference. Grasses include Agrostis stolonifera (Creeping Bent), Dactylis glomerata (Cock's-foot), Deschampsia cespitosa (Tufted Hair-grass), *Arrhenatherum elatius* (False Oat-grass) and Poa trivialis (Rough Meadow-grass).

Herbs on the western bank of the canal include those typical of damp conditions such as *Angelica sylvestris* (Wild Angelica), *Tussilago farfara* (Colt's-foot) and *Scrophularia nodosa* (Common Figwort), as well as more typical grassland species such as *Centaurea debeauxii* (Chalk knapweed). The tall gramminoid *Carex riparia* (Greater Pond-sedge), is also present.

On the eastern bank of the canal herbs include *Glechoma hederacea* (Ground-ivy), *Myosotis arvensis* (Field Forget-me-not) and *Potentilla reptans* (Creeping Cinquefoil). There are also areas of vegetation influenced by damp soil conditions with infrequent *Carex riparia* (Greater Pond-sedge), *Dactylorhiza fuchsii* (Common Spotted-orchid) and *Stellaria graminea* (Lesser Stitchwort).

The grassland on the road verge contains a mixture of grasses, herbs and incipient scrub. There are a few halophytes present probably as a result of salt spreading in the winter.

Running Water

There is a wet ditch along the southern edge of the area containing tall-herb swamp habitat. It is 1 m wide at water level and runs in a channel that is approximately 0.5 m deep with steep earth banks. The water depth throughout is 0.3 m. The water is static and loaded with suspended organic matter. There are no aquatic specialist plants and the banks are shaded by trees and shrubs including *Crataegus monogyna* (Hawthorn), and *Fraxinus excelsior* (Ash).

A second wet ditch is situated at the northern edge of the same habitat area. It is 1 m wide at water level and runs in a channel that is 0.5 m deep with steep earth banks. The water depth throughout is 0.3 m. The water is static and loaded with suspended organic matter. There are no aquatic specialist plants and the banks are shaded by trees and shrubs including *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash) *Sambucus nigra* (Elder) and *Salix cinerea* (Grey Willow).

A brook runs along the western edge of the area containing tall herb swamp habitat. It is 1.5 m wide at water level and runs in a channel 2 m deep with steep earth banks, The water depth throughout is 0.3 m. The channel substrate was comprised predominantly of pebbles, cobbles and silt. Trees and shrubs shade the water and include *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash) and *Salix cinerea* (Grey Willow). Aquatic plants are limited to *Apium nodiflorum* (Fool's Water-cress) whilst the banks are dominated by *Urtica dioica* (Common Nettle).

Scrub

This habitat is located in patches across the site within the grassland, swamp, and areas of tall herbs, but most notably adjacent to the slip-road from the A43 to the M1. The scrub areas are dominated by *Salix cinerea* (Grey Willow) and *Crataegus monogyna* (Hawthorn), with young *Salix cinerea* (Grey Willow) invading in places, and *Rubus fruticosus* agg. (Bramble) at the fringes.

Tall Ruderals

Tall herb vegetation is growing in a small field east of the canal at *Target Note 305 (Figure B2.2)*, and at the edge of the arable field at *Target Note 332 (Figure B2.2).* It is dominated by a limited number of tall herbs which grow over a layer of bryophytes. The tall herbs include dominant *Conium maculatum* (Hemlock), *Arctium minus* (Lesser Burdock), and *Epilobium hirsutum* (Great Willowherb). Other herbaceous species in lower levels of abundance include *Calystegia sepium* (Hedge Bindweed), *Dipsacus fullonum* (Teasel), *Galium aparine* (Cleavers) and *Scrophularia nodosa* (Common Figwort). Mosses are dominant at ground level and include *Brachythecium rutabulum* and *Kindbergia praelonga*. There are scattered small bushes of *Rosa canina* (Dog-rose) and tufts of the rush *Juncus effusus* (Soft-rush).

Assessment for Protected Species

Badger

Main SRFI Site

No evidence of Badger setts was recorded within the accessible areas of the site.

One potential sett was noted in woodland adjacent to the north of Towcester Road. This consisted of a hole within a steep bank, with a sizeable spoil heap. As access was not available to this area, it was not possible to inspect it to determine if the hole is used by Badgers. A previous survey of parts of the site had also identified a possible sett in an area of scrub and gardens to the west of Towcester Road. This area was also not accessible, although there was no evidence of a likely sett, such as trackways, apparent within the adjacent accessible areas of the site.

One possible 'push-through' was recorded under the railway fence to the south of the site at the location of a culvert under the rail line. There was no evidence of Badgers, such as hairs, prints or latrines, but the hole under the fence is of an appropriate size for a Badger and a faint trackway was present. It is possible that Badgers use the culvert to cross under the rail line to access the site for occasional foraging.

Although no evidence of badgers was recorded, the habitats present are suitable to provide foraging resources, particularly seasonally where ripe grain or maize are available and more consistently in rough grass margins and areas of woodland and scrub.

Junction 15a

Field signs of Badger were noted during walkover surveys at this site. A disused sett of approximately six holes was noted adjacent to the brook within the rush pasture habitat, and a footprint was identified on the far bank of this brook. Suitable foraging habitat is present at this site, including the areas of scrub, woodland and running water.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

Bats

Main SRFI Site

There are a number of buildings within the site. The majority of the agricultural buildings are of negligible suitability for roosting bats, but there are houses and older farm buildings that have potential to support roosts.

The network of hedgerows and field margins on the site is suitable for commuting and foraging bats, as are the small watercourses within the site and the Grand Union Canal to

the west. There are also a number of mature hedgerow trees on the site that provide roosting opportunities for bats in splits, holes and under flaking bark.

These habitats are all interconnected and may also connect suitable habitats off-site.

Junction 15a

There are no buildings present on this site, however the three highways bridges which cross the canal potentially offer roosting potential for bats; one of these, the A43 (north of the M1), will be directly impacted by the development.

The site provides good commuting and foraging habitat for all bat species, in the form of woodland, hedgerows and watercourses. The tall herb swamp is also likely to be a good resource as it almost certainly attracts a large range and number of insect species.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

Dormouse

Main SRFI Site

There are no historic records of Dormice using the site and it is generally unsuitable for Dormice. The density of sites used by Dormice in the geographical region is low so the chance of Dormice being present is low, especially considering the poor quality of woody habitats on site and its relative isolation within the wider landscape.

There is very little woodland and scrub present on the site and woody vegetation is largely limited to species-poor hawthorn hedges, many of which are cut on an annual basis to limit their spread; as Dormice are largely arboreal, species-poor hedges that are regularly cut make poor Dormouse habitat. The site is now largely surrounded by significant habitat barriers to the movement of Dormice, such as the A43, other roads, a canal and railway lines, and therefore colonisation is unlikely.

Junction 15a

There are no historic records of Dormice using the site and although it provides a pocket of good habitat it is poorly connected to the wider habitat, which is of poor quality for Dormice. There are limited woody or scrub habitats outside the boundary of the site and Dormice would be limited in their options for dispersal or initial immigration to the site.

The density of sites used by Dormice in the geographical region is low and thus the chance of Dormice being present is low. The site is surrounded by significant habitat barriers to the movement of Dormice, such as the A43, the M1, and the canal, and therefore colonisation is considered unlikely.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

Great Crested Newt (and other amphibians)

Main SRFI Site

Pond Scoping Assessment

There are a number of ponds and ditches within the site boundary and several within approximately 500m of the site boundary that were identified as having potential to support Great Crested Newts. Other streams and ditches within the site were either flowing or dry and therefore deemed unsuitable. The locations of these are shown on *Figure B3.1*.

Great Crested Newts have been recorded within 2km of the site.

Habitat Suitability Assessment

The results of the assessments of these water bodies for their suitability for Great Crested Newts are summarised in *Table 1.*

Table B1: Main SRFI Site: Habitat Suitability Assessment of water bodies for Great Crested Newts

Pond Number	Suitability
1	Below Average
2	Average
3	Below Average
4	Average
7	Below Average
8	Poor
10	Poor
11	Average
13	Average
14	Average

Terrestrial Habitats

The arable farmland dominating the site provides poor habitat for great crested newts, however, suitable habitats are present in field margins, hedgerows and areas of rough grassland, scrub, woodland and ruderal vegetation. If Great Crested Newts are present in water bodies, it is likely that they will use suitable terrestrial habitats within up to 500m.

Junction 15a

Pond Scoping Assessment

There are a number of wet ditches within the boundary of the site, and three ponds, plus a large lake, within 500m. All of the ponds considered for their suitability for Great crested Newts were either behind major barriers to Newt movement such as a river or major highway, or were dry at the time of survey, which makes them unsuitable for Great Crested Newts. Access permission was not granted to survey one of the ponds.

Great Crested Newts have been recorded within 2km of the site.

Habitat Suitability Assessment

The results of the assessments of these water bodies for their suitability for Great Crested Newts are summarised in *Table B2.*

Table B2: Junction 15a: Habitat Suitability Assessment of Water bodies for Great Crested Newts

Pond Number	Suitability
1	No Access
2	Poor (Dry)
3	Poor (Behind major barrier)
4	Poor (Behind major barrier)

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

Nesting Birds

Main SRFI Site

The site consists primarily of relatively intensively farmed arable fields, separated by hedgerows and grass margins. These habitats are likely to support limited diversity and relatively low densities of farmland birds, including notable species such as Skylark (*Alauda arvensis*) and Yellowhammer (*Emberiza citrinella*).

Areas of woodland and scrub and high hedges provide cover for wood-edge species such as Song Thrush (*Turdus philomelos*), while areas of ruderal vegetation and grassland in the south of the site could provide valuable foraging resources for species such as Linnet (*Carduelis cannabina*).

Junction 15a

The site offers an isolated parcel of good quality habitat for nesting birds in the form of woodland, hedgerows, scrub, the canal, and the area of tall herb swamp. These habitats are likely to support species including reed bunting (*Emberiza schoeniclus*), willow warbler

(*Phylloscopus trochilus*), and chiffchaff (*Phylloscopus collybita*). The wider landscape mostly consists of intensively-farmed arable fields, separated by hedgerows and grass margins. These habitats are likely to support limited diversity and relatively low densities of farmland birds, including notable species such as Skylark (*Alauda arvensis*) and Yellowhammer (*Emberiza citrinella*).

Other Junction Improvements

Otter and Water Vole

Main SRFI Site

A small stream flows north-east across the site, starting as a ditch in the south of the site and becoming more established, particularly from its confluence with another drain to the west of Towcester Road.

Otter have been recorded within 100m of the site boundary and Water voles have been recorded within 2km.

The watercourses are not suitable to support otters regularly, although they could use them to navigate between other areas in their territory. No evidence of otters was observed.

The upper reaches of the stream are largely unsuitable for water voles, being very shallow and shaded. The small tributary to the west of Towcester Road is slow flowing with some deeper pools, but is of limited suitability owing to heavy shading.

The lower reaches of the stream provide good habitats for Water Voles, with varied structure and grass banks. No evidence of Water Voles was observed, however it was not possible to access all sections of the stream fully to inspect it.

Junction 15a

The Grand Union Canal runs north-south across the site and there is a brook along the western side of the tall herb swamp area. In addition to this there are wet ditches in two locations. All of these habitats have the potential to support Water Voles, and it is possible that Otter will be present on the site as well.

Both Water Vole and Otter have been recorded within 2km of the site, and Water Vole may be present within 100m, but the record relates to a four figure or tetrad grid reference that could potentially be anywhere within a 1 km or 2 km square.

No signs of Water Voles were noted during the Phase 1 Habitat Survey, but Otter spraint was recorded by the canal. It was not possible to access all sections of the brook due to very dense / impenetrable vegetation at the time of the survey.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

Reptiles

Main SRFI Site

Suitable habitats for reptiles are present throughout the site in field margins, hedgerows and areas of rough grassland, scrub, woodland and ruderal vegetation. Grass snake has been recorded potentially within 100m of the site boundary, and Adder within 2km, however the records are four figure or tetrad grid references and could be anywhere within a 1 km or 2 km square.

Junction 15a

The tall herb swamp area and parcels of rough grassland provide suitable habitat for all four common reptile species. Grass snakes will also take advantage of watercourses, in this case this includes the canal, brook, and wet ditches.

Grass snakes have been recorded within 2km of the site boundary.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

White-Clawed Crayfish

Main SRFI Site

The Milton Malsor Brook contains habitat features that make it potentially suitable for White-Clawed Crayfish, and there are historic records of this species occurring within 4 km of the brook. The flow within the channel was typically slow to moderate at the time of the survey/s, with no particularly high velocity areas. The substrate varied throughout but typically comprised a gravel substrate interspersed with larger cobbles and boulders, woody debris and other relatively heavy objects such as bricks and concrete slabs. Such features provide refuge possibilities for crayfish together with undercut banks, tree roots and deeper pool areas. Several holes considered highly likely to be crayfish burrows were also observed. A high density of burrows can be indicative of a non-native Signal Crayfish (*Pacifastacus leniusculus*) population as this species typically burrows more frequently than native White-Clawed crayfish. However, the observed burrows could also indicate White-Clawed Crayfish presence.

Junction 15a

The brook along the western edge of the area containing tall herb swamp is 1.5 m wide at water level and runs in a channel 2 m deep with steep earth banks. The water depth throughout is 0.5 m. The substrate is comprised of pebbles, cobbles and silt. The two wet

ditches along the north and south edges of this area have steep earth banks with water 0.3m deep. In both features the water is static and loaded with organic matter. There is the potential for White-clawed Crayfish to be present in all water bodies on the site, including the canal although this is less likely.

There are records of this species within 2km of the site.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

4 EVALUATION AND CONCLUSIONS

Habitats and Plant

Main SRFI Site

Habitats

The survey area contains habitat types that are ubiquitous throughout lowland Britain.

Semi-improved agricultural grasslands towards the south-western part of the site may prove, on closer examination, to have relatively high nature conservation value, since unimproved mesotrophic grasslands have suffered exceptionally high percentage losses since 1945 (figures widely quoted are well in excess of 90%).

A wooded pit and a field under invasion by scrub on either side of Towcester Road (*Target Notes 121* and *122* in *Figure B2.1*) and woodland beside the railway west of Towcester Road (*Target Note 95*, *Figure B2.1*) could not be assessed owing to lack of permission for access, but they could potentially have relatively high nature conservation value. These areas are currently outside the red line boundary and will not be affected by the proposals.

Various brickwork structures at the edges of the site support exceptional collections of plants, especially ferns.

Otherwise features making a high contribution to local biodiversity include:

- several small streams and associated hedges, including those passing through (as reference points) *Figure B2.1*, Target Notes 50, 100, 106, 116 and 125 (also possibly non-accessed areas in the vicinity of Target Note 3);
- ponds including those at *Figure B2.1***,** Target Notes 25 and 60;
- the disused service area on the A43;
- canal towpaths and other features adjacent to the south-western boundaries of the site (though probably outside them);
- railway embankments (though perhaps outside boundaries); and
- road verges especially those along Towcester Road, along the northern edge of the site, and in the vicinity of Navigation Cottages.

Some hedges - especially those that qualify as Important Hedges under *The Hedgerows Regulations 1997* - also contribute significantly, though most of the hedges are species-poor. Though this may detract from their value individually, it remains that the largely intact hedgerow network as a whole is a key feature of the survey area, having value in the district context.

Plants

1.1 No statutorily protected plant species or Red List species (vulnerable or above) have been recorded during any of the surveys. Many species that are widespread and locally common elsewhere in southern England are scarce in Northamptonshire, partly due to lack of suitable habitat, and also due to species impoverishment consequent on modern agriculture and habitat loss.

1.2 On the Main SRFI Site, species of note in the Northamptonshire context according to the latest county Flora (*Gill Gent and Rob Wilson, 2012) - i.e.* described there as 'occasional' (or in some way implying greater scarcity than that) and recorded there from fewer than 100 tetrads - are listed below.

- *Adoxa moschatellina* (moschatel) occurs in small quantity in two deeply shaded places about 150m apart on the banks of the stream in the north-western part of the main SRFI. It is occasional in Northamptonshire (26 tetrads) according to the Flora.
- *Allium vineale* (wild onion) was seen in very small quantity in road-verge grassland in the north-eastern part of the site in 2015; it was not refound in 2016 or 2017. It is very occasional (33 tetrads) in Northamptonshire according to the Flora, though it notes that it has been recorded more frequently in recent years.
- *Asplenium adiantum-nigrum* (black spleenwort) occurs on the engineering brick bridges on the eastern edge of the main SRFI site and on other engineering-brick structures adjacent to the main SRFI site. It is occasional in Northamptonshire *(c.*60 tetrads) according to the Flora, and mainly found on railway and canal bridges as here.
- *Asplenium trichomanes* (maidenhair spleenwort) occurs on the engineering brick bridges on the eastern edge of the main SRFI site and on other engineering-brick structures adjacent to the main SRFI site. It is occasional in Northamptonshire (*c.*75 tetrads) according to the Flora, and mainly found on railway and canal bridges as here.
- *Bromus* cf. *secalinus* (rye brome) was recorded in disturbed ground in a grassland field where the use of wild-flower seed-mixture is suspected. It is rare in Northamptonshire (9 tetrads) according to the Flora, but in other parts of lowland Britain it has increased dramatically in very recent years, and its rarity in Northamptonshire may have changed.
- *Carex* cf*. spicata* (spiked sedge) is in Northamptonshire the most likely identification for a sedge in the *Carex spicata – Carex divulsa – Carex muricata* ssp. *pairae* group, which was encountered in a few places in grassland west of Towcester Road and in the canal corridor adjacent to the main SFRI site. It is described as occasional (*c.*145 tetrads) by the Flora. The other two species are much less common in the county, but the serious difficulty of identification in this group of sedges means that they are under-recorded.
- *Hypericum maculatum* (imperforate St John's-wort) was recorded in very small quantity on the main SRFI site on the verges of Towcester Road. It is rare in Northamptonshire (26 tetrads) according to the Flora, though they note that it is increasingly being recorded (possibly overlooked in the past).
- *Iris foetidissima* (stinking iris) was recorded in very small quantity. It is occasional in Northamptonshire (*c.*75 tetrads) according to the Flora, and mainly associated with gardens or old woodland plantings as here.

- *Lathyrus nissolia* (grass vetchling) had clearly been sown in a wild-flower seed-mixture on set-aside arable in the south-eastern corner of the main SRFI site. It is occasional in Northamptonshire (40 tetrads) according to the Flora but they express a degree of uncertainty about the reasons for its increase. Elsewhere in lowland Britain it is a common constituent of wild-flower seed-mixtures, and seems to have been sown in vast amounts in grass-seed mixtures used on those motorways and dual-carriageway roads that were added to the highways network in the late 1960s or early 1970s.
- *Lemna gibba* (fat duckweed) was recorded from a small pond east of Towcester Road. It is occasional in Northamptonshire (37 tetrads) according to the Flora. Since 2012 experts have suggested that the non-inflated form of *Lemna gibba* has been widely overlooked and recorded as *Lemna minor*, which has always been regarded as the ubiquitous duckweed in lowland Britain. On closer examination (using additional identification characters) *Lemna minor* is now - in many counties at least – turning out to be uncommon, *i.e.* what botanists were mostly calling *Lemna minor* they are now discovering to be *Lemna gibba*.
- *Lepidium campestre* (field pepperwort) is abundant in the margins of an arable field east of the railway on the eastern edge of the main SRFI site. It is occasional in Northamptonshire (29 tetrads) according to the Flora.
- *Oenanthe crocata* (hemlock water-dropwort) was recorded in very small quantity (*c.* 3 plants) from a ditch west of Towcester Road, and more commonly from the canal corridor adjacent to the main SRFI site. It is rare in Northamptonshire (10 tetrads) according to the Flora mainly being known from the canal system near Blisworth. It was thought extinct in the county, but has been found in several places in recent years.
- *Primula veris* (cowslip) was recorded in very small quantity in the edge of a field east of the railway on the eastern edge of the main SRFI. It is occasional in Northamptonshire according to the Flora but its status throughout lowland Britain is greatly confused by frequent planting in wild-flower seed-mixtures on roadsides and elsewhere.
- *Rumex hydrolapathum* (water dock) occurs very occasionally by the stream in the north-western part of the main SRFI site and in associated ditches. It is occasional and mainly confined to the canal system in Northamptonshire (*c.*70 tetrads) according to the Flora. It is also present in small quantity on the water-margins of the canal adjacent to the main SRFI site.
- *Sison amomum* (stone parsley) was recorded on the edge of a field east of the railway on the eastern edge of the main SRFI. It is occasional in Northamptonshire (*c.*65 tetrads) according to the Flora, but rare in the west of the county.
- *Vulpia myuros* (rat's-tail fescue) occurs on the engineering brick bridges on the eastern edge of the main SRFI site and probably on other engineering-brick structures adjacent to the main SRFI site including some in the canal corridor. It is occasional in Northamptonshire (41 tetrads) according to the Flora, though it may be under-recorded on railways and in brown-field sites.

1.3 The following species recorded at the Main SRFI Site are also either described as occasional in the Flora though present in between 100 and 150 tetrads (species in more than 150 are disregarded here) or else noted as being garden escapes in the great majority of places where they occur: *Aphanes arvensis* (parsley-piert), *Campanula persicifolia*

(peach-leaved Bellflower), *Carduus nutans* (musk thistle), *Dactylorhiza fuchsii* (common Spotted-orchid), *Digitalis purpurea* (foxglove), *Erigeron acris* (blue fleabane), *Euphorbia lathyris* (caper spurge), *Fragaria vesca* (wild strawberry), *Humulus lupulus* (hop), *Iris pseudacorus* (yellow iris), *Malva moschata* (musk-mallow), *Moehringia trinervia* (three-nerved Sandwort), *Rhinanthus minor* (yellow-rattle)and *Sherardia arvensis* (field madder). Further detail on these species is given in *Appendix 16, Annex C*.

1.4 The following species of note (as explained above) were recorded only on land adjacent to the Main SFRI Site:

- *Carex pseudocyperus* (cyperus sedge) is locally abundant on the water-margins of the canal adjacent to the main SFRI site. It is very occasional in Northamptonshire (18 tetrads) according to the Flora and mostly found on the Grand Union Canal.
- *Inula conyzae* (ploughman's-spikenard) occurs in small quantity on engineering brick structures at Towcester Road and in the canal corridor. It is occasional in Northamptonshire (*c.*65 tetrads) according to the Flora, but rare in the west of the county.
- *Lythrum salicaria* (purple-loosestrife) was recorded in small quantity in the canal corridor adjacent to the main SRFI site. It is occasional in Northamptonshire according to the Flora but recorded from over 100 tetrads.
- *Poa angustifolia* (narrow-leaved meadow-grass) was recorded in small quantity from several places adjacent to the main SFRI site, especially on engineering- brick structures. It is occasional in Northamptonshire according to the Flora but they consider it to be under-recorded. Throughout lowland Britain it is under-recorded, partly because it is often lumped into the *Poa pratensis* aggregate, and partly because it often grows in inaccessible places, especially railways.

Junction 15a Site

Habitats

The survey area contains habitats that are botanically rich and interesting, particularly the tall herb swamp area west of the canal at Target Note 309 (*Figure B2.2*). This fragmented parcel is rare in Northamptonshire and is of relatively high nature conservation value.

Highways bridges over the canal may offer habitats suitable for roosting bats, and the foraging habitat offered by the watercourses, woodland, scrub, and grassland on the site is optimal for foraging bats.

Other features contributing to local habitat diversity and associated biodiversity include:

- The canal, a brook, and two wet ditches at Target Notes 302, 313, 314, and 316 (*Figure B2.2*), plus associated vegetation;
- The encroaching woodland and scrub habitats at Target Notes 312, 317 and 318; (*Figure B2.2)* and
- road verges along the A43.

Most of the hedges on the site are species-poor. Although this may detract from their value individually, it remains that the largely intact hedgerow network as a whole is a key feature of the survey area, having value in the district context.

A detailed hedgerow assessment will be undertaken in 2017 and reported separetely.

Plants

1.5 On the J15a Site, species of note in the Northamptonshire context include *Oenanthe crocata* (hemlock water-dropwort) discussed in connection with the Main SFRI site, which grows beside the canal. Others are:

- *Arctium lappa* (Greater Burdock) was recorded in small quantity. It is occasional in Northamptonshire according to the Flora but recorded from over 100 tetrads.
- *Cardamine amara* (Large Bitter-cress) was recorded scattered all through the marsh west of the canal and south of J15a, though mainly in the southern half. It is rare in Northamptonshire (14 tetrads) according to the Flora, and mostly found near canals.
- *Dactylorhiza praetermissa* (Southern Marsh-orchid) was recorded in a few places in the marsh west of the canal and south of J15a, though mainly in the southern half. It is rare in Northamptonshire (26 tetrads) according to the Flora, though spreading owing to its ability to colonise brown-field sites.
- *Elodea nuttallii* (Nuttall's Waterweed) was seen in the canal. It is occasional in Northamptonshire (63 tetrads) according to the Flora but spreading and under-recorded. Since 2012 it has been added to *Schedule 9* of the The Wildlife and Countryside Act 1981 (as amended) as an invasive alien.
- *Impatiens capensis* (Orange Balsam) in the marsh and woodland west of the canal and south of J15a and along the canal. It is occasional in Northamptonshire (*c.*92 tetrads) according to the Flora, but occurs along most of the rivers and canals.
- *Oenanthe crocata* (hemlock water-dropwort) grows along the canal. It is rare in Northamptonshire (10 tetrads) according to the Flora mainly being known from the canal system near Blisworth. It was thought extinct in the county, but has been found in several places in recent years.
- *Potamogeton* cf. *lucens* (Shining Pondweed) was noted in the canal but not critically determined. If the identification is correct then it is occasional in Northamptonshire (37 tetrads) according to the Flora.
- *Sagittaria sagittifolia* (Arrowhead) was recorded in considerable quantity in the canal. It is occasional in Northamptonshire (87 tetrads) according to the Flora.
- *Sparganium emersum* (Unbranched Bur-reed) was noted in the canal but not critically determined. If the identification is correct then it is occasional in Northamptonshire (75 tetrads) according to the Flora.

1.6 In addition the following species occur along the canal outside the boundary of the J15a Site but within the study area. They grow in dry grassland in a narrow (0.3m strip at the lip of the towpath sward where it tops the canal bank, mostly close to the several locks.

- *Avenula pubescens* (downy oat-grass) was recorded in dry turf forming a narrow strip at the lip of the canal bank near locks. It is occasional in Northamptonshire (c.57 tetrads) according to the Flora.
- *Bidens cf. connata* (London bur-marigold) was seen in brickwork around locks. This alien species is still rare in Northamptonshire (6 tetrads) according to the Flora which documents its spread along the canal system from Buckinghamshire.
- *Briza media* (quaking-grass) was recorded in dry turf forming a narrow strip at the lip of the canal bank near locks. It is now occasional in Northamptonshire (c.94 tetrads) according to the Flora, having been much more common in the past.
- *Erodium cicutarium* (common stork's-bill) was recorded in dry turf forming a narrow strip at the lip of the canal bank near locks. It is occasional in Northamptonshire (*c.*66 tetrads) according to the Flora.
- *Koeleria macrantha* (crested hair-grass) was recorded in dry turf forming a narrow strip at the lip of the canal bank near locks. It is rare in Northamptonshire (23 tetrads) according to the Flora, and very rare away from the extreme northern tip of the county.
- *Linum catharticum* (fairy flax) was recorded in dry turf forming a narrow strip at the lip of the canal bank near locks. It is occasional in Northamptonshire according to the Flora but recorded from over 100 tetrads.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

Protected Species

Badger

Main SRFI Site

No definitive evidence of badgers was recorded within the areas surveyed although an extensive search was not carried out and a comprehensive badger survey is recommended.

There is potential for badgers to be present in wooded and scrub areas in the north of the site which were not accessible at the time of survey. A potential sett was noted in one area of woodland to the east of Towcester Road and a sett was previously recorded to the west of Towcester Road.

A push-through was noted under the fence to the railway line along the southern boundary of the site. While there were no prints, hairs or other evidence to confirm the presence of badgers, the size of the hole and force required to push under the fence indicate that it was likely to have been created by badgers, which are likely to cross under the rail line using the culvert at this point to access the site occasionally for foraging.

Junction 15a Site

A single footprint and suspected disused sett comprising six holes were recorded within the areas surveyed, although an extensive search was not carried out and a comprehensive badger survey is recommended.

There is potential for badgers to be present in wooded and scrub areas across the site. The potential sett was noted in the bank of the brook at Target Note 314 (*Figure B2.2*). Badgers have been recorded within 2km of the site.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

Bats

Main SRFI Site

The site incorporates a network of hedgerows and field margins around a matrix of primarily arable farmland, with features including stands of woodland and scrub, trees and ponds. These features are suitable to provide foraging resources for bats occurring in the local area. There are also a number of trees and buildings within the Site that have potential to provide roosting sites and hibernacula for bats.

Further assessment of the site for bats is recommended. This should include walked activity transects and the deployment of automated bat detectors to determine the level of bat usage of the site, along with detailed inspections and emergence and re-entry surveys of potential roost sites.

Design of the proposed development would need to take account of the presence of any roosts and the usage of the sites by bat assemblages. If proposals are likely to result in the disturbance of bat roosts then a European Protected Species licence is likely to be required from Natural England to facilitate this and the loss of any roosts, which will include a requirement for mitigation and alternative habitat provision. The design of the proposed development should retain key bat habitats where possible and maintain connectivity of habitats through the creation of a green infrastructure network.

Junction 15a Site

The site offers optimal foraging habitat for bats in the form of the canal and damp areas which both attract a myriad of insects. The woodland edges, scrub and grassland also offer good habitat for foraging bats. There are also features which could offer roosting potential for bats in the form of trees and the highways bridges which cross the canal.

Further assessment of the site for bats is recommended. This should include walked activity transects and the deployment of automated bat detectors to determine the extent to

which bats use the site, in addition to detailed inspections and emergence and re-entry surveys of potential roost sites.

Design of the proposed development would need to take account of the presence of any roosts and the use of the sites by bats. If proposals are likely to result in the disturbance of bat roosts then a European Protected Species licence will be required from Natural England to facilitate this and the loss of any roosts, which will include a requirement for mitigation and alternative habitat provision. The design of the proposed development should retain key bat habitats where possible and maintain connectivity of habitats through the creation of a green infrastructure network.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

Dormouse

Main SRFI Site

The site is mainly arable land, with woody habitats largely limited to species-poor hedges that are regularly cut. The site is also surrounded by potential barriers to the dispersion of Dormice such as roads, railways and canals, and the site is also in a geographical region where Dormice are uncommon. It is therefore unlikely that Dormice are present and further surveys for this species are not recommended.

Junction 15a Site

The site provides a small, isolated pocket of habitat suitable for Dormice. The surroundings are largely agricultural fields with well-managed hedgerows, and the proximity of the M1 motorway, A43 and the canal indicate that this species would struggle to disperse. The chance of a population existing at this site is therefore considered to be small and further surveys for this species are not recommended.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

Great Crested Newt (and other amphibians)

Main SRFI Site

The grassy margins, hedgerows and areas of woodland and scrub provide suitable terrestrial habitat for Great Crested Newts and other amphibians.

Several water features were identified during the field surveys as providing potential to support Great Crested Newts. An "*isolated Large population*" was also recorded in one pond 250 m to the east of the site during surveys carried out in 2014 by *FPCR(2014)*.

Where Great Crested Newts are present, they are likely to use terrestrial habitats up to 500 m from a pond, which would include suitable habitats within the Site.

Further surveys of water features on the site and within 500 m of it are therefore recommended to determine whether Great Crested Newts are present, and to inform mitigation / compensation measures necessary to ensure the protection of this species from potential effects of the development.

Junction 15a Site

The site provides a variety of habitats suitable for Great Crested Newts in their terrestrial phase, including rough grassland, scrub, and reed pasture. Four ponds were identified within 500m of the site (*Figure B3.2*), although access to Pond 1 is not granted for further survey. Pond 2 was dry at the time of survey, which indicates that it is not suitable to support a breeding population of Great Crested Newts. Pond 3 is a SuDS feature for a recent housing development, although it is located on the other side of the River Nene, which can be considered a major barrier to Newt movement. Pond 4 is a large lake, however it is again separated by a major barrier to Newt movement; the M1 motorway.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

Nesting Birds

Main SRFI Site

The habitats in the site are suitable to support a typical assemblage of common farmland birds. Given the size of the site there is potential for occasional rarities to occur, but it is unlikely that this would make the site of particularly increased value in relation to similar habitats occurring in the wider landscape.

Further breeding bird surveys would allow for a more detailed assessment of the value of the site for breeding birds, and thereby inform the design of the proposed development so that it can take account of the species and habitats present.

Junction 15a Site

The habitat for nesting birds at the Junction 15a site is optimal and may support common garden and farmland birds, as well as some wetland species. It is possible that some rarer species will also occur at this site owing to the variety of habitats present, however given the size of the site it is unlikely to be of significance at anything more than a local level.

Further breeding bird surveys would allow for a more detailed assessment of the value of the site for breeding birds, and thereby inform the design of the proposed development so that it can take account of the species and habitats present.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

Otter and Water Vole

Main SRFI Site

No evidence of Otter was observed during the field surveys. The watercourses on the site are sub-optimal for regular Otter activity, although they could use these watercourses on occasion to navigate between other areas in their territory. It is therefore considered unlikely that Otters would be affected by development of the site. Appropriate pollution prevention measures would be required regarding the watercourses, during construction and once the development is complete.

Suitable Water Vole habitat is present on the site within the small watercourses (streams). A detailed bank-side survey for evidence of water voles is recommended to determine if they are present, and to inform any appropriate mitigation measures if so.

Junction 15a Site

The canal offers the only suitable habitat for Otter and spraint was found on the bank indicating that the species occurs within the area. Otter would only be affected by development works if there was a holt on the site, and further otter-specific surveys are recommended to establish whether or not this is the case, and to inform an appropriate mitigation strategy if required,

Habitat considered to be suitable for Water Vole is present on the site within the small watercourses (the brook and wet ditches). A detailed bank-side survey for evidence of water voles is recommended to determine if they are present, and to inform any appropriate mitigation measures if so.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

Reptiles

Main SRFI Site

Suitable habitats for common reptiles, including Grass Snake, Slow Worm and Common Lizard, are present throughout the site in the form of field margins, hedgerows, scrub and woodland, with some areas of higher suitability. It is recommended that further surveys for reptiles be undertaken using the placement and checking of artificial refuges in key areas, to determine if any of these species are present, and to inform any mitigation measures to ensure their protection within the proposed development if so.

Junction 15a Site

Suitable habitats for all four common reptile species are present on the site, including rough grassland, tall herbs, and watercourses. Some areas, such as the area of tall herb swamp, provide more optimal reptile habitat than others.

It is recommended that further surveys for reptiles be undertaken using the placement and checking of artificial refuges in key areas, to determine if any of these species are present, and to inform any mitigation measures to ensure their protection within the proposed development if so.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

White-Clawed Crayfish

Main SRFI Site

Overall, the habitat present within the Milton Malsor Brook is considered to be of moderate quality with regard to White-Clawed Crayfish. The presence of crayfish burrows and historic records of White Clawed Crayfish within 4 km of the brook indicated that this species may be present. It is therefore recommended that crayfish surveys are undertaken to determine the presence or likely absence of this species, and to inform mitigation measures if its presence is confirmed.

Junction 15a Site

The habitat at the Junction 15a Site is varied and includeswet ditches and the canal., Overall it is of moderate suitability for White-Clawed Crayfish. This site has not been surveyed in detail for this species and no field signs were noted during the initial walkover. It is recommended that crayfish surveys are undertaken to determine the presence or likely absence of this species, and to inform mitigation measures if its presence is confirmed.

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

5 REFERENCES

Benatt, B. (2012). *Guidelines for Preliminary Ecological Appraisal.* Chartered Institute of Ecology and Environmental Management.

Cherrill, A. & McClean, C. (1999). Between-observer variation in the application of a standard method of habitat mapping by environmental consultants in the UK. *Journal of Applied Ecology*, **36**, 989-1000.

Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015) *Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man*. British Birds 108, 708–746.

FPCR. (2014) *Great Crested Newt Report*

Hill, M.O., Blackstock, T.H., Long, D.G. & Rothero, G.P. (2008). *A Checklist and*

Census Catalogue of British and Irish Bryophytes. British Bryological Society, Middlewich.

Institute of Environmental Assessment (IEEM). (1995). *Guidelines for Baseline Ecological Assessment*. Spon, London.

JNCC. (2010). *Handbook for Phase 1 Habitat Survey (revised 2010 edition*). JNCC, Peterborough.

Rodwell, J.S. (1991). *British Plant Communities 1: Woodlands and Scrub*. Cambridge University Press, Cambridge.

Rodwell, J.S. (1992). *British Plant Communities 3: Grasslands and Montane Communities*. Cambridge University Press, Cambridge.

Rodwell, J.S. (2000). *British Plant Communities 5: Maritime Communities and Vegetation of Open Habitats*. Cambridge University Press, Cambridge.

Stace CA (2010). *New Flora of the British Isles*. Cambridge University Press; 3rd Edition.

Stroh, P.A., Leach, S.J., August, T.A., Walker, K.J., Pearman, D.A., Rumsey, F.J., Harrower, C.A., Fay, M.F., Martin, J.P., Pankhurst, T., Preston, C.D. & Taylor, I. (2014*). A Vascular Plant Red List for England*. Botanical Society of Britain and Ireland, Bristol.

Gill Gent and Rob Wilson, 2012, *The Flora of Northamptonshire & The Soke of Peterborough*

APPENDIX A: BOTANICAL TABLES

Main SRFI Site

Table B3. *Plant species recorded from the main SFRI site and immediately adjacent areas. Column 1 – main SRFI west of and including Towcester Road; column 2 – main SFRI site east of Towcester Road; column 3 – land east of the railway on the eastern side of the main SRFI site; column 4 – canal corridor west of main SRFI site. Species occurring only outside the main SFRI site are marked with asterisks – in column 3 this includes trees in adjacent plantation woodland just outside the site boundary (no additional herbaceous species were recorded there). Some semi-ruderal plants recorded on Towcester Road may have been outside the main SRFI site but could easily occur in parts of the roadside habitat that are within. Plants clearly associated with gardens or amenity planting are marked with 'g' in square brackets.*

a) Trees, shrubs and woody climbers

Acer campestre (Field Maple)	o	r	r	r
**Acer platanoides* cf. 'Goldsworth Purple' (Norway Maple)	-	-	vr	-
Acer pseudoplatanus	o	o	vr	vr
**Acer saccharinum* (Silver Maple)	-	-	vr	-
Aesculus carnea (Red Horse-chestnut) [g]	vr	-	-	-
Aesculus hippocastanum (Horse-chestnut)	-	vr	vr	-
**Alnus cordata* (Italian Alder)	-	-	vr	-
Aucuba japonica (Spotted-laurel) [g]	vr	-	-	-
Berberis cultivars (Barberry)	vr	-	-	-
Betula pendula (Silver Birch)	vr	-	-	-
Carpinus betulus (Hornbeam)	-	vr	-	-
Castanea sativa (Sweet Chestnut)	-	vr	-	-
Chamaecyparis lawsoniana (Lawson's Cypress) [g]	vr	-	vr	-
Clematis vitalba (Traveller's Joy)	vr	-	-	-
Cornus sanguinea (Dogwood)	r	-	vr	vr
**Cornus sericea* (Red-osier Dogwood)	-	-	vr	-
Corylus avellana (Hazel)	o	o	-	r
Cotoneaster cf. ×*watereri* (Waterer's Cotoneaster)	vr	-	-	-
Crataegus ×*media* (Hybrid Hawthorn)	o	o	r	-
Crataegus laevigata (Midland Hawthorn)	r	r	-	-
Crataegus monogyna (Hawthorn)	a	a	a	a
*×*Cuprocyparis leylandii* (Leyland Cypress)	-	-	vr	-
Fagus sylvatica (Beech)	-	vr	-	-
**Fagus sylvatica* 'Purpurea' (Beech)	-	-	vr	-
Fraxinus excelsior (Ash)	f	f	-	r
Hedera helix (Ivy)	a	a	la	a
Ilex aquifolium (Holly)	r	vr	-	-
Ligustrum ovalifolium (Garden Privet) [g]	vr	-	-	-

Ligustrum vulgare (Wild Privet)	r	vr	-	-
Lonicera periclymenum (Honeysuckle)	-	r	-	-
Mahonia aquifolium (Oregon-grape)	vr	-	-	-
Mahonia cf. 'Charity' (an Oregon-grape)	vr	-	-	-
Malus pumila (Apple)	r	vr	r	-
Malus sylvestris (Crab Apple)	o	o	vr	-
Picea abies (Norway Spruce)	vr	-	-	-
**Pinus nigra* cf. ssp. *laricio* (Corsican Pine)	-	-	vr	-
**Pinus sylvestris* (Scots Pine)	-	-	vr	-
**Platanus ×hispanica* (London Plane)	-	-	vr	-
Populus ×canadensis (Hybrid Black-poplar)	r	-	-	-
Populus ×canescens (Grey Poplar)	-	vr	-	-
Populus nigra 'Italica' (Lombardy Poplar)	vr	vr	-	-
**Populus tremula* (Aspen)	-	-	-	la
Prunus avium (Wild Cherry) [g]	vr	-	-	-
Prunus cerasifera (Cherry Plum) [g]	vr	-	-	-
Prunus domestica (Wild Plum)	r	-	-	-
Prunus laurocerasus (Cherry Laurel) [g]	vr	-	-	-
Prunus spinosa (Blackthorn)	a	a	-	r
Quercus ilex (Evergreen Oak)	vr	-	-	-
Quercus robur (Pedunculate Oak)	o	o	r	-
**Quercus rubra* (Red Oak)	-	-	vr	-
Rhamnus cathartica (Buckthorn)	vr	-	vr	-
**Ribes nigrum* (Black Currant)	-	-	-	r
Rosa arvensis (Field-rose)	r	vr	-	-
Rosa canina (Dog-rose)	f	f	r	r
**Rubus armeniacus* (Bramble)	-	-	vr	-
Rubus caesius (Dewberry)	o	-	-	-
Rubus fruticosus agg. (Bramble)	a	f	a	f
Rubus ulmifolius (Bramble)	o	f	a	r
Salix caprea (Goat Willow)	vr	-	-	o
Salix cinerea ssp. *oleifolia* (Rusty Willow)	o	r	vr	-
Salix ×fragilis (Crack Willow)	r	-	-	r
Salix ×reichardtii (Hybrid Grey-willow)	-	vr	r	-
Salix ×smithiana (Broad-leaved Osier)	vr	-	lf	-
Salix viminalis (Osier)	vr	vr	-	-
Sambucus nigra (Elder)	f	f	o	r
**Sorbus aria* cf. (Common Whitebeam)	-	-	vr	-
Sorbus aucuparia (Rowan)	-	vr	vr	-
Symphoricarpos albus (Snowberry)	vr	-	-	-
Taxus baccata (Yew) [g]	vr	-	-	-
Tilia ×europaea (Lime)	vr	-	-	-
**Tilia platyphyllos* (Large-leaved Lime)	-	-	vr	-
Ulmus glabra (Wych Elm)	r	-	-	-
Ulmus cf. *procera* (English Elm)	f	f	o	r

**Viburnum lantana* (Wayfaring-tree)	-	-	vr	-
Viburnum opulus (Guelder-rose)	vr	-	vr	-
b) Herbaceous species				
Achillea millefolium (Yarrow)	o	o	-	o
Adoxa moschatellina (Moschatel)	vr	-	-	-
Aegopodium podagraria (Ground-elder)	r	-	-	-
Agrimonia eupatoria (Agrimony)	r	r	-	-
Agrostis capillaris (Common Bent)	a	o	lf	-
Agrostis gigantea (Black Bent)	-	r	-	-
Agrostis stolonifera (Creeping Bent)	a	a	o	o
Alisma plantago-aquatica (Water-plantain)	-	vr	-	-
Alliaria petiolata (Garlic Mustard)	f	f	-	r
Allium vineale (Wild Onion)	vr	-	-	-
Alopecurus geniculatus (Marsh Foxtail)	r	-	-	-
Alopecurus myosuroides (Black-grass)	la	o	r	-
Alopecurus pratensis (Meadow Foxtail)	o	o	-	-
Anagallis arvensis (Scarlet Pimpernel)	o	r	vr	-
Angelica sylvestris (Wild Angelica)	vr	vr	r	vr
Anisantha sterilis (Barren Brome)	f	f	o	o
Anthoxanthum odoratum (Sweet Vernal-grass)	r	r	-	-
Anthriscus sylvestris (Cow Parsley)	a	a	o	r
Aphanes arvensis (Parsley-piert)	-	vr	-	-
Apium nodiflorum (Fool's Water-cress)	lf	r	vr	-
Arctium minus (Lesser Burdock)	o	r	-	o
Arrhenatherum elatius (False Oat-grass)	a	a	a	a
Artemisia vulgaris (Mugwort)	o	r	-	-
Arum maculatum (Lords-and-Ladies)	r	vr	-	-
Asplenium adiantum-nigrum (Black Spleenwort)	vr	vr	-	vr
Asplenium ruta-muraria (Wall-rue)	vr	vr	vr	-
Asplenium scolopendrium (Hart's-tongue)	-	vr	vr	vr
**Asplenium trichomanes* (Maidenhair Spleenwort)	-	vr	vr	vr
Atriplex littoralis (Grass-leaved Orache)	vr	-	-	-
Atriplex patula (Common Orache)	f	-	r	-
Atriplex prostrata (Spear-leaved Orache)	r	vr	r	vr
Avena fatua (Wild-oat)	o	-	-	-
Ballota nigra (Black Horehound)	r	r	-	-
Barbarea vulgaris (Winter-cress)	-	vr	r	vr
Bellis perennis (Daisy)	r	r	-	r
Berula erecta (Lesser Water-parsnip)	r	-	-	-
Brachypodium sylvaticum (False Brome)	r	vr	-	r
Bromus hordeaceus ssp*. hordeaceus* (Soft-brome)	f	f	r	-
Bromus hordeaceus ssp*. longipedicillatus* (Soft-brome)	vr	-	vr	-
Bromopsis ramosa (Hairy-brome)	r	vr	-	-
Bromus secalinus (Rye Brome)	la	la	-	-
Bryonia dioica (White Bryony)	r	r	vr	-

Calamagrostis epigejos (Wood Small-reed)	vr	-	-	-
Callitriche cf. *stagnalis* (Common Water-starwort)	-	vr	-	-
Calystegia sepium ssp. *sepium* (Hedge Bindweed)	o	r	-	o
Calystegia silvatica (Large Bindweed)	r	r	-	-
Campanula persicifolia (Peach-leaved Bellflower)	vr	-	-	-
Capsella bursa-pastoris (Shepherd's-purse)	r	o	vr	-
Cardamine flexuosa (Wavy Bitter-cress)	-	r	-	-
Cardamine hirsuta (Hairy Bitter-cress)	r	r	r	-
**Cardamine pratensis* (Cuckooflower)	-	-	-	vr
Carduus crispus (Welted Thistle)	r	r	-	-
Carduus nutans (Musk Thistle)	-	vr	-	-
Carex hirta (Hairy Sedge)	r	r	vr	r
Carex otrubae (False Fox-sedge)	vr	-	-	r
Carex pendula (Pendulous Sedge)	vr	-	-	vr
**Carex pseudocyperus* (Cyperus Sedge)	-	-	-	lf
**Carex remota* (Remote Sedge)	-	-	-	vr
**Carex riparia* (Greater Pond-sedge)	-	-	-	r
Carex spicata (Spiked Sedge)	-	vr	-	vr
Centaurea debeauxii (Chalk Knapweed)	r	o	r	o
Centaurium erythraea (Common Centaury)	-	vr	-	-
Cerastium fontanum (Common Mouse-ear)	f	f	r	-
Cerastium glomeratum (Sticky Mouse-ear)	o	o	-	-
Cerastium cf. semidecandrum (Little Mouse-ear)	vr	-	-	-
Chaerophyllum temulum (Rough Chervil)	o	-	-	o
Chamerion angustifolium (Rosebay Willowherb)	lf	r	lf	vr
Chelidonium majus (Greater Celandine)	vr	vr	-	-
Chenopodium album (Fat-hen)	f	o	-	-
Chenopodium ficifolium (Fig-leaved Goosefoot)	r	-	-	-
Chenopodium polyspermum (Many-seeded Goosefoot)	vr	vr	-	-
Cirsium arvense (Creeping Thistle)	a	a	o	r
Cirsium eriophorum (Woolly Thistle)	-	vr	-	-
**Cirsium palustre* (Marsh Thistle)	-	-	-	vr
Cirsium vulgare (Spear Thistle)	f	f	r	r
Cochlearia danica (Danish Scurvygrass)	r	-	-	-
Conium maculatum (Hemlock)	o	o	vr	-
Convolvulus arvensis (Field Bindweed)	o	o	o	f
Conyza canadensis (Canadian Fleabane)	r	-	-	-
Crepis capillaris (Smooth Hawk's-beard)	r	r	r	vr
Crepis vesicaria (Beaked Hawk's-beard)	vr	-	-	-
Cynosurus cristatus (Crested Dog's-tail)	r	lf	lf	-
Dactylis glomerata (Cock's-foot)	a	a	o	f
Dactylorhiza fuchsii (Common Spotted-orchid)	vr	vr	-	-
**Daucus carota* ssp. *carota* (Wild Carrot)	-	-	-	vr
Deschampsia cespitosa (Tufted Hair-grass)	o	r	vr	-
Digitalis purpurea (Foxglove)	r	-	-	-
Dipsacus fullonum (Wild Teasel)	o	r	-	o

Dryopteris filix-mas (Male-fern)	o	vr	vr	vr
Elytrigia repens (Common Couch)	f	f	-	-
Epilobium ciliatum (American Willowherb)	o	lf	f	vr
Epilobium hirsutum (Great Willowherb)	a	f	f	o
Epilobium montanum (Broad-leaved Willowherb)	r	vr	vr	-
Epilobium parviflorum (Hoary Willowherb)	o	la	f	-
Epilobium tetragonum (Square-stalked Willowherb)	f	la	f	-
Equisetum arvense (Field Horsetail)	o	o	r	f
Erigeron acris (Blue Fleabane)	vr	-	-	-
Erophila verna (Common Whitlowgrass)	-	r	-	-
Euphorbia lathyris (Caper Spurge)	vr	vr	-	-
Euphorbia peplus (Petty Spurge)	r	r	-	-
Fallopia convolvulus (Black-bindweed)	o	-	o	-
Festuca rubra (Red Fescue)	a	a	o	f
Ficaria verna (Lesser Celandine)	f	r	-	-
Filipendula ulmaria (Meadowsweet)	r	vr	-	f
Fragaria vesca (Wild Strawberry)	vr	vr	-	-
Galium album (Hedge-bedstraw)	r	-	-	-
Galium aparine (Cleavers)	a	a	o	r
**Galium palustre* (Common Marsh-bedstraw)	-	-	-	vr
Geranium dissectum (Cut-leaved Crane's-bill)	o	r	o	o
Geranium molle (Dove's-foot Crane's-bill)	o	o	r	r
Geranium pusillum (Small-flowered Crane's-bill)	-	r	-	-
Galium odoratum (Woodruff) [g]	vr	-	-	-
Geranium pusillum (Small-flowered Crane's-bill)	r	-	-	-
Geranium robertianum (Herb-Robert)	o	o	-	-
Geum urbanum (Wood Avens)	o	o	vr	o
Glechoma hederacea (Ground-ivy)	f	o	vr	f
Glyceria fluitans (Floating Sweet-grass)	o	r	vr	-
Glyceria maxima (Reed Sweet-grass)	vr	-	-	o
Helianthus annuus (Sunflower)	vr	-	-	-
Helminthotheca echioides (Bristly Oxtongue)	o	r	r	r
Heracleum sphondylium (Hogweed)	f	f	a	o
Hieracium species (Hawkweed)	vr	-	vr	-
Holcus lanatus (Yorkshire-fog)	a	a	f	a
Hordeum murinum (Wall Barley)	r	vr	-	r
Hordeum secalinum (Meadow Barley)	lf	r	-	-
Humulus lupulus (Hop)	-	r	-	-
Hyacinthoides ×massartiana (Hybrid Bluebell)	r	vr	-	-
Hypericum hirsutum (Hairy St John's-wort)	vr	-	-	-
Hypericum maculatum (Imperforate St John's-wort)	-	vr	-	-
Hypericum perforatum (Perforate St John's-wort)	r	r	-	-
Hypericum tetrapterum (Square-stalked St John's-wort)	-	vr	-	vr
Hypochaeris radicata (Cat's-ear)	r	r	-	vr
Inula conyzae (Ploughman's-spikenard)	vr	-	-	vr
Iris foetidissima (Stinking Iris)	vr	-	-	-

Iris pseudacorus (Yellow Iris)	-	vr	-	r
Juncus articulatus (Jointed Rush)	-	vr	-	-
Juncus effusus (Soft-rush)	r	r	vr	vr
Juncus inflexus (Hard Rush)	o	r	r	vr
Lactuca serriola (Prickly Lettuce)	r	-	-	-
Lamium album (White Dead-nettle)	o	o	-	r
Lamium purpureum (Red Dead-nettle)	o	o	vr	-
Lapsana communis (Nipplewort)	f	o	r	r
Lathyrus nissolia (Grass Vetchling) [wfsm]	-	vr	-	-
Lathyrus pratensis (Meadow Vetchling)	o	r	vr	r
Lemna gibba (Fat Duckweed)	-	vr	-	-
Lemna minor (Common Duckweed)	r	vr	-	-
Lepidium campestre (Field Pepperwort)	-	-	lf	-
Lepidium coronopus (Swine-cress)	o	o	vr	-
Leucanthemum vulgare (Oxeye Daisy) [wfsm]	r	r	vr	vr
Linaria vulgaris (Common Toadflax)	r	-	-	-
Lolium perenne (Perennial Rye-grass)	a	a	o	a
Lotus corniculatus (Common Bird's-foot-trefoil)	vr	vr	-	-
Lotus corniculatus var. *sativus* (Fodder Bird's-foot-trefoil)	r	r		
Lycopus europaeus (Gipsywort)	vr	-	-	r
**Lythrum salicaria* (Purple-loosestrife)	-	-	-	o
Malva moschata (Musk-mallow)	-	vr	-	-
Malva sylvestris (Common Mallow)	o	-	-	vr
Matricaria discoidea (Pineappleweed)	o	r	-	-
Medicago lupulina (Black Medick)	o	o	-	o
Mentha aquatica (Water Mint)	vr	-	-	vr
**Moehringia trinervia* (Three-nerved Sandwort)	-	-	-	vr
Myosotis arvensis (Field Forget-me-not)	f	o	o	o
Myosotis scorpioides (Water Forget-me-not)	r	-	-	r
Myosoton aquaticum (Water Chickweed)	vr	vr	-	-
Narcissus cf. *pseudonarcissus* cultivars (Daffodil)	vr	vr	-	-
Nasturtium officinale (Water-cress)	r	-	-	-
Odontites vernus ssp. *serotinus* (Red Bartsia)	vr	-	-	-
Oenanthe crocata (Hemlock Water-dropwort)	vr	-	-	vr
Oxalis corniculata (Procumbent Yellow-sorrel)	vr	-	-	-
Papaver rhoeas (Common Poppy)	r	-	-	-
**Persicaria amphibia* (Amphibious Bistort)	-	-	-	r
Persicaria maculosa (Redshank)	o	r	r	-
Phacelia tanacetifolia (Phacelia)	vr	-	-	-
Phalaris arundinacea (Reed Canary-grass)	r	-	-	r
Phleum bertolonii (Smaller Cat's-tail)	o	o	-	-
Phleum pratense (Timothy)	o	r	r	-
Phragmites australis (Common Reed)	vr	-	-	-
Plantago coronopus (Buck's-horn Plantain)	vr	-	-	-
Plantago lanceolata (Ribwort Plantain)	a	f	o	o
Plantago major ssp. *intermedia* (Greater Plantain)	-	vr	-	r

Plantago major ssp. *major* (Greater Plantain)	o	o	o	-
Poa angustifolia (Narrow-leaved Meadow-grass)	vr	vr	-	-
Poa annua (Annual Meadow-grass)	a	a	o	o
Poa humilis (Spreading Meadow-grass)	r	-	vr	vr
Poa pratensis (Smooth Meadow-grass)	-	vr	-	-
Poa trivialis (Rough Meadow-grass)	f	a	f	f
Polygonum arenastrum (Equal-leaved Knotgrass)	o	o	-	-
Polygonum aviculare (Knotgrass)	o	o	o	-
Potentilla anserina (Silverweed)	o	vr	-	o
Potentilla reptans (Creeping Cinquefoil)	o	o	-	o
Primula veris (Cowslip)	-	-	vr	-
Prunella vulgaris (Selfheal)	o	r	-	o
Pteridium aquilinum (Bracken)	r	-	r	-
Puccinellia distans (Reflexed Saltmarsh-grass)	vr	-	-	-
Ranunculus acris (Meadow Buttercup)	o	r	vr	vr
Ranunculus repens (Creeping Buttercup)	a	a	f	o
Ranunculus sceleratus (Celery-leaved Buttercup)	vr	-	-	-
Reseda luteola (Weld)	r	vr	-	-
Rhinanthus minor (Yellow-rattle) [wfsm]	-	lf	vr	-
Rumex acetosa (Common Sorrel)	r	r	r	-
Rumex acetosella (Sheep's Sorrel)	-	vr	-	vr
Rumex conglomeratus (Clustered Dock)	vr	-	-	-
Rumex crispus (Curled Dock)	f	o	r	-
Rumex hydrolapathum (Water Dock)	vr	-	-	r
Rumex obtusifolius (Broad-leaved Dock)	f	f	r	r
Rumex sanguineus (Wood Dock)	f	o	a	o
Sagina procumbens (Procumbent Pearlwort)	r	r	-	-
Schedonorus arundinaceus (Tall Fescue)	lf	r	lf	-
Schedonorus pratensis (Meadow Fescue)	-	vr	-	-
Scorzoneroides autumnalis (Autumn Hawkbit)	o	-	-	r
Scrophularia auriculata (Water Figwort)	o	o	-	-
**Scutellaria galericulata* (Skullcap)	-	-	-	vr
Sedum acre (Biting Stonecrop)	-	vr	-	-
Senecio erucifolius (Hoary Ragwort)	o	r	-	vr
Senecio jacobaea (Common Ragwort)	f	f	r	r
Senecio squalidus (Oxford Ragwort)	-	vr	-	-
**Senecio viscosus* (Sticky Groundsel)	-	-	-	vr
Senecio vulgaris (Groundsel)	f	f	o	-
Sherardia arvensis (Field Madder)	vr	-	-	-
Silene dioica (Red Campion)	-	r	-	vr
Silene ×hampeana (Hybrid Red-campion)	-	vr	-	-
Silene latifolia ssp. *alba* (White Campion)	r	vr	-	r
**Sinapis arvensis* (Charlock)	-	-	r	-
Sison amomum (Stone Parsley)	vr	-	lf	-
Sisymbrium officinale (Hedge Mustard)	o	o	vr	-
Solanum dulcamara (Bittersweet)	o	r	r	-

Solanum nigrum ssp. *nigrum* (Black Nightshade)	r	-	-	-
Sonchus arvensis (Perennial Sow-thistle)	o	-	-	r
Sonchus asper (Prickly Sow-thistle)	f	f	r	r
Sonchus oleraceus (Smooth Sow-thistle)	r	-	-	vr
Spergularia marina (Lesser Sea-spurrey)	vr	vr	-	-
Stachys palustris (Marsh Woundwort)	r	-	-	f
Stachys sylvatica (Hedge Woundwort)	o	o	r	o
Stellaria graminea (Lesser Stitchwort)	-	r	vr	-
Stellaria media (Common Chickweed)	f	f	o	vr
Symphytum orientale (White Comfrey)	-	vr	-	-
Symphytum ×*uplandicum* (Russian Comfrey)	vr	-	-	-
Tamus communis (Black Bryony)	r	r	-	-
Tanacetum parthenium (Feverfew)	vr	-	-	-
Taraxacum species (Dandelion)	f	o	r	o
Thlaspi arvense (Field Penny-cress)	-	r	-	-
Torilis japonica (Upright Hedge-parsley)	o	-	-	vr
Tragopogon pratensis (Goat's-beard)	-	vr	-	vr
Trifolium dubium (Lesser Trefoil)	r	r	r	r
Trifolium pratense (Red Clover)	r	r	vr	r
Trifolium repens (White Clover)	f	f	r	f
Tripleurospermum inodorum (Scentless Mayweed)	f	f	r	-
Trisetum flavescens (Yellow Oat-grass)	r	vr	-	-
Triticum aestivum (Bread Wheat)	vr	-	-	-
Tussilago farfara (Colt's-foot)	r	r	-	r
Typha latifolia (Bulrush)	vr	-	-	-
Urtica dioica (Common Nettle)	a	a	a	f
Urtica urens (Small Nettle)	-	r	-	-
Veronica arvensis (Wall Speedwell)	o	-	-	vr
Veronica beccabunga (Brooklime)	vr	vr	vr	-
Veronica chamaedrys (Germander Speedwell)	o	r	-	r
Veronica hederifolia (Ivy-leaved Speedwell)	vr	-	-	-
Veronica persica (Common Field-speedwell)	o	o	vr	vr
Veronica serpyllifolia (Thyme-leaved Speedwell)	vr	r	vr	r
Verbascum thapsus (Great Mullein)	vr	vr	vr	-
**Vicia cracca* (Tufted Vetch)	-	-	vr	-
Vicia faba (Broad Bean)	-	vr	-	-
Vicia hirsuta (Hairy Tare)	-	r	-	-
Vicia sativa ssp. *segetalis* (Common Vetch)	r	o	o	r
Vicia tetrasperma (Smooth Tare)	-	la	r	-
Vinca major (Greater Periwinkle)	vr	vr	-	-
Viola odorata (Sweet Violet)	r	vr	-	vr
Vulpia myuros (Rat's-tail Fescue)	-	vr	vr	-

Junction 15a Site

Table B4. *Plant species recorded in the vicinity of J15a. Column 1 – the canal corridor on either side of Junction 15a from 50m north of the lock north of the M1 junction to the point where the canal diverges from the A43 south of the J15a site. column 2 - the PWS south-west of the M1 and north-west of the canal; column 3 – secondary woodland south of the PWS.*

a) Trees, shrubs and woody climbers

Acer campestre (Field Maple) - in A43 landscape plantings	la	-	r
Acer pseudoplatanus (Sycamore)	o	-	-
Alnus glutinosa (Alder)	r	-	-
Cornus australis (Asiatic Dogwood) - in A43 landscape plantings	lf	-	-
Corylus avellana (Hazel) - in A43 landscape plantings	o	-	-
Crataegus monogyna (Hawthorn)	a	r	a
Fraxinus excelsior (Ash)	f	r	a
Hedera helix (Ivy)	f	vr	a
Ligustrum vulgare (Wild Privet)	r	-	-
Malus pumila (Apple)	r	-	-
Populus ×*canadensis* (Hybrid Black-poplar)	lf	-	-
Populus ×*canescens* (Grey Poplar)	-	-	la
Prunus avium (Wild Cherry) - in A43 landscape plantings	lf	-	-
Prunus spinosa (Blackthorn)	o	r	f
Quercus robur (Pedunculate Oak)	r	vr	r
Rhamnus cathartica (Buckthorn) - in A43 landscape plantings	vr	-	-
Rosa canina (Dog-rose)	r	vr	-
Rubus armeniacus (Bramble)	vr	vr	-
Rubus fruticosus agg. (Bramble)	o	r	-
Rubus ulmifolius (Bramble)	r	-	-
Salix alba ssp. *alba* (White Willow)	r	-	-
Salix caprea (Goat Willow)	r	-	-
Salix cinerea cf. ssp. *oleifolia* (Rusty Willow)	o	lf	o
Salix fragilis (Crack Willow)	-	lf	-
Salix ×*holosericea* (Silky-leaved Osier)	-	lf	-
Sambucus nigra (Elder)	o	vr	f
Ulmus cf. *procera* (English Elm) [6]	-	-	o

b) Herbaceous species

Achillea millefolium (Yarrow)	o	-	-
Agrostis stolonifera (Creeping Bent)	f	-	-
Alliaria petiolata (Garlic Mustard)	f	-	-
Alopecurus pratensis (Meadow Foxtail)	o	-	-
Anagallis arvensis (Scarlet Pimpernel)	vr	-	-
Angelica sylvestris (Wild Angelica)	o	f	r
Anisantha sterilis (Barren Brome)	o	-	-
Anthoxanthum odoratum (Sweet Vernal-grass)	r	-	-

Anthriscus sylvestris (Cow Parsley)	f	la	-
Apium nodiflorum (Fool's Water-cress)	r	r	-
Arctium lappa (Greater Burdock)	vr	-	-
Arctium minus cf. ssp. *minus* (Lesser Burdock)	r	-	-
Arenaria serpyllifolia (Thyme-leaved Sandwort)	vr	-	-
Arrhenatherum elatius (False Oat-grass)	f	lf	-
Artemisia vulgaris (Mugwort)	r	-	-
Arum maculatum (Lords-and-Ladies)	vr	-	-
Asplenium adiantum-nigrum (Black Spleenwort)	vr	-	-
Asplenium ruta-muraria (Wall-rue)	vr	-	-
Atriplex prostrata (Spear-leaved Orache)	vr	-	-
Avenula pubescens (Downy Oat-grass)	vr	-	-
Barbarea vulgaris (Winter-cress)	r	-	-
Bellis perennis (Daisy)	o	-	-
Bidens cf. *tripartita* (Trifid Bur-marigold) [3]	vr	-	-
Brachypodium sylvaticum (False Brome)	-	r	-
Briza media (Quaking-grass)	vr	-	-
Bromus hordeaceus ssp. *hordeaceus* (Soft-brome)	o	-	-
Bromopsis ramosa (Hairy-brome)	r	-	-
Bryonia dioica (White Bryony)	r	-	-
Caltha palustris (Marsh-marigold)	-	-	vr
Calystegia sepium ssp. *sepium* (Hedge Bindweed)	f	f	-
Cardamine amara (Large Bitter-cress)	-	r	-
Cardamine hirsuta (Hairy Bitter-cress)	r	-	-
Cardamine pratensis (Cuckooflower)	o	o	-
Carduus crispus (Welted Thistle)	r	-	-
Carex flacca (Glaucous Sedge)	r	-	-
Carex hirta (Hairy Sedge)	o	r	-
Carex otrubae (False Fox-sedge)	r	o	-
Carex pendula (Pendulous Sedge)	-	vr	-
Carex remota (Remote Sedge)	vr	-	r
Carex riparia (Greater Pond-sedge)	la	r	-
Centaurea debeauxii (Chalk Knapweed)	o	-	-
Cerastium fontanum (Common Mouse-ear)	f	-	-
Cerastium glomeratum (Sticky Mouse-ear)	o	-	-
Chamerion angustifolium (Rosebay Willowherb)	r	-	-
Cirsium arvense (Creeping Thistle)	o	a	-
Cirsium palustre (Marsh Thistle)	r	r	-
Cirsium vulgare (Spear Thistle)	o	-	-
Conium maculatum (Hemlock)	lf	-	-
Convolvulus arvensis (Field Bindweed)	o	-	-
Dactylis glomerata (Cock's-foot)	f	-	-
Dactylorhiza praetermissa (Southern Marsh-orchid)	-	vr	-
Deschampsia cespitosa (Tufted Hair-grass)	-	o	-
Dipsacus fullonum (Wild Teasel)	o	o	-
Dryopteris filix-mas (Male-fern)	-	r	-

Elodea nuttallii (Nuttall's Waterweed)	la	-	-
Elytrigia repens (Common Couch)	r	-	-
Epilobium ciliatum (American Willowherb)	o	-	-
Epilobium hirsutum (Great Willowherb)	a	a	-
Epilobium parviflorum (Hoary Willowherb)	o	-	-
Epilobium tetragonum (Square-stalked Willowherb)	o	r	-
Equisetum arvense (Field Horsetail)	o	-	-
Equisetum palustre (Marsh Horsetail)	r	o	-
Erodium cicutarium (Common Stork's-bill)	r	-	-
Erophila verna (Common Whitlowgrass)	r	-	-
Festuca rubra (Red Fescue)	a	-	-
Ficaria verna ssp. *verna* (Lesser Celandine)	r	-	-
Filipendula ulmaria (Meadowsweet)	f	a	o
Galium album (Hedge-bedstraw)	vr	-	-
Galium aparine (Cleavers)	f	o	-
Galium palustre (Common Marsh-bedstraw)	o	o	r
Galium verum (Lady's Bedstraw)	o	-	-
Geranium dissectum (Cut-leaved Crane's-bill)	r	-	-
Geranium molle (Dove's-foot Crane's-bill)	o	-	-
Geranium robertianum (Herb-Robert)	o	-	-
Geum urbanum (Wood Avens)	o	r	-
Glechoma hederacea (Ground-ivy)	f	lf	f
Glyceria maxima (Reed Sweet-grass)	la	lf	-
Helminthotheca echioides (Bristly Oxtongue)	o	-	-
Heracleum sphondylium (Hogweed)	o	o	-
Holcus lanatus (Yorkshire-fog)	a	o	-
Humulus lupulus (Hop)	r	r	-
Hypericum hirsutum (Hairy St John's-wort)	-	vr	-
Hypericum maculatum (Imperforate St John's-wort)	vr	-	-
Hypericum tetrapterum (Square-stalked St John's-wort)	r	r	-
Impatiens capensis (Orange Balsam)	r	o	o
Iris pseudacorus (Yellow Iris)	o	r	r
Juncus articulatus (Jointed Rush)	r	-	-
Juncus effusus (Soft-rush)	r	o	-
Juncus inflexus (Hard Rush)	f	f	-
Koeleria macrantha (Crested Hair-grass)	vr	-	-
Lactuca serriola (Prickly Lettuce)	vr	-	-
Lamium album (White Dead-nettle)	o	r	-
Lapsana communis (Nipplewort)	o	r	-
Lathyrus pratensis (Meadow Vetchling)	o	o	-
Leontodon hispidus (Rough Hawkbit)	r	-	-
Leucanthemum vulgare (Oxeye Daisy)	r	-	-
Linum catharticum (Fairy Flax)	vr	-	-
Lolium perenne (Perennial Rye-grass)	a	-	-
Lotus corniculatus (Common Bird's-foot-trefoil)	o	-	-
Lycopus europaeus (Gipsywort)	f	r	-

Lysimachia nummularia (Creeping-Jenny)	r	-	-
Lythrum salicaria (Purple-loosestrife)	o	-	-
Medicago lupulina (Black Medick)	f	-	-
Mentha aquatica (Water Mint)	f	o	-
Myosotis arvensis (Field Forget-me-not)	f	o	-
Nuphar lutea (Yellow Water-lily)	o	-	-
Oenanthe crocata (Hemlock Water-dropwort)	r	-	-
Oenothera biennis (Common Evening-primrose)	vr	-	-
Pentaglottis sempervirens (Green Alkanet)	r	-	-
Persicaria amphibia (Amphibious Bistort)	-	o	-
Phalaris arundinacea (Reed Canary-grass)	la	la	-
Phleum bertolonii (Smaller Cat's-tail)	r	-	-
Pilosella officinarum (Mouse-ear Hawkweed)	r	-	-
Plantago lanceolata (Ribwort Plantain)	f	-	-
Plantago major ssp. *major* (Greater Plantain)	f	-	-
Poa angustifolia (Narrow-leaved Meadow-grass)	o	-	-
Poa annua (Annual Meadow-grass)	o	-	-
Poa trivialis (Rough Meadow-grass)	a	f	f
Polygonum arenastrum (Equal-leaved Knotgrass)	o	-	-
Potamogeton crispus (Curled Pondweed) [4]	r	-	-
Potamogeton cf. *lucens* (Shining Pondweed) [4]	r	-	-
Potamogeton cf. *pectinatus* (Fennel Pondweed) [4]	r	-	-
Potamogeton perfoliatus (Perfoliate Pondweed) [4]	r	-	-
Potentilla anserina (Silverweed)	r	-	-
Potentilla reptans (Creeping Cinquefoil)	f	-	-
Prunella vulgaris (Selfheal)	o	-	-
Ranunculus acris (Meadow Buttercup)	o	-	-
Ranunculus repens (Creeping Buttercup)	f	o	-
Reseda luteola (Weld)	vr	-	-
Rumex acetosa (Common Sorrel)	r	-	-
Rumex conglomeratus (Clustered Dock)	r	-	-
Rumex crispus (Curled Dock)	r	-	-
Rumex hydrolapathum (Water Dock)	r	-	-
Rumex obtusifolius (Broad-leaved Dock)	o	-	-
Rumex sanguineus (Wood Dock)	f	f	o
Sagina procumbens (Procumbent Pearlwort)	o	-	-
Sagittaria sagittifolia (Arrowhead)	la	-	-
Schedonorus arundinaceus (Tall Fescue)	r	-	-
Schedonorus giganteus (Giant Fescue)	vr	r	-
Scorzoneroides autumnalis (Autumn Hawkbit)	r	-	-
Scrophularia auriculata (Water Figwort)	f	o	-
Scutellaria galericulata (Skullcap)	r	-	-
Senecio erucifolius (Hoary Ragwort)	o	-	-
Senecio jacobaea (Common Ragwort)	f	o	-
Senecio vulgaris (Groundsel)	r	-	-
Silene dioica (Red Campion)	r	-	-

Silene latifolia ssp. *alba* (White Campion)	vr	-	-
Sinapis arvensis (Charlock)	vr	-	-
Solanum dulcamara (Bittersweet)	r	o	-
Sonchus arvensis (Perennial Sow-thistle)	o	-	-
Sonchus asper (Prickly Sow-thistle)	o	-	-
Sparganium cf. *emersum* (Unbranched Bur-reed) [5]	lf	-	-
Sparganium erectum (Branched Bur-reed)	la	-	-
Stachys palustris (Marsh Woundwort)	o	r	-
Stachys sylvatica (Hedge Woundwort)	o	-	-
Symphytum ×*uplandicum* (Russian Comfrey)	vr	-	-
Taraxacum species (Dandelion)	f	-	-
Torilis japonica (Upright Hedge-parsley)	r	-	-
Trifolium dubium (Lesser Trefoil)	o	-	-
Trifolium pratense (Red Clover)	r	-	-
Trifolium repens (White Clover)	f	-	-
Tussilago farfara (Colt's-foot)	r	-	-
Typha latifolia (Bulrush)	o	o	-
Urtica dioica (Common Nettle)	a	f	a
Veronica arvensis (Wall Speedwell)	r	-	-
Veronica chamaedrys (Germander Speedwell)	o	-	-
Veronica persica (Common Field-speedwell)	vr	-	-
Veronica serpyllifolia ssp. *serpyllifolia* (Thyme-leaved Speedwell)	r	-	-
Verbascum thapsus (Great Mullein)	vr	-	-
Vicia cracca (Tufted Vetch)	-	o	-
Vicia sativa ssp. *segetalis* (Common Vetch)	o	-	-
Viola odorata (Sweet Violet)	r	-	-

Note 1. Though mosses and liverworts were not systematically recorded, the following species were noted along the canal: *Brachythecium rutabulum*, *Calliergonella cuspidata*, *Homalothecium sericeum*, *Hypnum cupressiforme*, *Kindbergia praelonga*, *Lunularia cruciata*, *Tortula muralis*. Similarly the following species were noted in the PWS: *Brachythecium rutabulum*, *Calliergonella cuspidata*, *Kindbergia praelonga*, *Lophocolea bidentata*, *Plagiomnium undulatum*.

Note 2. SP72565657 *Avenula pubescensi*, *Koeleria macrantha*; SP72585665 *Asplenium ruta-muraria*, *Avenula pubescens*, *Linum catharticum*; SP72565671 *Briza media*, *Potamogeton* cf. *lucens*; SP72615686 *Leontodon hispidus*, *Potamogeton perfoliatus*; SP72645707 *Potamogeton crispus*, *Potamogeton* cf. *friesii* ??, *Sagittaria sagittifolia*.

Note 3. No specimen accessible for examination – several non-native *Bidens* species are possible on the canal network, but *Bidens tripartita* is the most likely species.

Note 4. Permission to sample aquatic plants was not available, so *Potamogeton* species – difficult at the best of times – could not be recorded with confidence, except for *Potamogeton crispus* and *Potamogeton perfoliatus* which are very distinctive. A large-leaved species was probably *Potamogeton lucens* but its hybrids cannot be ruled out. A fine-leaved species was probably *Potamogeton pectinatus* but several other fine-leaved species cannot be ruled out and more than one may be present. A species with parallel-sided leaves c.6-7 mm wide was not seen at all closely, and could belong to several species such as *Potamogeton friesii* – the uncommon *Potamogeton compressus* cannot be ruled out.

Note 5. Plants of *Sparganium* in deep water with leaves c.10 mm wide reaching the surface and floating there are very probably *Sparganium emersum* which is common but hugely under-recorded as it almost never flowers in this situation and therefore remains technically indistinguishable from *Sparganium erectum*.

Note 6. Identification of most *Ulmus* species (except for *Ulmus glabra*) requires examination of twigs from mature trees, and since Dutch elm-disease it has been impossible to identify most hedgerow elms and suckering regrowth of elms reliably. Here we have assigned them all to *Ulmus procera* but they are likely to include forms of *Ulmus minor* (Small-leaved Elm).

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

APPENDIX B: TARGET NOTES

Main SRFI Site

East of Towcester Road (the Barn Lane Area)

Target Note 1. Rough grassland on the verge of a single-track road (Barn Lane) mostly dominated by the grasses *Arrhenatherum elatius* (False Oat-grass) and *Dactylis glomerata* (Cock's-foot) together with a few common grassland forbs and many tall semi-ruderal herbs including *Anthriscus sylvestris* (Cow Parsley), *Ficaria verna* (Lesser Celandine), *Galium aparine* (Cleavers), *Lamium album* (White Dead-nettle) and *Urtica dioica* (Common Nettle); there is also scattered *Rubus fruticosus* agg. (Bramble). The sward is loosely referable to the NVC type **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community**.

Target Note 2. An untrimmed roadside hedge up to about 4m tall mostly consisting of *Crataegus monogyna* (Hawthorn) with some *Acer campestre* (Field Maple) and *Prunus spinosa* (Blackthorn) and a few mature standard trees of *Quercus robur* (Pedunculate Oak). A ditch at its foot had running water at the time of the survey, and species growing on its banks include *Epilobium hirsutum* (Great Willowherb), *Ficaria verna* (Lesser Celandine) and *Rumex sanguineus* (Wood Dock). The adjacent road verge is similar to that described in *Target Note 1* though shade-tolerant species are more frequent, *e.g. Geum urbanum* (Wood Avens).

Target Note 3. Highly improved agricultural grassland strongly dominated by *Lolium perenne* (Perennial Rye-grass) and referable to the NVC type **MG7a *Lolium perenne* leys and related grasslands, *Lolium perenne-Trifolium repens* leys**. Though hard to judge without access in March, it may simply be a sown short-ley of *Lolium* in which case the field is essentially arable.

Target Note 4. A road hedge which at the time of the survey had recently been trimmed (or flailed) to a height of 1m so that the woody species could not easily be recognized, though it is mostly *Crataegus monogyna* (Hawthorn). Species growing beneath the hedge include *Anthriscus sylvestris* (Cow Parsley), *Galium aparine* (Cleavers), *Hedera helix* (Ivy) and *Urtica dioica* (Common Nettle). It has a dry ditch on the side nearest the road, and species growing on the banks include *Ficaria verna* (Lesser Celandine) and *Geum urbanum* (Wood Avens). The adjacent road verge supports rough grassland dominated by the grasses *Arrhenatherum elatius* (False Oat-grass), *Dactylis glomerata* (Cock's-foot), *Festuca rubra* (Red Fescue) and *Lolium perenne* (Perennial Rye-grass) together with tall semi-ruderal herbs and scramblers including *Anthriscus sylvestris* (Cow Parsley), *Heracleum sphondylium* (Hogweed), *Vicia sativa* ssp. *segetalis* (Common Vetch) and *Urtica dioica* (Common Nettle).

Target Note 5. A roadside ditch with water at the time of the survey. Species on the banks include *Epilobium hirsutum* (Great Willowherb), *Ficaria verna* (Lesser Celandine) and *Urtica dioica* (Common Nettle). The adjacent road verge is similar to that described in *Target Note 4.*

Target Note 6. The grassy verges of a drive have agriculturally improved swards continuous with those of the adjacent fields, though locally there is a more species-rich sward featuring the grass *Festuca rubra* (Red Fescue) together with common grassland forbs including *Achillea millefolium*

(Yarrow), *Cerastium fontanum* (Common Mouse-ear), *Taraxacum* species (Dandelion), *Trifolium repens* (White Clover) and *Veronica chamaedrys* (Germander Speedwell). There are two mature trees of *Acer pseudoplatanus* (Sycamore) at the entrance.

Target Note 7. Nettle-bed vegetation strongly dominated by *Urtica dioica* (Common Nettle) and probably referable to the NVC type **OV24a *Urtica dioica-Galium aparine* community, typical sub-community** on a bund at the edge of a farmyard. To the west there is a tall conifer hedge probably consisting of old trees of *Chamaecyparis lawsoniana* (Lawson's Cypress). There was no permission for access to inspection any of this closely.

Target Note 8. Scattered ruderals and fragmentary patches of nettle-bed vegetation around buildings, outdoor farm storage, and hard-standing in a large farmyard area. A wide range of common species includes *Geranium molle* (Dove's-foot Crane's-bill), *Lamium album* (White Dead-nettle), *Helmithotheca echioides* (Bristly Oxtongue) and *Urtica dioica* (Common Nettle).

Target Note 9. Rough grassland, tall semi-ruderal vegetation and bramble scrub in mosaic and transition on the embankment of an operational railway. Among the dominant species are *Arrhenatherum elatius* (False Oat-grass), *Galium aparine* (Cleavers), *Rosa canina* (Dog-rose), *Rubus fruticosus* agg. (Bramble) and *Urtica dioica* (Common Nettle). Several NVC types are doubtless represented in mosaic and transition including **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community**, **OV24b *Urtica dioica-Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* sub-community** and perhaps **W24a *Rubus fruticosus-Holcus lanatus* underscrub, *Cirsium arvense-Cirsium vulgare* sub-community**.

Target Note 10. A species-poor hedge of *Crataegus monogyna* (Hawthorn) trimmed to a height of about 1.5m. Additional bushes of *Crataegus* on the far side of a ditch at its western foot are sufficiently numerous in places to given the impression of a double hedge with a central ditch. Species present in (and characteristic of) the wet ditch-bottom include *Epilobium hirsutum* (Great Willowherb) and *Ranunculus repens* (Creeping Buttercup), while on the banks tall-herb vegetation mostly consisting of *Galium aparine* (Cleavers) and *Urtica dioica* (Common Nettle) grades at the top into adjacent agriculturally improved grassland.

Target Note 11. Rough grassland and nettle-bed vegetation in a field corner grades into adjacent agriculturally improved grassland. The nearby railway embankment had been relatively recently disturbed at the time of the survey, and supported tall ruderal vegetation in which prominent species included *Dipsacus fullonum* (Wild Teasel), *Urtica dioica* (Common Nettle) and *Verbascum thapsus* (Great Mullein).

Target Note 12. Scrub or an overgrown hedge up to about 4m high at the foot of earth bunds to the north. It mostly consists of *Acer pseudoplatanus* (Sycamore) saplings, *Crataegus monogyna* (Hawthorn), *Sambucus nigra* (Elder) and *Ulmus procera* (English Elm) with abundant *Hedera helix* (Ivy). A ditch at its foot had flowing water at the time of the survey but little vegetation.

Target Note 13. At the time of the survey, tall ruderal vegetation on the relatively recently disturbed embankment of an operational railway included *Arrhenatherum elatius* (False Oat-grass), *Artemisia vulgaris* (Mugwort), *Conium maculatum* (Hemlock), *Dipsacus fullonum* (Wild Teasel), *Rubus fruticosus* agg. (Bramble), *Urtica dioica* (Common Nettle) and *Verbascum thapsus* (Great Mullein).

Target Note 14. A pond about 20m by 10m with the semi-aquatic grass *Glyceria fluitans* (Floating Sweet-grass) in the water, while wetland plants on the water-margin include *Epilobium hirsutum* (Great Willowherb) and *Juncus inflexus* (Hard Rush). Nettle-bed vegetation on the rubble banks mostly consists of *Galium aparine* (Cleavers) and *Urtica dioica* (Common Nettle) with some *Rubus fruticosus* agg. (Bramble), being perhaps referable to the NVC type **OV24b *Urtica dioica-Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* sub-community**. Bushes of *Crataegus monogyna* (Hawthorn) and *Sambucus nigra* are frequent.

Target Note 15. A species-poor hedge of *Crataegus monogyna* (Hawthorn) trimmed to a height of about 2m. It has no bank or ditch but does have a few mature standard trees of *Fraxinus excelsior* (Ash). Vegetation in the hedge bottom mostly consists of *Galium aparine* (Cleavers) and *Urtica dioica* (Common Nettle). A grassy field-edge track on the southern side has an agriculturally improved sward strongly dominated by *Lolium perenne* (Perennial Rye-grass) and *Trifolium repens* (White Clover) and referable to the NVC type **MG7a *Lolium perenne* leys and related grasslands, *Lolium perenne-Trifolium repens* leys**.

Target Note 16. A hedge similar to that described in *Target Note 15*.

Target Note 17. A hedge similar to that described in *Target Note 15* though with some *Fraxinus excelsior* (Ash), *Prunus spinosa* (Blackthorn), *Rosa canina* (Dog-rose) and *Sambucus nigra* (Elder).

Target Note 18. About 25 plants of the fern *Asplenium adiantum-nigrum* (Black Spleenwort) on the parapet of a blue-brick railway bridge. There were also a very few plants of *Asplenium ruta-muraria* (Wall-rue). It was not possible to view the outer (railway-side) face of the brickwork.

Target Note 19. Thorn scrub dominated by *Crataegus monogyna* (Hawthorn) and referable to the NVC type **W21a *Crataegus monogyna-Hedera helix* scrub, *Hedera helix-Urtica dioica* sub-community**, and bramble scrub referable to the NVC types **W24a *Rubus fruticosus-Holcus lanatus* underscrub, *Cirsium arvense-Cirsium vulgare* sub-community** and **W24b *Rubus fruticosus-Holcus lanatus* underscrub, *Arrhenatherum elatius-Heracleum sphondylium* sub-community,** and tall-herb vegetation perhaps referable to the NVC types **OV24b *Urtica dioica-Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* sub-community** and **OV27b *Epilobium angustifolium* community, *Urtica dioica-Cirsium arvense* sub-community** and rough grassland referable to the NVC type **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community** all in mosaic and transition on the cutting sides of an operational railway. The thorn scrub is dense on either side of the bridge and thins away from it giving way predominantly to rough grassland towards the southern edge of the survey area (so far as could be discerned from the bridge without access).

Target Note 20. A species-poor hedge mostly consisting of *Crataegus monogyna* (Hawthorn) with small amounts of *Sambucus nigra* (Elder) and trimmed to a height of about 1.5m. It has a dry ditch but little discernible bank and few if any standard trees. Vegetation in the hedge bottom mostly consists of *Rubus fruticosus* agg. (Bramble) and *Urtica dioica* (Common Nettle). There is a strip of agriculturally improved grassland on the adjacent field edge.

Target Note 21. A hedge similar to that described in *Target Note 20*.

Target Note 22. A non-trimmed hedge mostly consisting of *Crataegus monogyna* (Hawthorn) and *Prunus spinosa* (Blackthorn) to a height of about 2.5m, though there are taller stands of *Fraxinus*

excelsior (Ash) and *Ulmus procera* (English Elm) in the hedge especially towards the east. A ditch had been newly cleaned out and was devoid of vegetation at the time of the survey.

Target Note 23. A species-poor road hedge of *Crataegus monogyna* (Hawthorn) trimmed to a height of about 1.5m. It includes a mature *Fraxinus excelsior* (Ash) standard tree and has a ditch which held water at the time of the survey. The adjacent road verge supports rough grassland dominated by the grass *Arrhenatherum elatius* (False Oat-grass) together with tall semi-ruderal herbs including *Anthriscus sylvestris* (Cow Parsley), *Cirsium vulgare* (Spear Thistle), *Rumex obtusifolius* (Broad-leaved Dock) and *Urtica dioica* (Common Nettle) so that it is referable to the NVC type **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community**.

Target Note 24. A tall road hedge mostly consisting of *Ulmus procera* (English Elm) to a height of about 5m together with smaller amounts of *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash), *Hedera helix* (Ivy) and *Prunus spinosa* (Blackthorn). A ditch at its foot held water at the time of the survey and the sparsely vegetated banks had shade-tolerant species including *Alliaria petiolata* (Garlic Mustard) in addition to the widespread *Urtica dioica* (Common Nettle). Towards the road edge a sward including *Lolium perenne* (Perennial Rye-grass) is loosely referable to the NVC type **OV23 *Lolium perenne-Dactylis glomerata* community**.

Target Note 25. A pond about 20m by 10m and about 0.3m deep at the time of the survey. It is deeply shaded but relatively rich in aquatic vegetation which includes *Alisma plantago-aquatica* (Water-plantain), *Callitriche* cf. *stagnalis* (Common Water-starwort) and *Iris pseudacorus* (Yellow Iris), while plants on the water-margin include *Carex* cf. *pendula* (Pendulous Sedge), *Ranunculus repens* (Creeping Buttercup) and *Urtica dioica* (Common Nettle).

Target Note 26. Secondary woodland surrounding the pond described in *Target Note 25* and adjacent to the hedge described in *Target Note 24*. It is dominated in the canopy by *Fraxinus excelsior* (Ash) and *Quercus robur* (Pedunculate Oak), in the shrub-layer by *Crataegus monogyna* (Hawthorn), and in the field-layer by *Rubus fruticosus* agg. (Bramble) so that it is loosely referable to the NVC type **W10d *Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland, *Hedera helix* sub-community**.

Target Note 27. A tall road hedge outside a plant nursery has affinities with that described in *Target Note 24* but is greatly modified and includes some exotic species.

Target Note 28. A road hedge trimmed to about 2m but recently trimmed or flailed at the time of the survey so that its woody-species composition was hard to assess. It probably consists mainly of *Crataegus monogyna* (Hawthorn) perhaps with *Ulmus procera* (English Elm). Shade-tolerant species in the hedge bottom include *Alliaria petiolata* (Garlic Mustard), *Galium aparine* (Cleavers), *Hedera helix* (Ivy) and *Urtica dioica* (Common Nettle). A ditch at its foot held water at the time of the survey and had relatively abundant emergent aquatic vegetation mostly consisting of *Apium nodiflorum* (Fool's Water-cress) and *Epilobium hirsutum* (Great Willowherb). Species on the ditch banks include *Ficaria verna* (Lesser Celandine) and *Rumex sanguineus* (Wood Dock). The adjacent road verge has rough grassland in which the coarse grass *Schedonorus arundinaceus* (Tall Fescue) is relatively prominent along with more usual components of roadside rough grassland referable to the NVC type **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community** including *Anthriscus sylvestris* (Cow Parsley), *Arrhenatherum elatius* (False Oat-grass), *Ranunculus repens* (Creeping Buttercup) and *Urtica dioica* (Common Nettle). Towards the road edge it grades into grassland with

Lolium perenne (Perennial Rye-grass) referable to the NVC type **OV23 *Lolium perenne-Dactylis glomerata* community**.

Target Note 29. A tall road hedge mostly consisting of *Prunus* cf. *domestica* (Wild Plum) to about 6m in height with a small amount of *Fraxinus excelsior* (Ash). The deeply shaded hedge bottom is carpeted by *Hedera helix* (Ivy) and shade-tolerant species on the adjacent road verge include *Alliaria petiolata* (Garlic Mustard), *Anthriscus sylvestris* (Cow Parsley), and *Urtica dioica* (Common Nettle).

Target Note 30. A hedge similar to that described in *Target Note 4*.

Target Note 31. A road hedge trimmed to about 2m but recently trimmed or flailed at the time of the survey so that its woody-species composition was hard to assess. It probably consists mainly of *Crataegus monogyna* (Hawthorn). Vegetation in the hedge-bottom mostly consists of *Galium aparine* (Cleavers), *Hedera helix* (Ivy) and *Urtica dioica* (Common Nettle). The adjacent verge had been relatively recently disturbed at the time of the survey but had typical road-verge plants including *Anthriscus sylvestris* (Cow Parsley), *Cirsium vulgare* (Spear Thistle), *Galium aparine* (Cleavers), *Geranium robertianum* (Herb-Robert), *Poa trivialis* (Rough Meadow-grass) and *Urtica dioica* (Common Nettle).

Target Note 32. Rough grassland along a road-side fence-line. It is dominated by the grasses *Arrhenatherum elatius* (False Oat-grass), *Lolium perenne* (Perennial Rye-grass) and *Schedonorus arundinaceus* (Tall Fescue) together with tall semi-ruderal herbs including *Anthriscus sylvestris* (Cow Parsley) and *Urtica dioica* (Common Nettle).

Target Note 33. A wide but species-poor hedge of *Crataegus monogyna* (Hawthorn) with some *Ulmus procera* (English Elm) trimmed to about 1.5m high over a shallow dry depression. There are occasional mature *Fraxinus excelsior* (Ash) and *Quercus robur* (Pedunculate Oak) standard trees. Vegetation in the hedge bottom mostly consists of *Galium aparine* (Cleavers) and *Urtica dioica* (Common Nettle).

Target Note 34. An overgrown trackside hedge mainly consisting of *Crataegus monogyna* (Hawthorn) and *Ulmus procera* (English Elm) to about 5m high with small amounts of *Rosa canina* (Dog-rose). There is a dry ditch and vegetation in the hedge bottom mostly consists of *Rubus fruticosus* agg. (Bramble) and *Urtica dioica* (Common Nettle).

Target Note 35. A hedge similar to that described in *Target Note 34* but trimmed to about 2m high at the time of the survey.

Target Note 36. A species-poor hedge mostly consisting of *Crataegus monogyna* (Hawthorn) trimmed to about 1.5m high with re-growth to 2m at the time of the survey.

Target Note 37. A species-poor hedge mostly consisting of *Crataegus monogyna* (Hawthorn) trimmed to about 2.5m high (including re-growth at the time of the survey). A ditch at its foot contained a small amount of water at the time of the survey. To the south of the hedge is a rough grassland strip about 12m wide dominated by the grasses *Arrhenatherum elatius* (False Oat-grass), *Holcus lanatus* (Yorkshire-fog) and *Poa trivialis* (Rough Meadow-grass) with tall semi-ruderal herbs including *Epilobium hirsutum* (Great Willowherb), *Rumex obtusifolius* (Broad-leaved Dock) and *Urtica*

dioica (Common Nettle) plus game-cover plants including at the time of the survey a 'Brassica' that may be *Raphanus raphanistrum* ssp. *landra* (Mediterranean Radish).

Target Note 38. A dry ditch and wide grassy track along a fence-line. The sward is dominated by the grasses *Arrhenatherum elatius* (False Oat-grass) and *Elytrigia repens* (Common Couch) with grassland forbs and tall semi-ruderal herbs including *Anthriscus sylvestris* (Cow Parsley), *Ranunculus repens* (Creeping Buttercup), *Rumex obtusifolius* (Broad-leaved Dock), *Trifolium pratense* (Red Clover) and *Urtica dioica* (Common Nettle). It is mostly referable to the NVC type **MG1a *Arrhenatherum elatius* grassland, *Festuca rubra* sub-community** grading locally into **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community** in places where the tall herbs rise to prominence.

Target Note 39. A hedge similar to that described in *Target Note 36*.

Target Note 40. A grassy arable headland similar to that described in *Target Note 37*.

Target Note 41. Mixed tall-herb vegetation and bramble scrub variously dominated by *Rubus fruticosus* agg. (Bramble) and *Urtica dioica* (Common Nettle) on the embankment of an operational railway.

Target Note 42. Mixed railway vegetation similar to that described in *Target Note 41* but with more bushes of *Sambucus nigra* (Elder) and saplings of *Fraxinus excelsior* (Ash).

Target Note 43. Rough grassland in a field-edge strip about 10m wide is dominated by the grasses *Arrhenatherum elatius* (False Oat-grass), *Holcus lanatus* (Yorkshire-fog), *Lolium perenne* (Perennial Rye-grass) and *Schedonorus arundinaceus* (Tall Fescue) together with grassland forbs including *Ranunculus repens* (Creeping Buttercup) and *Trifolium pratense* (Red Clover). The rush *Juncus inflexus* (Hard Rush) is also scattered.

Target Note 44. A wooded pit holding water only in a very small area with no wetland vegetation. The canopy mostly consists of *Crataegus monogyna* (Hawthorn) and *Fraxinus excelsior* (Ash) though there is at least one old rose-family tree, possibly a *Pyrus* species (Pear) but impossible to identify in March. The field-layer variously consists of *Anthriscus sylvestris* (Cow Parsley), *Arctium minus* (Lesser Burdock), *Ficaria verna* (Lesser Celandine), *Galium aparine* (Cleavers) and *Urtica dioica* (Common Nettle).

Target Note 45. A tall hedge of large *Crataegus monogyna* (Hawthorn) bushes about 5m in height at about a five-metre spacing so that the hedge has gaps beneath the upper canopy. It also contains some *Fraxinus excelsior* (Ash). There is a dry ditch and the field-layer mostly consists of *Galium aparine* (Cleavers) and *Urtica dioica* (Common Nettle) grading into rough grassland similar to that described in *Target Note 43* on an arable headland about 3m wide.

Target Note 46. Dense bramble scrub loosely referable to the NVC type **W24 *Rubus fruticosus-Holcus lanatus* underscrub** on the embankment of an operational railway. There are also scattered bushes of *Sambucus nigra* (Elder).

Target Note 47. A wet ditch between bramble scrub on the adjacent railway and rough grassland on the adjacent arable field headland. The ditch has well-developed semi-aquatic vegetation that

includes *Epilobium hirsutum* (Great Willowherb), *Juncus effusus* (Soft-rush), *Nasturtium* cf. *officinale* (Water-cress) and *Scrophularia auriculata* (Water Figwort).

Target Note 48. A hedge trimmed to about 2m but recently trimmed or flailed at the time of the survey so that its woody-species composition was hard to assess. It probably consists mainly of *Crataegus monogyna* (Hawthorn) with *Sambucus nigra* (Elder) and *Ulmus procera* (English Elm). It has a wet ditch or small stream and several mature standard trees of *Quercus robur* (Pedunculate Oak). Vegetation in the hedge bottom mostly consists of *Galium aparine* (Cleavers), *Hedera helix* (Ivy), *Poa trivialis* (Rough Meadow-grass) and *Urtica dioica* (Common Nettle). Alongside the hedge and stream are narrow strips of rough grassland loosely referable to the NVC type **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community**.

Target Note 49. A hedge similar to that described in *Target Note 48* though with no stream.

Target Note 50. A hedge similar to that described in *Target Note 48*.

Target Note 51. A pond about 15m across with *Lemna* cf. *minor* (Common Duckweed) on the water surface. It is surrounded and shaded by scrub mainly consisting of *Prunus spinosa* (Blackthorn) with some *Crataegus monogyna* (Hawthorn) and *Ulmus procera* (English Elm), over a field-layer of *Poa trivialis* (Rough Meadow-grass) and *Urtica dioica* (Common Nettle); the scrub is perhaps loosely referable to the NVC type **W22a *Prunus spinosa-Rubus fruticosus* scrub, *Hedera helix-Silene dioica* sub-community**. On its southern edge the scrub gives way to wet nettle-bed vegetation mostly consisting of *Epilobium hirsutum* (Great Willowherb), *Galium aparine* (Cleavers) and *Urtica dioica* (Common Nettle) perhaps referable to the NVC type **OV26e *Epilobium angustifolium* community, *Urtica dioica-Cirsium arvense* sub-community**. The adjacent section of the stream mentioned in *Target Note 48* is relatively wide and has well-developed semi-aquatic vegetation that includes *Apium nodiflorum* (Fool's Water-cress), *Glyceria fluitans* (Floating Sweet-grass), *Scrophularia auriculata* (Water Figwort) and *Veronica beccabunga* (Brooklime).

Target Note 52. A hedge similar to that described in *Target Note 48* with scrub surrounding a pond similar to that described in *Target Note 51* but much smaller at its northern end.

Target Note 53. A hedge similar to that described in *Target Note 48* though with no ditch. On its southern side a shallow depression is filled with nettle-bed vegetation loosely referable to the NVC type **OV24a *Urtica dioica-Galium aparine* community, typical sub-community**.

Target Note 54. A hedge similar to that described in *Target Note 48* though it has some standard trees of *Fraxinus excelsior* (Ash) and the ditch contains stands of *Epilobium hirsutum* (Great Willowherb).

Target Note 55. A field-corner patch of scrub mostly consisting of *Prunus spinosa* (Blackthorn) over a largely bare field-layer with scattered *Urtica dioica* (Common Nettle); it is probably referable to the NVC type **W22a *Prunus spinosa-Rubus fruticosus* scrub, *Hedera helix-Silene dioica* sub-community**. There is at least one old rose-family tree, possibly a *Pyrus* species (Pear) but impossible to identify in March.

Target Note 56. A tall hedge of large *Crataegus monogyna* (Hawthorn) bushes about 5m in height and well-spaced so that the hedge has gaps beneath the upper canopy. The deeply-shaded field

layer is largely bare save for carpets of the moss *Brachythecium rutabulum* and scattered plants of *Arum maculatum* (Lords-and-Ladies) and *Urtica dioica* (Common Nettle).

Target Note 57. A species-poor hedge mostly consisting of *Crataegus monogyna* (Hawthorn) with large gaps and a rough grassland grassland strip loosely referable to the NVC type **MG1 *Arrhenatherum elatius* grassland** alongside.

Target Note 58. A hedge similar to described in *Target Note 48* though with no stream.

Target Note 59. A hedge similar to described in *Target Note 48* though with a wet ditch.

Target Note 60. A pond about 30m by 10m surrounded by mixed scrub mostly consisting of *Crataegus monogyna* (Hawthorn) with some *Fraxinus excelsior* (Ash) and *Malus sylvestris* (Crab Apple). Plants in the water include *Callitriche* cf. *stagnalis* (Common Water-starwort) and *Glyceria fluitans* (Floating Sweet-grass). The field-layer beneath the denser parts of the scrub is largely bare, but towards the edges it gives way to bramble scrub and tall-herb vegetation mostly consisting of *Rubus fruticosus* agg. (Bramble) and *Urtica dioica* (Common Nettle) perhaps referable to the NVC type **OV24b *Urtica dioica-Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* sub-community**.

Target Note 61. A tall and diffusely wide hedge – perhaps originally a double hedge now overgrown – mostly consisting of *Crataegus monogyna* (Hawthorn) with some *Fraxinus excelsior* (Ash) and *Rosa canina* (Dog-rose) to a height of about 5m. The deeply-shaded field-layer is mostly dominated by *Hedera helix* (Ivy).

West of or Close to Towcester Road

Target Note 62. Thorn scrub mostly consisting of *Crataegus monogyna* (Hawthorn) and loosely referable to the NVC type **W21a *Crataegus monogyna-Hedera helix* scrub, *Hedera helix-Urtica dioica* sub-community** in a field corner. It contains *Cotoneaster* cf. ×*watereri* (Waterer's Cotoneaster), *Symphoricarpos albus* (Snowberry) and other ornamental species.

Target Note 63. A species-poor hedge of *Crataegus monogyna* (Hawthorn) to a height of about 4m on a slight bank between a field and the towpath of a canal. Scattered vegetation in the hedge-bottom consists of shade-tolerant species including *Alliaria petiolata* (Garlic Mustard), *Galium aparine* (Cleavers), *Glechoma hederacea* (Ground-ivy) and *Urtica dioica* (Common Nettle). The adjacent towpath has closely mown but relatively species-rich amenity-turf dominated by the grasses *Dactylis glomerata* (Cock's-foot), *Lolium perenne* (Perennial Rye-grass) and *Poa trivialis* (Rough Meadow-grass) together with a wide range of common grassland forbs including *Cerastium fontanum* (Common Mouse-ear), *Glechoma hederacea* (Ground-ivy) and *Ranunculus repens* (Creeping Buttercup). It is probably intermediate between the NVC types **MG7e *Lolium perenne* leys and related grasslands, *Lolium perenne-Plantago lanceolata* grassland** and **OV23 *Lolium perenne-Dactylis glomerata* community**.

Target Note 64. Semi-improved or perhaps unimproved agricultural grassland probably referable to the NVC type **MG6a *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community**. There was no permission for access to inspect more closely. At the time of the survey parts of the sward had been cleared for surveying or construction works of some kind.

Target Note 65. A hedge similar to that described in *Target Note 63*.

Target Note 66. Relatively species-rich roadside amenity-turf outside houses.

Target Note 67. A hedge on a canal towpath similar to those described in *Target Note 63*.

Target Note 68. Semi-improved or unimproved grassland similar to that described in *Target Note 64* though in this case ridge-and-furrow.

Target Note 69. Barely mature broad-leaved plantation woodland on the embankment of the A43 dual-carriageway main road. At this point it mostly consists *Acer campestre* (Field Maple) with some other species including *Betula pendula* (Silver Birch) but it is likely to vary in composition from place to place. The field-layer has scattered plants probably remaining from former grassland into which the trees were planted, but it is bare in places or replaced by carpets of moss. It was not accessed for closer inspection.

Target Note 70. A hedge and canal towpath similar to those described in *Target Note 63*.

Target Note 71. The brickwork buttresses of a former bridge (perhaps a railway bridge) between remaining sections of embankment support a diverse collection of plants including the ferns *Asplenium adiantum-nigrum* (Black Spleenwort), *Asplenium trichomanes* (Maidenhair Spleenwort) and *Asplenium scolopendrium* (Hart's-tongue) and almost certainly others, and flowering plants including *Fragaria vesca* (Wild Strawberry), *Inula conyzae* (Ploughman's-spikenard) and *Poa angustifolia* (Narrow-leaved Meadow-grass). This collection of relatively infrequent species is likely to be of some importance in the Northamptonshire context; it could not be fully assessed in March, and other species of note may be present.

Target Note 72. Semi-improved or perhaps unimproved grassland grazed by rabbits on slopes adjacent to a large embankment (probably a former railway embankment). The sward is dominated by the grasses *Agrostis capillaris* (Common Bent), *Festuca rubra* (Red Fescue) and *Holcus lanatus* (Yorkshire-fog) together with common grassland forbs including *Ficaria verna* (Lesser Celandine), *Ranunculus repens* (Creeping Buttercup) and *Trifolium repens* (White Clover) and the moss *Brachythecium rutabulum*. Taller herbs are scattered including *Carduus nutans* (Musk Thistle), *Inula conyzae* (Ploughman's-spikenard) and *Senecio jacobaea* (Common Ragwort). The sward is probably referable to the NVC type **MG6a *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community** but on the former railway embankment it grades into tall-herb vegetation dominated by *Urtica dioica* (Common Nettle) with patchy *Rubus fruticosus* agg. (Bramble) probably referable to the NVC type **OV24b *Urtica dioica-Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* sub-community**.

Target Note 73. A tall hedge of *Crataegus monogyna* (Hawthorn) bushes about 4m in height and well-spaced so that the hedge has gaps beneath the upper canopy. The adjacent agricultural continues beneath the hedge though *Urtica dioica* (Common Nettle) is frequent.

Target Note 74. Semi-improved or perhaps unimproved mesotrophic grassland on ridge-and-furrow. The sward is dominated by the grasses *Agrostis capillaris* (Common Bent), *Festuca rubra* (Red Fescue), *Holcus lanatus* (Yorkshire-fog) and *Lolium perenne* (Perennial Rye-grass) together with

common grassland forbs including *Cerastium fontanum* (Common Mouse-ear), *Prunella vulgaris* (Selfheal), *Ranunculus repens* (Creeping Buttercup) and *Trifolium repens* (White Clover). Taller herbs are scattered including *Carduus nutans* (Musk Thistle), *Inula conyza* (Ploughman's-spikenard) and *Senecio jacobaea* (Common Ragwort). The sward is probably referable to the NVC type **MG6a *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community**.

Target Note 75. Planted trees of *Salix ×fragilis* (Crack Willow) and other species including *Acer campestre* (Field Maple) forming an open canopy on the embankment of the A43 dual-carriageway road. There are scattered bushes of *Crataegus monogyna* (Hawthorn) insufficient to amount to a hedge along the fence-line. A varied field-layer is dominated by *Poa trivialis* (Rough Meadow-grass) and *Urtica dioica* (Common Nettle) together with a scatter of grasses and tall herbs typical of road verges.

Target Note 76. A species-poor hedge of *Crataegus monogyna* (Hawthorn) to a height of about 3m over a ditch holding water but no aquatic vegetation at the time of the survey. The adjacent agricultural sward extends into the foot of the hedge.

Target Note 77. Semi-improved improved or perhaps unimproved ridge-and-furrow grassland similar to that described in *Target Note 74* but long neglected so that it has become rank and tussocky. There are some patches of the coarse grass *Deschampsia cespitosa* (Tufted Hair-grass) and tall semi-ruderal herbs are scattered, especially *Dipsacus fullonum* (Wild Teasel) and *Rumex sanguineus* (Wood Dock). There is some patchy encroachment by *Rubus fruticosus* agg. (Bramble) especially towards the edges.

Target Note 78. Barely mature plantation woodland on earth bunds mostly consists of *Fraxinus excelsior* (Ash) with smaller amounts of *Betula pendula* (Silver Birch), *Crataegus monogyna* (Hawthorn) and other species. The field-layer is largely bare save for a thin scatter of the *Urtica dioica* (Common Nettle) and similar shade-tolerant species.

Target Note 79. Dense *Rubus fruticosus* agg. (Bramble) scrub and nettle-bed vegetation in mosaic and transition. In addition to *Urtica dioica* (Common Nettle), species contributing to the nettle-bed element include *Cirsium arvense* (Creeping Thistle), *Dipsacus fullonum* (Wild Teasel), *Glechoma hederacea* (Ground-ivy). The moss *Brachythecium rutabulum* forms carpets in the ground layer.

Target Note 80. Scattered ruderals on the tarmac and concrete of a disused main-road service area include *Cerastium fontanum* (Common Mouse-ear), *Cerastium* cf. *semidecandrum* (Little Mouse-ear), *Myosotis arvensis* (Field Forget-me-not), *Sonchus asper* (Prickly Sow-thistle) and (oddly) *Scrophularia auriculata* (Water Figwort) among many others. In places there are patches of ornamental shrubbery mostly consisting of *Berberis* cultivars (Barberry), *Betula* cultivars (Birches) and *Mahonia* cf. 'Charity' (an Oregon-grape).

Target Note 81. Barely mature plantation woodland consisting of *Populus* species (Poplars) with a eutrophic field-layer mostly dominated by *Cirsium arvense* (Creeping Thistle), *Poa trivialis* (Rough Meadow-grass) and *Urtica dioica* (Common Nettle).

Target Note 82. A dry ditch with grassy vegetation similar to that described in *Target Note 83*.

Target Note 83. Rabbit-grazed semi-ruderal grassland dominated by *Agrostis capillaris* (Common Bent) and *Arrhenatherum elatius* (False Oat-grass) with a scatter of tall semi-ruderal herbs including *Cirsium arvense* (Creeping Thistle), *Dipsacus fullonum* (Wild Teasel) and *Urtica dioica* (Common Nettle). In wet depressions the sward is characterised by the moss *Calliergonella cuspidata* and the grass *Cynosurus cristatus* (Crested Dog's-tail). Where the tall semi-ruderal herbs rise to prominence this grassland is referable to the NVC type **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community** and it forms mosaic and transition with adjacent stands of nettle-bed and bramble scrub referable to the NVC types **OV24b *Urtica dioica-Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* sub-community** or **W24a *Rubus fruticosus-Holcus lanatus* underscrub, *Cirsium arvense-Cirsium vulgare* sub-community**.

Target Note 84. A species-poor hedge of *Crataegus monogyna* (Hawthorn) with small amounts of *Sambucus nigra* (Elder) trimmed to a height of about 2m (including re-growth at the time of the survey). A ditch at its foot contains *Epilobium hirsutum* (Great Willowherb) and otherwise the field-layer mostly consists of *Galium aparine* (Cleavers) and *Urtica dioica* (Common Nettle).

Target Note 85. A hedge similar to that described in *Target Note 84* though more overgrown.

Target Note 86. A hedge similar to that described in *Target Note 84* with a wide grassy arable margin alongside.

Target Note 87. A hedge similar to that described in *Target Note 84*.

Target Note 88. A hedge similar to that described in *Target Note 84* but grown to a height of about 4m. A wet ditch at its foot contains relatively species-rich aquatic vegetation that includes *Apium nodiflorum* (Fool's Water-cress), *Epilobium hirsutum* (Great Willowherb), *Glyceria* cf. *fluitans* (Floating Sweet-grass), *Myosotis* cf. *scorpioides* (Water Forget-me-not) and *Veronica beccabunga* (Brooklime).

Target Note 89. A tall hedge of large *Crataegus monogyna* (Hawthorn) bushes about 4m to 5m in height and well-spaced so that the hedge has gaps beneath the upper canopy. There are a few old bushes of *Salix* cf. *cinerea* ssp. *oleifolia* (Rusty Willow) indeterminable in March. The adjacent agricultural sward continues beneath the hedge though *Urtica dioica* (Common Nettle) is frequent. A ditch or small stream beneath the hedge is about 0.5m wide at the water-margin and was about 0.1m deep at the time of the survey, but had little distinctive aquatic vegetation.

Target Note 90. Semi-improved agricultural grassland dominated by the grasses *Agrostis capillaris* (Common Bent), *Festuca rubra* (Red Fescue), *Holcus lanatus* (Yorkshire-fog) and *Lolium perenne* (Perennial Rye-grass) together with common grassland forbs especially *Cerastium fontanum* (Common Mouse-ear) and *Ranunculus repens* (Creeping Buttercup), though broad-leaved herb cover does not generally exceed 10% to 20%. Tall semi-ruderal herbs are scattered, especially *Carduus nutans* (Musk Thistle), *Cirsium arvense* (Creeping Thistle) and *Senecio jacobaea* (Common Ragwort). The sward is probably referable to the NVC type **MG6a *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community**.

Target Note 91. Less markedly improved agricultural grassland on steeper banks and ridge-and-furrow in the southern and south-eastern parts of the field described in *Target Note 90*. Here additional grassland forbs include *Achillea millefolium* (Yarrow), *Prunella vulgaris* (Selfheal), *Rumex*

acetosa (Common Sorrel) and *Veronica serpyllifolia* (Thyme-leaved Speedwell). The species-richness of the sward could have been under-estimated in March.

Target Note 92. A tall species-poor *Crataegus monogyna* (Hawthorn) hedge to a height of about 5m between the field described in *Target Note 91* and a canal towpath. Shade-tolerant species growing at its foot include *Brachypodium sylvaticum* (False Brome), *Galium aparine* (Cleavers), *Glechoma hederacea* (Ground-ivy), *Heracleum sphondylium* (Hogweed) and *Urtica dioica* (Common Nettle) and there are carpets of the moss *Kindbergia praelonga*.

Target Note 93. A hedge similar to that described in *Target Note 92* though probably less species-rich in the field-layer.

Target Note 94. An agricultural grassland sward probably similar to that described in *Target Notes 90* and *91*. There was no permission for access to inspect more closely.

Target Note 95. Secondary woodland on banks near a railway seen only from a distance since there was no permission for access to intervening land.

Target Note 96. Fairly extensive field-corner nettle-bed vegetation dominated by *Urtica dioica* (Common Nettle) together with *Galium aparine* (Cleavers), *Heracleum sphondylium* (Hogweed) and *Poa trivialis* (Rough Meadow-grass). It may be referable to the NVC type **OV24a *Urtica dioica-Galium aparine* community, typical sub-community** but is probably rather species-rich for that community, perhaps forming transitions to other ruderal communities.

Target Note 97. A hedge similar to that described in *Target Note 84*.

Target Note 98. A patch of relatively species-rich nettle-bed vegetation variously consisting of *Carduus nutans* (Musk Thistle), *Galium aparine* (Cleavers), *Poa trivialis* (Rough Meadow-grass), *Rumex obtusifolius* (Broad-leaved Dock) and *Urtica dioica* (Common Nettle) among other species.

Target Note 99. A hedge similar to that described in *Target Note 84* though a ditch or small stream at its foot had flowing water at the time of the survey and aquatic vegetation mostly consisting of *Apium nodiflorum* (Fool's Water-cress).

Target Note 100. A hedge similar to that described in *Target Note 84* but wider and taller to a height of about 2.5m. A ditch or small stream at its foot had flowing water at the time of the survey and mixed aquatic vegetation mostly consisting of *Apium nodiflorum* (Fool's Water-cress, *Epilobium hirsutum* (Great Willowherb), *Juncus effusus* (Soft-rush) and *Phalaris arundinacea* (Reed Canary-grass).

Target Note 101. A hedge and stream similar to that described in *Target Note 100* though the hedge contains several standard trees of *Fraxinus excelsior* (Ash). There is a wide grassy arable headland alongside.

Target Note 102. A hedge and stream similar to that described in *Target Note 100*.

Target Note 103. A hedge similar to that described in *Target Note 84* but with gaps in parts and a wide grassy arable headland alongside.

Target Note 104. A large area of nettle-bed vegetation referable to the NVC type **OV24a *Urtica dioica-Galium aparine* community, typical sub-community** and ruderal scrub mostly consisting of *Sambucus nigra* (Elder) and referable to the proposed NVC type ***Sambucus nigra-Urtica dioica* community** (Rodwell *et al.* 2000).

Target Note 105. A eutrophic stream about 0.8m wide at the water-margin and about 0.2m deep at the time of the survey. It is largely lacking in distinctively aquatic vegetation. On the eastern bank there are tall bushes of *Crataegus monogyna* (Hawthorn) with some *Sambucus nigra* (Elder) and abundant *Hedera helix* (Ivy) all to about 5m in height. Here the sparse field-layer contains shade-tolerant plants including *Alliaria petiolata* (Garlic Mustard), *Arum maculatum* (Lords-and-Ladies) and *Rumex sanguineus* (Wood Dock). On the western bank there is nettle-bed vegetation mostly consisting of *Epilobium hirsutum* (Great Willowherb) and *Urtica dioica* (Common Nettle) with occasional *Conium maculatum* (Hemlock) probably referable to the NVC type **OV24a *Urtica dioica-Galium aparine* community, typical sub-community** or perhaps to **OV26e *Epilobium angustifolium* community, *Urtica dioica-Cirsium arvense* sub-community**. Adjacent to this there is a wide grassy track.

Target Note 106. A hedge of *Crataegus monogyna* (Hawthorn) and *Sambucus nigra* (Elder) trimmed to a height of about 2m (plus about 1m of re-growth at the time of the survey) on the banks of the stream described in *Target Note 105*. Shade-tolerant species on the banks include *Bromopsis ramosa* (Hairy-brome) and *Geum urbanum* (Wood Avens).

Target Note 107. A hedge similar to that described in *Target Note 84* but with wide grassy arable headlands on either side. Locally these support rough grassland referable to the NVC type **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community** with the grasses *Arrhenatherum elatius* (False Oat-grass) and *Elytrigia repens* (Common Couch) and tall semi-ruderal herbs including *Conium maculatum* (Hemlock), *Galium aparine* (Cleavers), *Heracleum sphondylium* (Hogweed) and *Urtica dioica* (Common Nettle).

Target Note 108. A hedge and stream similar to that described in *Target Note 107*. There was no permission for access to inspect more closely.

Target Note 109. A hedge similar to that described in *Target Note 84* but with no ditch and having a grassy arable headland alongside.

Target Note 110. Stands of *Urtica dioica* (Common Nettle) along a fence-line.

Target Note 111. A road hedge otherwise similar to that described in *Target Note 84*. The ditch has *Epilobium hirsutum* (Great Willowherb) and *Typha latifolia* (Bulrush) and shade-tolerant plants on the banks include *Arum maculatum* (Lords-and-Ladies) and *Rumex sanguineus* (Wood Dock).

Target Note 112. A relatively species-rich road hedge trimmed to about 2m in height and almost equal to that in thickness. It at least contains *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash), *Prunus spinosa* (Blackthorn) and *Rosa canina* (Dog-rose). The ditch contained water at the time of the survey. The field-layer is dominated by *Hedera helix* (Ivy) and *Galium aparine* (Cleavers) and shade-tolerant species include *Arum maculatum* (Lords-and-Ladies).

Target Note 113. A road hedge otherwise similar to that described in *Target Note 84*.

Target Note 114. A track with grassy verges planted with *Narcissus* cultivars (Daffodils) conspicuous at the time of the survey, but there was no permission for access to inspect more closely.

Target Note 115. Rough grassland marking a field boundary. There was no permission for access to inspect more closely.

Target Note 116. A stream containing aquatic vegetation that includes *Apium nodiflorum* (Fool's Water-cress), *Juncus inflexus* (Hard Rush) and *Scrophularia auriculata* (Water Figwort). Nettle-bed vegetation on the banks close to Towcester Road is dominated by *Epilobium hirsutum* (Great Willowherb) and *Urtica dioica* (Common Nettle) and other species include *Arum maculatum* (Lords-and-Ladies), *Ballota nigra* (Black Horehound) and *Galium aparine* (Cleavers); it is probably referable to the NVC type **OV24a *Urtica dioica-Galium aparine* community, typical sub-community** or perhaps to **OV26e *Epilobium angustifolium* community, *Urtica dioica-Cirsium arvense* sub-community**.

Target Note 117. A road hedge similar to those described in *Target Notes 111* and *112*.

Target Note 118. Amenity-turf or something very like it. There was no permission for access to inspect more closely. There is also a wide strip of amenity-turf on the adjacent road verge.

Target Note 119. A species-poor road hedge of *Crataegus monogyna* (Hawthorn) trimmed to about 1.5m in height (plus 1m wispy re-growth at the time of the survey) on a marked bank. The field-layer mostly contains *Hedera helix* (Ivy) and *Urtica dioica* (Common Nettle). Rough grassland on the adjacent road verge is loosely referable to the NVC type **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community**.

Target Note 120. Wooded verges on either side of Towcester Road are here dominated in the canopy by *Acer pseudoplatanus* (Sycamore) and *Fraxinus excelsior* (Ash) together with abundant *Hedera helix* (Ivy) – other tree species are probably present. The field-layer is mostly dominated by *Hedera helix* (Ivy) with a relatively species-rich scatter of shade-tolerant plants including *Alliaria petiolata* (Garlic Mustard), *Arum maculatum* (Lords-and-Ladies), *Ballota nigra* (Black Horehound), *Galium aparine* (Cleavers) *Iris foetidissima* (Stinking Iris) and *Urtica dioica* (Common Nettle).

Target Note 121. Neglected agricultural grassland – possibly unimproved – grown rank and tussocky with extensive invasion by thorn scrub especially but by no means only at the edges (perhaps about 35% scrub cover). There was no permission for access to inspect more closely.

Target Note 122. A large and mostly wooded excavation up to about 5m deep. Secondary woodland on the verge of Towcester Road grades into scrub consisting of *Sambucus nigra* (Elder) close to the point where it was viewed though other thorn-scrub species are likely to dominate elsewhere. The central part of the area is open with rough grassland. There was no permission for access to inspect more closely.

Target Note 123. Tall bushes of *Crataegus monogyna* (Hawthorn) and saplings of *Fraxinus excelsior* (Ash) up to about 6m or 7m in height along a fence-line. A wide but dry ditch alongside contains nettle-bed vegetation referable to the NVC type **OV24a *Urtica dioica-Galium aparine* community,**

typical sub-community. There was at least one specimen of an old rose-family tree – perhaps a *Malus* (Apple) or *Pyrus* (Pear) – indeterminable in March.

Target Note 124. Scattered bushes of *Crataegus monogyna* (Hawthorn) to a height of about 5m along a fence-line beside a stream about 1m wide at the water-margin and about 0.15m deep at the time of the survey. Aquatic vegetation in the channel mostly consists of *Apium nodiflorum* (Fool's Water-cress), *Epilobium hirsutum* (Great Willowherb), *Glyceria fluitans* (Floating Sweet-grass) and *Phalaris arundinacea* (Reed Canary-grass), while rough grassland and tall-herb vegetation on the banks variously consists of *Arrhenatherum elatius* (False Oat-grass), *Epilobium hirsutum* (Great Willowherb), *Galium aparine* (Cleavers) and *Urtica dioica* (Common Nettle).

Target Note 125. A wooded stream about 1.5m wide at the water-margin and fast-flowing at about 0.15m in depth at the time of the survey (though with pools up to about 0.4m deep). Aquatic vegetation in the stream includes *Apium nodiflorum* (Fool's Water-cress), *Epilobium hirsutum* (Great Willowherb), *Juncus inflexus* (Hard Rush) and *Myosotis* cf*. scorpioides* (Water Forget-me-not). The eastern banks are steep and deeply shaded by large bushes of *Crataegus monogyna* (Hawthorn), *Prunus spinosa* (Blackthorn) and *Sambucus nigra* (Elder) and probably other species up to about 5m in height. Here the field-layer contains shade-tolerant species including *Arum maculatum* (Lords-and-Ladies), *Brachypodium sylvaticum* (False Brome) and *Hedera helix* (Ivy). The more open western bank has tall-herb vegetation on the banks variously consisting of *Arrhenatherum elatius* (False Oat-grass), *Epilobium hirsutum* (Great Willowherb), *Galium aparine* (Cleavers) and *Urtica dioica* (Common Nettle).

Target Note 126. A tall species-poor hedge of *Crataegus monogyna* (Hawthorn) to about 4m in height on a slight bank with no ditch. The hedge bottom was largely grazed-out at the time of the survey.

Target Note 127. A section of the stream described in *Target Note 125* with large beds of *Phalaris arundinacea* (Reed Canary-grass) and *Phragmites australis* (Common Reed). Nettle-bed vegetation on the western bank is slightly more ruderal in character with more *Conium maculatum* (Hemlock) and *Poa trivialis* (Rough Meadow-grass).

Target Note 128. Field-edge pheasant cover consisting at the time of the survey of *Helianthus annuus* (Sunflower), *Phacelia tanacetifolia* (Phacelia) and a 'Brassica' possibly *Raphanus raphanistrum* ssp*. landra* (Mediterranean Radish).

Target Note 129. A species-poor hedge of *Crataegus monogyna* (Hawthorn) with some *Sambucus nigra* (Elder) trimmed to a height of about 2m on a slight bank with no ditch. Eutrophic tall-herb vegetation at its foot contains *Conium maculatum* (Hemlock) and *Urtica dioica* (Common Nettle).

Target Note 130. A hedge similar to that described in *Target Note 129*.

Target Note 131. A tall road hedge consisting of *Crataegus monogyna* (Hawthorn) and *Sambucus nigra* (Elder) to about 5m in height and saplings of *Fraxinus excelsior* (Ash) to about 10m. Rough grassland on the adjacent verge is dominated by the grasses *Arrhenatherum elatius* (False Oat-grass) and *Dactylis glomerata* (Cock's-foot) with various broad-leaved herbs including *Conium maculatum* (Hemlock), *Galium aparine* (Cleavers), *Glechoma hederacea* (Ground-ivy) and *Urtica*

dioica (Common Nettle). It is loosely referable to the NVC type **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community**.

Target Note 132. Garden fences and hedges viewed from a distance.

Target Note 133. A relatively heavily wooded section of the stream described in *Target Notes 125* and *127*. It has *Fraxinus excelsior* (Ash) and *Salix* cf. ×*fragilis* (Crack Willow) to a height of about 10m over scrub consisting of *Crataegus monogyna* (Hawthorn), *Prunus spinosa* (Blackthorn), *Salix* cf. *cinerea* ssp. *oleifolia* (Rusty Willow) and *Sambucus nigra* (Elder).

Target Note 134. Nettle-bed vegetation on roadside earth mounds is relatively species-rich and includes *Arrhenatherum elatius* (False Oat-grass), *Conium maculatum* (Hemlock) and *Urtica dioica* (Common Nettle). At the time of the survey *Viola odorata* (Sweet Violet) was conspicuous.

Target Note 135. A steep road verge bank is partially shaded by adjacent mature trees of *Fraxinus excelsior* (Ash) and *Quercus robur* (Pedunculate Oak) and bushes of *Crataegus monogyna* (Hawthorn) and *Sambucus nigra* (Elder). Rough grassland and nettle-bed vegetation referable to the NVC types **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community** and **OV24a *Urtica dioica-Galium aparine* community, typical sub-community** (and perhaps **OV24b *Urtica dioica-Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* sub-community**) in mosaic and transition is variously dominated by *Arrhenatherum elatius* (False Oat-grass), *Conium maculatum* (Hemlock), *Galium aparine* (Cleavers), *Heracleum sphondylium* (Hogweed), *Rubus fruticosus* agg. (Bramble) and *Urtica dioica* (Common Nettle).

Target Note 136. Sheep-grazed improved grassland. This grassland is dominated by a limited number of grasses and a small number of grassland herbs. The majority of the sward is comprised of the grasses *Lolium perenne* (Perennial Rye-grass) and *Cynosurus cristatus* (Crested Dog's-tail) and the forb *Trifolium repens* (White Clover). Other grasses at lower levels of abundance include *Agrostis stolonifera* (Creeping Bent), *Poa annua* (Annual Meadow-grass) and *Poa trivialis* (Rough Meadow-grass). Common grassland forbs include *Cardamine flexuosa* (Wavy Bitter-cress), *Cerastium fontanum* (Common Mouse-ear), *Cerastium glomeratum* (Sticky Mouse-ear), *Crepis biennis* (Rough Hawk's-beard), *Ficaria verna* (Lesser Celandine), *Geranium dissectum* (Cut-leaved Crane's-bill), *Trifolium pratense* (Red Clover) and *Veronica persica* (Common Field-speedwell). Tall semi-ruderals are also present including *Carduus nutans* (Musk Thistle), *Cirsium arvense* (Creeping Thistle), *Cirsium vulgare* (Spear Thistle) and *Urtica dioica* (Common Nettle).

Target Note 137. A cluster of trees growing over a sparse field layer with much bare ground. The trees include *Acer pseudoplatanus* (Sycamore) and *Quercus robur* (Pedunculate Oak). The field layer includes *Urtica dioica* (Common Nettle) and *Galium aparine* (Cleavers).

Target Note 138. Ruderal and semi-ruderal vegetation. This is a slope that has been recently excavated and colonised by a range of forbs, ruderal and semi-ruderal herbs. *Conium maculatum* (Hemlock) is dominant in the area. Other species include *Achillea millefolium* (Yarrow), *Cardamine flexuosa* (Wavy Bitter-cress), *Carduus nutans* (Musk Thistle), *Cirsium arvense* (Creeping Thistle), *Cirsium vulgare* (Spear Thistle), *Dipsacus fullonum* (Teasel), *Helminthotheca echioides* (Bristly Oxtongue), *Lamium album* (White Dead-nettle), *Lamium purpureum* (Red Dead-nettle), *Leucanthemum vulgare* (Oxeye Daisy), *Medicago lupulina* (Black Medick), *Papaver somniferum* (Opium Poppy), *Reseda luteola* (Weld). *Silene latifolia* (White Campion), *Stachys sylvatica* (Hedge Woundwort), *Trifolium repens* (White Clover) and *Veronica persica* (Common Field-speedwell).

Target Note 139. An outgrown hedge. This hedge is 5 m tall and 4 m wide it has a bank and a ditch. It is unmanaged and the shrubs are bushy and outgrown. It is dominated by *Crataegus monogyna* (Hawthorn), and *Hedera helix* (Ivy), but there are also *Acer campestre* (Field Maple), *Acer pseudoplatanus* (Sycamore), *Malus domestica* (Apple), *Sambucus nigra* (Elder) and *Ulmus procera* (English Elm). The field layer is dominated by *Urtica dioica* (Common Nettle) and *Galium aparine* (Cleavers) with limited amounts of *Arctium minus* (Lesser Burdock), *Cirsium vulgare* (Spear Thistle), *Glechoma hederacea* (Ground-ivy), *Heracleum sphondylium* (Hogweed) and *Rumex obtusifolius* (Broad-leaved Dock).

Target Note 140. A rubble pile colonised by ruderal and semi-ruderal vegetation. Species include *Carduus nutans* (Musk Thistle), *Cerastium glomeratum* (Sticky Mouse-ear), *Cirsium arvense* (Creeping Thistle), *Geranium molle* (Dove's-foot Crane's-bill), *Lamium purpureum* (Red Dead-nettle), *Malva sylvestris* (Common Mallow), *Ranunculus repens* (Creeping Buttercup), *Urtica dioica* (Common Nettle), *Urtica urens* (Small Nettle), *Veronica hederifolia* (Ivy-leaved Speedwell). There is a single plant of *Onopordum acanthium* (Cotton Thistle).

Target Note 141. Trees. This cluster of trees includes *Acer pseudoplatanus* (Sycamore), and *Quercus robur* (Pedunculate Oak) growing over shrubs of *Crataegus monogyna*(Hawthorn) and *Sambucus nigra* (Elder). The field layer is dominated by *Urtica dioica* (Common Nettle).

Target Note 142. Nettle-bed vegetation. This tall herb community is dominated by *Urtica dioica* (Common Nettle) together with grasses and herbs, many of which are resistant to rabbit grazing or poisonous to rabbits. Grasses present include *Holcus lanatus* (Yorkshire-fog) and *Lolium perenne* (Perennial Rye-grass). Herbs include *Anthriscus sylvestris* (Cow Parsley), *Cardamine flexuosa* (Wavy Bitter-cress), *Conium maculatum* (Hemlock), *Dipsacus fullonum* (Teasel), *Ficaria verna* (Lesser Celandine), *Galium aparine* (Cleavers), *Geum urbanum* (Wood Avens), *Glechoma hederacea* (Ground-ivy), *Heracleum sphondylium* (Hogweed) and *Myosotis arvensis* (Field Forget-me-not).

Target Note 143. A defunct hedge. This hedge is outgrown and defunct with lots of gaps. It is up to 4 m tall and 4 m wide in the more outgrown sections and there is a post and wire fence making up the gaps. Tree and shrubs include *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash), *Malus sylvestris* (Crab Apple) and *Quercus robur* (Pedunculate Oak). The field layer includes *Glechoma hederacea* (Ground-ivy), *Lamium album* (White Dead-nettle), *Urtica dioica* (Common Nettle) and *Veronica persica* (Common Field-speedwell).

Target Note 144. A hedge. This hedge is outgrown and up to 5 m tall and 5 m wide. Tree and shrubs include *Crataegus monogyna* (Hawthorn), *Prunus spinosa* (Blackthorn), *Rosa canina* (Dog-rose), *Sambucus nigra* (Elder). The field layer is grassy and includes *Galium aparine* (Cleavers), *Holcus lanatus* (Yorkshire-fog), *Lolium perenne* (Perennial Rye-grass) and *Urtica dioica* (Common Nettle).

Target Note 145. A cluster of trees growing over nettle-bed vegetation. The trees include *Crataegus monogyna* (Hawthorn), *Salix fragilis* (Crack-willow). The field layer includes *Urtica dioica* (Common Nettle) and *Urtica urens* (Small Nettle).

Target Note 146. A hedge. This hedge is outgrown and up to 6 m tall and 5 m wide. Tree and shrubs include *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash), *Hedera helix* (Ivy) and *Urtica dioica* (Common Nettle).

Target Note 147. A hedge. This hedge is outgrown and up to 8 m tall and 5 m wide. Tree and shrubs include *Acer cappadocicum* (Cappadocian Maple), *Acer pseudoplatanus* (Sycamore), *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash), *Prunus spinosa* (Blackthorn). Other species include *Alliaria petiolata* (Garlic Mustard), *Anthriscus sylvestris* (Cow Parsley), *Ficaria verna* (Lesser Celandine), *Hedera helix* (Ivy) and *Urtica dioica* (Common Nettle).

Target Note 148. A wet ditch. It is 0.7 m wide at water level and runs in a channel 2 m deep with steep earth banks, thought the water is only 0.05 m deep. The substrate is rocky with gravel and sand. The banks are covered in tall herbs, frequently *Urtica dioica* (Common Nettle), but there are also stands of *Epilobium hirsutum* (Great Willowherb) that step down to water level. In the channel there are a limited range of marginal specie including *Apium nodiflorum* (Fool's Water-cress), *Juncus effusus* (Soft-rush), *Ranunculus repens* (Creeping Buttercup), *Scrophularia auriculata* (Water Figwort), and *Solanum dulcamara* (Bittersweet). There are shrubs that occasionally shade the water and include *Sambucus nigra* (Elder) and *Salix cinerea* (Grey Willow).

Target Note 149. Semi-improved, rough grassland. This grassland is neglected and unmanaged for at least a year. It contains a range of coarse grasses and herbs including some stands of semi-ruderals and incipient *Salix fragilis* (Crack-willow) scrub. The most abundant grass species present is *Holcus lanatus* (Yorkshire-fog) , other grasses present include *Agrostis stolonifera* (Creeping Bent), *Arrhenatherum elatius* (False Oat-grass), *Dactylis glomerata* (Cock's-foot), *Festuca rubra* (Red Fescue), *Holcus lanatus* (Yorkshire-fog), *Holcus mollis* (Creeping Soft-grass), *Lolium perenne* (Perennial Rye-grass) and *Poa trivialis* (Rough Meadow-grass). Herbs include those typical of agricultural grasslands such as abundant *Ranunculus repens* (Creeping Buttercup) and frequent *Trifolium pratense* (Red Clover) and *Trifolium repens* (White Clover) other species at lower levels of abundance include *Lathyrus pratensis* (Meadow Vetchling), *Stellaria graminea* (Lesser Stitchwort), *Stellaria neglecta* (Greater Chickweed) and *Vicia tetrasperma* (Smooth Tare). Semi-ruderals typical of neglected eutrophic conditions are abundant and diverse including large stands of *Rumex obtusifolius* (Broad-leaved Dock) and *Epilobium hirsutum* (Great Willowherb). Other species at lower levels of abundance include, *Calystegia silvatica* (Large Bindweed) , *Cirsium arvense* (Creeping Thistle), *Cirsium vulgare* (Spear Thistle), *Epilobium hirsutum* (Great Willowherb), *Epilobium montanum* (Broad-leaved Willowherb), *Heracleum sphondylium* (Hogweed), *Rumex sanguineus* (Wood Dock), *Senecio jacobaea* (Common Ragwort) and *Urtica dioica* (Common Nettle). The gramminoid *Carex spicata* (Spiked Sedge) is also present.

Target Note 150. Improved Grassland. This grassland is agriculturally improved and sown with large cultivars of *Lolium perenne* (Perennial Rye-grass) and *Trifolium repens* (White Clover). Other species include *Cardamine flexuosa* (Wavy Bitter-cress), *Crepis biennis* (Rough Hawk's-beard), *Poa annua* (Annual Meadow-grass) and *Trifolium repens* (White Clover) all at low levels of abundance.

Target Note 151. A wet ditch. The water in this ditch is 0.2 m deep and runs clear and at a moderate speed in the channel. It is no more than 1 m wide at water level and the banks are up to 2 m high and made of earth. The channel is well-vegetated and there is a hedge on one side. The banks are covered in grasses and nettle bed vegetation. In the channel there are a modest array of marginal and aquatic plants including *Alisma plantago-aquatica* (Water-plantain), *Apium nodiflorum* (Fool's Water-cress), *Carex otrubae* (False Fox-sedge), *Glyceria fluitans* (Floating Sweet-grass), *Juncus inflexus* (Hard Rush), *Ranunculus repens* (Creeping Buttercup) and *Typha latifolia* (Bulrush), all at low levels of abundance. On the banks there are grasses such as *Arrhenatherum elatius* (False Oat-grass), *Dactylis glomerata* (Cock's-foot) and *Elytrigia repens* (Common Couch) as well as typical nettle bed vegetation such *Anthriscus sylvestris* (Cow Parsley). *Urtica dioica* (Common Nettle) and *Galium aparine* (Cleavers).

Target Note 152. A species-poor hedge trimmed to about 2m in height and mostly consisting of *Crataegus monogyna* (Hawthorn), *Prunus spinosa* (Blackthorn) and *Ulmus procera* (English Elm) with some *Rosa canina* (Dog-rose). A large gap in the centre is filled by *Rubus fruticosus* agg. (Bramble). Thus it has more than 10% gaps, no ditch, no standard trees, no parallel hedge within 15m, and only a single connection point with one other hedge. The field edge where it stands has a half bank falling to the south, but the hedge stands beside and below it rather than on it. Though detailed survey has not been carried out, the hedge is unlikely to qualify as 'important' under *The Hedgerows Regulations 1997*.

Target Note 153. Arable in set-aside at the time of the survey, when it had grassy ruderal vegetation at close to 100% cover. This mainly consisted of the grasses *Alopecurus myosuroides* (Black-grass) and *Anisantha sterilis* (Barren Brome) together with mostly medium-height to tall broad-leaved herbs including *Cirsium vulgare* (Spear Thistle), *Epilobium ciliatum* (American Willowherb), *Epilobium hirsutum* (Great Willowherb), *Epilobium parviflorum* (Hoary Willowherb) and *Senecio jacobaea* (Common Ragwort). [By early June this vegetation had been sprayed off with herbicide.]

Target Note 154. A wet ditch about 60 cm wide at the water-margin with 1-m high banks sloping at about 35 degrees to the vertical. Water depth at the time of the survey was *c.*3 cm. The banks have rough grassland and bramble scrub with a few small thorn bushes. They are variously dominated by *Galium aparine* (Cleavers), *Heracleum sphondylium* (Hogweed), *Poa trivialis* (Rough Meadow-grass), *Rubus fruticosus* agg. (Bramble), *Rumex sanguineus* (Wood Dock) and *Urtica dioica* (Common Nettle). Common wetland plants occur more-or-less frequently along the water-margin including *Angelica sylvestris* (Wild Angelica), *Apium nodiflorum* (Fool's Water-cress), *Epilobium hirsutum* (Great Willowherb) and *Filipendula ulmaria* (Meadowsweet).

Target Note 155. Arable in set-aside at the time of the survey, when it had grassy ruderal vegetation at *c.*90% cover. This mainly consisted of the grasses *Agrostis* cf*. gigantea* (Black Bent), *Cynosurus cristatus* (Crested Dog's-tail), *Elytrigia repens* (Common Couch), *Festuca rubra* (Red Fescue) and *Holcus lanatus* (Yorkshire-fog)together with a wide range of forbs including *Centaurea debeauxii* (Chalk Knapweed), *Leucanthemum vulgare* (Oxeye Daisy), *Lotus corniculatus* (Common Bird's-foot-trefoil) and *Plantago lanceolata* (Ribwort Plantain); also abundant is *Equisetum arvense* (Field Horsetail). Other species present in small quantity include *Achillea millefolium* (Yarrow), *Helminthotheca echioides* (Bristly Oxtongue), *Prunella vulgaris* (Selfheal), *Ranunculus acris* (Meadow Buttercup),*Rhinanthus minor* (Yellow-rattle) and *Veronica serpyllifolia* (Thyme-leaved Speedwell). While many of these species are undoubtedly ruderal colonisers, others are likely to have been sown in a seed mixture, especially *Centaurea debeauxii*, *Cynosurus cristatus*, *Festuca rubra*, *Leucanthemum vulgare*, *Lotus corniculatus* and *Rhinanthus minor*.

Target Note 156. Scattered scrub and tall-herb vegetation beside a railway security fence at the edge of a field. The woody element mostly consists of *Rubus fruticosus* agg. (Bramble) with some *Prunus spinosa* (Blackthorn) and *Sambucus nigra* (Elder) and the tall-herb element mostly consists of *Urtica dioica* (Common Nettle) with some *Cirsium arvense* (Creeping Thistle), *Heracleum sphondylium* (Hogweed), *Rumex obtusifolius* (Broad-leaved Dock) and *Rumex sanguineus* (Wood Dock). A grassy track between this complex and the field-margin has species-poor grassland mostly consisting of *Holcus lanatus* (Yorkshire-fog) and *Poa trivialis* (Rough Meadow-grass).

Target Note 157. Arable in set-aside at the time of the survey, when it had relatively species-poor ruderal vegetation at around 50% cover. This mainly consisted of the willowherbs *Epilobium ciliatum* (American Willowherb), *Epilobium hirsutum* (Great Willowherb), *Epilobium parviflorum* (Hoary Willowherb) and *Epilobium tetragonum* (Square-stalked Willowherb) perhaps hybridising. Other species included *Myosotis arvensis* (Field Forget-me-not), *Rumex sanguineus* (Wood Dock) and *Senecio jacobaea* (Common Ragwort). [By early June this vegetation had been sprayed off with herbicide.]

Target Note 158. Relatively species-rich turf closely in a field corner where it is closely grazed by rabbits. It mostly consists of the grasses *Agrostis capillaris* (Common Bent), *Holcus lanatus* (Yorkshire-fog), *Poa trivialis* (Rough Meadow-grass) and the sedge *Carex hirta* (Hairy Sedge). The mosses *Brachythecium rutabulum* and *Calliergonella cuspidata* are abundant and achieve up to about 50% cover in places. Grassland forbs present at *c.*20% cover include *Achillea millefolium* (Yarrow), *Plantago major* ssp. *major* (Greater Plantain), *Prunella vulgaris* (Selfheal) and *Ranunculus repens* (Creeping Buttercup) while potentially taller herbs – here mostly grazed down – include *Hypericum perforatum* (Perforate St John's-wort), *Senecio erucifolius* (Hoary Ragwort) and *Senecio*

jacobaea (Common Ragwort). At the time of the survey there were a few rosettes of the relatively uncommon thistle *Cirsium eriophorum* (Woolly Thistle).

Target Note 159. Field edge and track vegetation similar to that described in *Target Note 156* (again beside railway fences).

Target Note 160. An engineering-brick bridge carrying a farm track over the railway. The ferns *Asplenium adiantum-nigrum* (Black Spleenwort), *Asplenium ruta-muraria* (Wall-rue) and *Asplenium scolopendrium* (Hart's-tongue) grow in cracks in the brickwork, and there are several plants of *Verbascum thapsus* (Great Mullein) at the track edge.

Target Note 161. A narrow strip if field-edge rough grassland, tall-herb vegetation and fragmentary scrub adjacent to a railway fence. It mostly consists of *Arrhenatherum elatius* (False Oat-grass), *Galium aparine* (Cleavers), *Heracleum sphondylium* (Hogweed), *Rubus fruticosus* agg. (Bramble) and *Urtica dioica* (Common Nettle) and represents the NVC types MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community and W24a *Rubus fruticosus-Holcus lanatus* underscrub, *Cirsium arvense-Cirsium vulgare* sub-community in mosaic and transition.

Target Note 162. A V-shaped ditch recently cleaned out at the time of the survey, when it was dry. It is *c.*0.3 m wide at the bottom which is filled with grassy vegetation dominated by *Agrostis stolonifera* (Creeping Bent) and *Poa trivialis* (Rough Meadow-grass) with some *Juncus inflexus* (Hard Rush) and occasional tall herbs, especially *Epilobium hirsutum* (Great Willowherb) and *Rumex sanguineus* (Wood Dock). Its banks stand at *c.*45 degrees to the vertical, and have mixed grassy vegetation and bramble scrub variously consisting of the grasses *Arrhenatherum elatius* (False Oat-grass) and *Holcus lanatus* (Yorkshire-fog) and the tall herbs *Cirsium arvense* (Creeping Thistle) and *Heracleum sphondylium* (Hogweed) together with *Rubus fruticosus* agg. (Bramble).

Target Note 163. A species-poor and incomplete hedge between a fence-line and the ditch described in *Target Note 162.* It mostly consists of *Crataegus monogyna* (Hawthorn) with small amounts of *Prunus spinosa* (Blackthorn), *Rosa canina* (Dog-rose) and *Ulmus* cf*. procera* (English Elm). It has a ditch for more than 50% of its length but no obvious hedge-bank, more than 10% gaps, no standard trees, no parallel hedge within 15m, and only two connection points with other hedges. Though detailed survey has not been carried out ,it is unlikely to qualify as 'important' under *The Hedgerows Regulations 1997*.

Target Note 164. A ditch similar to that described in *Target Note 162*.

Target Note 165. A species-poor hedge alongside the ditch described in *Target Note 162.* It mostly consists of *Crataegus monogyna* (Hawthorn) with some *Rosa canina* (Dog-rose). It has a ditch for more than 50% of its length, less than 10% gaps, and a connection-point score of 4 (two points for connections with two hedges and two for a connection with a wood); it has no standard trees, no parallel hedge within 15m, and no obvious hedge-bank. Though no detailed survey has been carried out, it is unlikely to qualify as 'important' under *The Hedgerows Regulations 1997*.

Target Note 166. A newly planted mixed hedge along the edge of plantation woodland mostly consists of *Corylus avellana* (Hazel), *Crataegus monogyna* (Hawthorn) and *Prunus spinosa* (Blackthorn). An open and probably rabbit-grazed sward at its foot (and along the adjacent field-margin) is dominated by the grasses *Agrostis capillaris* (Common Bent), *Festuca rubra* (Red Fescue), *Holcus lanatus* (Yorkshire-fog) and *Poa trivialis* (Rough Meadow-grass) with scattered forbs and taller semi-ruderal herbs including *Cirsium vulgare* (Spear Thistle), *Epilobium* cf*. ciliatum* (American Willowherb), *Epilobium parviflorum* (Hoary Willowherb), *Geranium dissectum* (Cut-leaved Crane's-bill), *Plantago major* ssp. *major* (Greater Plantain), *Prunella vulgaris* (Selfheal), and *Sonchus asper* (Prickly Sow-thistle).

Target Note 167. Plantation woodland mostly consisting of *Pinus sylvestris* (Scots Pine) with a very wide range of additional tree and shrub species, especially along the edge; they include *Acer platanoides* (Norway Maple), *Acer pseudoplatanus* (Sycamore), *Aesculus hippocastanum* (Horse-chestnut), *Chamaecyparis lawsoniana* (Lawson's Cypress), *Cornus* cf. *sericea* (Red-osier Dogwood) X*Cuprocyparis leylandii* (Leyland Cypress), *Malus pumila* (Apple), *Prunus avium* (Wild Cherry), *Prunus laurocerasus* (Cherry Laurel), *Prunus spinosa* (Blackthorn), *Quercus rubra* (Red Oak), *Salix* cf. ×*smithiana* (Silky-leaved Osier), *Tilia* ×*europaea* (Lime) and *Viburnum* cf. *opulus* (Guelder-rose).

Target Note 168. A moderately species-poor hedge trimmed to about 2.3 m high with evidence of having been laid in the past. It mostly consists of *Crataegus monogyna* (Hawthorn) with some *Acer campestre* (Field Maple), *Crataegus* cf. ×*media* (Hybrid Hawthorn), *Malus sylvestris* (Crab Apple), *Prunus* cf. *domestica* (Wild Plum), *Prunus spinosa* (Blackthorn), *Quercus robur* (Pedunculate Oak) and *Salix* cf. ×*reichardtii* (Hybrid Grey-willow). It has less than 10% gaps, and a connection-point score of 4 (two points for connections with two hedges and two for a connection with a wood); it has less than one standard tree per 50 m, no parallel hedge within 15m, and no obvious hedge-bank. Detailed survey would be needed to ascertain whether it qualifies as 'important' under *The Hedgerows Regulations 1997*.

Target Note 169. A ditch up to *c.*1.5 m wide at the water-margin. At the time of the survey it had water *c.*10 cm deep over a silt substrate. Banks at *c.*45 degrees to the vertical rise to a height of *c.*1.3 m. It contains scattered wetland plants including *Angelica sylvestris* (Wild Angelica), *Apium nodiflorum* (Fool's Water-cress), *Epilobium hirsutum* (Great Willowherb), *Glyceria fluitans* (Floating Sweet-grass) and *Veronica beccabunga* (Brooklime). A hedge on its southern bank mostly consists of *Crataegus monogyna* (Hawthorn) and *Prunus spinosa* (Blackthorn) with a single large standard tree of *Quercus robur* (Pedunculate Oak).

Target Note 170. Semi-natural broad-leaved woodland dominated in the canopy by *Quercus robur* (Pedunculate Oak). Other woody species include *Acer pseudoplatanus* (Sycamore), *Crataegus monogyna* (Hawthorn) and *Malus pumila* (Apple). The field-layer is dominated by *Rubus fruticosus* agg. (Bramble) [No access]

Target Note 171. A wide grassy headland with a sward dominated by *Agrostis* cf. *stolonifera* (Creeping Bent), *Elytrigia repens* (Common Couch) and *Holcus lanatus* (Yorkshire-fog) with high cover of the moss *Brachythecium rutabulum* and a wide range of additional species including *Centaurea debeauxii* (Chalk Knapweed), *Equisetum arvense* (Field Horsetail), *Heracleum sphondylium* (Hogweed), *Ranunculus repens* (Creeping Buttercup), *Rumex obtusifolius* (Broad-leaved Dock) and *Vicia sativa* ssp. *segetalis* (Common Vetch).

Target Note 172. Scrub woodland on the railway overhangs a dry field-edge ditch (or shallow depression). It mostly consists of *Salix* ×*smithiana* (Silky-leaved Osier). The ditch mostly contains *Rubus fruticosus* agg. (Bramble) though the rush *Juncus inflexus* (Hard Rush) is occasional. At the southern corner of the field there is a patch of *Cornus sanguinea* (Dogwood) and turf dominated by the grasses *Holcus lanatus* (Yorkshire-fog) and *Poa trivialis* (Rough Meadow-grass) together with broad-leaved herbs including *Glechoma hederacea* (Ground-ivy), *Heracleum sphondylium* (Hogweed), *Ranunculus repens* (Creeping Buttercup) and *Rumex sanguineus* (Wood Dock).

Junction 15a

Target Note 301. Amenity turf. This grassland is intensively managed by mowing and grows alongside a canal. It contains a range of common grasses found in lawns and a modest range of herbs. Grasses include *Agrostis stolonifera* (Creeping Bent), *Dactylis glomerata* (Cock's-foot), *Festuca rubra* (Red Fescue), *Holcus lanatus* (Yorkshire-fog), *Lolium perenne* (Perennial Rye-grass), *Poa trivialis* (Rough Meadow-grass). Herbs include those typical of moist eutrophic conditions including *Aegopodium podagraria* (Ground-elder), *Bellis perennis* (Daisy), *Filipendula ulmaria* (Meadowsweet), *Ranunculus repens* (Creeping Buttercup), *Taraxacum* sect. *Ruderalia* (Common Dandelion), *Trifolium repens* (White Clover) *Urtica dioica* (Common Nettle) and *Viola reichenbachiana* (Early Dog-violet).

Target Note 302. A canal. The water in this ditch is 1 m deep 3- 12 m wide. The water is slightly murky and looks like it carries fine sediment and algae. There is a slight current which can be seen at the locks. The banks are up lined with brick and generally no more than to 0.2 m high. They are backfilled with earth. The channel clear of vegetation, but there are passing bays where vegetation has been allowed to colonise. The banks are covered in Amenity grassland as described in the preceding *Target Note.* It is suitable for Otter and White-clawed Crayfish.

Target Note 303. Marginal vegetation growing at the edges of passing bays in the canal. This vegetation includes a mixture of gramminoids and tall herbs. Gramminoids include *Carex flacca* (Glaucous Sedge), *Glyceria maxima* (Reed Sweet-grass) and *Phalaris arundinacea* (Reed Canary-grass). Tall herbs include *Epilobium hirsutum* (Great Willowherb), *Filipendula ulmaria* (Meadowsweet), *Heracleum sphondylium* (Hogweed), *Iris pseudacorus* (Yellow Iris), *Oenanthe crocata* (Hemlock Water-dropwort), *Rumex conglomeratus* (Clustered Dock), and *Urtica dioica* (Common Nettle). It is suitable for Water Vole and common reptiles such as Grass Snake.

Target Note 304. A hedge. This hedge is 6 m tall and 3 m wide. It is dominated by *Crataegus monogyna* (Hawthorn), with lesser proportions of *Prunus spinosa* (Blackthorn) and *Sambucus nigra* (Elder). The hedge includes a very large *Fraxinus excelsior* (Ash). The field layer is dominated by *Urtica dioica* (Common Nettle), but with lesser proportion of other herbs many of which are tolerant of shaded and damp conditions. These include *Angelica sylvestris* (Wild Angelica), *Arum maculatum* (Lords-and-Ladies), *Geum urbanum* (Wood Avens) and *Glechoma hederacea* (Ground-ivy).

Target Note 305. Tall herb vegetation. This vegetation grows in a small field. It is dominated by a limited number of tall herbs which grow over a layer of bryophytes. The tall herbs include dominant *Conium maculatum* (Hemlock), *Arctium minus* (Lesser Burdock), *Epilobium hirsutum* (Great Willowherb) and *Urtica dioica* (Common Nettle). Other herbaceous species in lower levels of abundance include *Calystegia sepium* (Hedge Bindweed), *Dipsacus fullonum* (Teasel), *Galium aparine* (Cleavers) and *Scrophularia nodosa* (Common Figwort). Mosses are dominant at ground level and include *Brachythecium rutabulum* and *Kindbergia praelonga*. There are scattered small bushes of *Rosa canina* (Dog-rose) and tufts of the rush *Juncus effusus* (Soft-rush).

Target Note 306. A hedge. This hedge is 7 m tall and 5 m wide. It is dominated by *Crataegus monogyna* (Hawthorn), with lesser proportions of *Betula pendula* (Silver Birch), *Corylus avellana* (Hazel) and *Prunus spinosa* (Blackthorn). The field layer is sparse but includes *Arum maculatum* (Lords-and-Ladies), *Glechoma hederacea* (Ground-ivy) and *Urtica dioica* (Common Nettle). This hedge is of relatively recent origin and probably was planted following road works.

Target Note 307. Rough grassland. This grassland is infrequently mown and grows alongside a canal. It contains a range of coarse grasses and herbs including some with an aquatic preference . It has a tussocky appearance. Grasses include *Agrostis stolonifera* (Creeping Bent), *Dactylis glomerata*

(Cock's-foot), *Deschampsia cespitosa* (Tufted Hair-grass), *Festuca rubra* (Red Fescue), *Holcus lanatus* (Yorkshire-fog), *Lolium perenne* (Perennial Rye-grass) and *Poa trivialis* (Rough Meadow-grass). Herbs include those typical of damp conditions including such as *Angelica sylvestris* (Wild Angelica), *Filipendula ulmaria* (Meadowsweet), *Tussilago farfara* (Colt's-foot) and *Scrophularia nodosa* (Common Figwort), as well as more typical grassland species such as *Centaurea debeauxii* (Chalk knapweed), *Ficaria verna* (Lesser Celandine), *Potentilla reptans* (Creeping Cinquefoil) and *Glechoma hederacea* (Ground-ivy). The tall gramminoid *Carex riparia* (Greater Pond-sedge), is also present.

Target Note 308. A hedge. This hedge is 7 m tall and 4 m wide, it is gappy, outgrown, and infrequently managed. It is dominated by *Crataegus monogyna* (Hawthorn), with lesser proportion of *Corylus avellana* (Hazel) and *Sambucus nigra* (Elder). The field layer is dominated by *Epilobium hirsutum* (Great Willowherb) with *Carex riparia* (Greater Pond-sedge) and *Urtica dioica* (Common Nettle).

Target Note 309. Swamp. It is dominated by *Carex riparia* (Greater Pond-sedge) with incipient *Salix cinerea* (Grey Willow) and *Salix fragilis* (Crack-willow) scrub. There are tall herbs present including abundant *Epilobium hirsutum* (Great Willowherb) but with lesser proportions of *Angelica sylvestris* (Wild Angelica) and *Filipendula ulmaria* (Meadowsweet). There are also small clumps of *Typha latifolia* (Bulrush).

Target Note 310. Rush pasture with abundant tall herbs . it is dominated by *Juncus inflexus* (Hard Rush), with *Glyceria maxima* (Reed Sweet-grass), *Juncus effusus* (Soft-rush), *Phalaris arundinacea* (Reed Canary-grass) and *Typha latifolia* (Bulrush) in smaller patches. There are herbs present including *Angelica sylvestris* (Wild Angelica), *Epilobium hirsutum* (Great Willowherb), *Epilobium parviflorum* (Hoary Willowherb), *Filipendula ulmaria* (Meadowsweet), and *Rumex conglomeratus* (Clustered Dock). This vegetation grades into the a large stand of *Chamerion angustifolium* (Rosebay Willowherb) on drier land.

Target Note 311. Tall herb. A large stand of *Chamerion angustifolium* (Rosebay Willowherb) with smaller proportion of *Dipsacus fullonum* (Teasel) and *Filipendula ulmaria* (Meadowsweet) . There are the shrubs *Rubus fruticosus* agg. (Bramble) and *Sambucus nigra* (Elder) present in low proportions.

Target Note 312. Broad-leaved woodland. This woodland is of recent origin with self sown *Fraxinus excelsior* (Ash) trees to 12 m tall. There are a limited number of tree species mainly *Fraxinus excelsior* (Ash), infrequent *Sambucus nigra* (Elder) and a single *Quercus robur* (Pedunculate Oak). The field layer is grassy and dominated by *Poa trivialis* (Rough Meadow-grass). Other species present are typically shade tolerant and include *Angelica sylvestris* (Wild Angelica), *Arum maculatum* (Lords-and-Ladies), *Glechoma hederacea* (Ground-ivy), *Ranunculus repens* (Creeping Buttercup) and *Urtica dioica* (Common Nettle).

Target Note 313. A wet ditch. It is 1 m wide at water level and runs in a channel 0.5 m deep with steep earth banks, thought the water is only 0.3 m deep. The water is static and loaded with organic matter. There are no aquatic specialist plants, the banks are shaded by trees and shrubs including *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash) *Sambucus nigra* (Elder) and *Salix cinerea* (Grey Willow).

Target Note 314. A brook. It is 1.5 m wide at water level and runs in a channel 2 m deep with steep earth banks, thought the water is only 0.5 m deep. The water is pebbles cobbles and silt. Trees and shrubs shade the water and include *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash) and *Salix cinerea* (Grey Willow). Aquatic plants are limited to *Apium nodiflorum* (Fool's Water-cress) whilst the banks are dominated by *Urtica dioica* (Common Nettle).

Target Note 315. A hedge. This hedge is outgrown to 7 m tall and 4 m wide. It is dominated by *Crataegus monogyna* (Hawthorn). The field layer is dominated by *Urtica dioica* (Common Nettle) but also contains *Arum maculatum* , *Angelica sylvestris* (Wild Angelica) and *Rumex sanguineus* (Wood Dock).

Target Note 316. A wet ditch. It is 1 m wide at water level and runs in a channel 0.5 m deep with steep earth banks, thought the water is only 0.3 m deep. The water is static and loaded with organic matter. There are no aquatic specialist plants. The banks are shaded by trees and shrubs including *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash) *Sambucus nigra* (Elder) and *Salix cinerea* (Grey Willow).

Target Note 317. Scrub. This vegetation is dominated by *Salix cinerea* (Grey Willow), but also contains one *Alnus glutinosa* (Alder) tree. The sub-shrub *Rubus fruticosus* agg. (Bramble) is present at the fringes and the ground flora is shaded and includes *Angelica sylvestris* (Wild Angelica), *Arum maculatum* (Lords-and-Ladies), *Galium aparine* (Cleavers), *Rumex sanguineus* (Wood Dock) and abundant *Urtica dioica* (Common Nettle).

Target Note 318. Scrub. This vegetation is dominated by *Crataegus monogyna* (Hawthorn) and *Prunus spinosa* (Blackthorn) but is also being invaded by young *Salix cinerea* (Grey Willow). The ground flora is sparse but contains the grass *Poa trivialis* (Rough Meadow-grass) and shade tolerant herbs such as *Angelica sylvestris* (Wild Angelica), *Arum maculatum* (Lords-and-Ladies), *Galium aparine* (Cleavers), and *Urtica dioica* (Common Nettle).

Target Note 319. Amenity planting of native shrubs. Shrubs and trees include *Acer campestre* (Field Maple), *Cornus sanguinea* (Dogwood), *Corylus avellana* (Hazel), *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash), and *Rosa canina* (Dog-rose). The sub shrub *Rubus fruticosus* agg. (Bramble), is also present. The field layer is shaded and sparse but includes *Carex hirta* (Hairy Sedge), and *Urtica dioica* (Common Nettle).

Target Note 320. A hedge. This hedge is 4 m tall and 2.5 m wide. It is dominated by *Crataegus monogyna* (Hawthorn), with lesser proportions of *Prunus spinosa* (Blackthorn) and a single *Prunus avium* (Wild Cherry). The field layer is dominated by *Urtica dioica* (Common Nettle) together with *Anthriscus sylvestris* (Cow Parsley), and the grass *Poa trivialis* (Rough Meadow-grass). This hedge is of relatively recent origin and probably was planted following road works.

Target Note 321. A hedge. This hedge is 4 m tall and 2.5 m wide. It is dominated by *Crataegus monogyna* (Hawthorn), with lesser proportions of *Prunus spinosa* (Blackthorn). The field layer is dominated by *Urtica dioica* (Common Nettle) together with *Anthriscus sylvestris* (Cow Parsley), and the grass *Poa trivialis* (Rough Meadow-grass). This hedge is of relatively recent origin and probably was planted following road works.

Target Note 322. Improved grassland. This sheep-grazed grassland is dominated by *Lolium perenne* (Perennial Rye-grass) with a modest range of other grasses and grassland forbs at low levels of abundance. Grasses include *Agrostis capillaris* (Common Bent), *Poa annua* (Annual Meadow-grass) and *Poa trivialis* (Rough Meadow-grass). Grassland forbs include *Cardamine flexuosa* (Wavy Bitter-cress), *Cerastium glomeratum* (Sticky Mouse-ear), *Geranium dissectum* (Cut-leaved Crane's-bill), *Lamium purpureum* (Red Dead-nettle), *Rumex obtusifolius* (Broad-leaved Dock), *Trifolium repens* (White Clover) and *Veronica persica* (Common Field-speedwell).

Target Note 323. Rough Grassland. This grassland grows on the road verge and contains a mixture of grasses, herbs and incipient scrub. There are a few halophytes present to due to salt spreading in

the winter. Grasses include *Agrostis stolonifera* (Creeping Bent), *Arrhenatherum elatius* (False Oat-grass) *Festuca rubra* (Red Fescue), *Holcus lanatus* (Yorkshire-fog), *Poa trivialis* (Rough Meadow-grass) and the halophyte *Puccinellia distans* (Reflexed Saltmarsh-grass). Grassland herbs are present with tall herbs and semi ruderals such as *Anthriscus sylvestris* (Cow Parsley), *Chamerion angustifolium* (Rosebay Willowherb), *Conium maculatum* (Hemlock), *Dipsacus fullonum* (Teasel), *Senecio jacobaea* (Common Ragwort) and *Urtica dioica* (Common Nettle). More typical grassland forbs are also present including *Daucus carota* (Wild Carrot), *Lotus corniculatus* (Common Bird's-foot-trefoil), *Potentilla anserina* (Silverweed) and the halophyte *Plantago coronopus* (Buck's-horn Plantain).

Target Note 324. Amenity planting of native shrubs. This planting is located on a roundabout. Shrubs and trees include *Betula pendula* (Silver Birch), *Cornus sanguinea* (Dogwood), *Crataegus monogyna* (Hawthorn), *Prunus avium* (Wild Cherry) and *Rosa canina* (Dog-rose). The sub shrub *Rubus fruticosus* agg. (Bramble), is also present. The field layer is shaded and sparse but includes *Kindbergia praelonga* (a moss) and *Urtica dioica* (Common Nettle).

Target Note 325. Improved grassland. This grassland is dominated by *Lolium perenne* (Perennial Rye-grass) with *Holcus lanatus* (Yorkshire-fog) and *Dactylis glomerata* (Cock's-foot) occurring frequently. The grassland forbs *Ranunculus repens* (Creeping Buttercup), *Rumex obtusifolius* (Broad-leaved Dock) and *Trifolium repens* (White Clover) are also present.

Target Note 326. A defunct hedge. This hedge has been coppiced in recent years and then annually flailed so it is no more than 0.7m high and 1 m wide. Shrubs are discontinuous and there are large gaps between individual bushes. *Crataegus monogyna* (Hawthorn) is dominant. The field layer includes grasses such as *Arrhenatherum elatius* (False Oat-grass), *Dactylis glomerata* (Cock's-foot) and *Elytrigia repens* (Common Couch), together with tall herbs such as *Heracleum sphondylium* (Hogweed) *Rumex crispus* (Curled Dock) and *Urtica dioica* (Common Nettle).

Field alongside the canal and the A43

Target Note 327. A mosaic of tall herb and semi-improved grassland with incipient *Rubus fruticosus* agg. (Bramble) scrub. Tall herbs most frequently include *Epilobium hirsutum* (Great Willowherb) and *Urtica dioica* (Common Nettle). Other species at lower levels of abundance include *Arctium minus* (Lesser Burdock), *Cirsium arvense* (Creeping Thistle), *Dipsacus fullonum* (Teasel), *Filipendula ulmaria* (Meadowsweet). *Galium aparine* (Cleavers), *Rumex sanguineus* (Wood Dock) and *Senecio jacobaea* (Common Ragwort). Shorter areas of vegetation show signs of being grazed by Rabbits and are grassier, but with a predominance of plant species tolerant of Rabbit grazing. Grasses include *Agrostis capillaris* (Common Bent), *Agrostis stolonifera* (Creeping Bent), *Arrhenatherum elatius* (False Oat-grass), *Dactylis glomerata* (Cock's-foot), *Holcus lanatus* (Yorkshire-fog) and *Poa trivialis* (Rough Meadow-grass). Herbs present include *Glechoma hederacea* (Ground-ivy), *Myosotis arvensis* (Field Forget-me-not), *Potentilla anserina* (Silverweed), *Potentilla reptans* (Creeping Cinquefoil), *Prunella vulgaris* (Selfheal), *Ranunculus repens* (Creeping Buttercup), *Silene latifolia* (White Campion) and *Veronica chamaedrys* (Germander Speedwell). There are areas of vegetation influenced by damp soil conditions with infrequent *Carex riparia* (Greater Pond-sedge), *Dactylorhiza fuchsii* (Common Spotted-orchid) and *Stellaria graminea* (Lesser Stitchwort).

Target Note 328. A hedge. This hedge is outgrown and reaches 6 m in height and 4 m wide. There are occasionally standard *Fraxinus excelsior* (Ash) trees along its length. There are no signs of recent management. It is dominated by *Crataegus monogyna* (Hawthorn), but also contains infrequent *Sambucus nigra* (Elder) and *Rosa canina* (Dog-rose). The field layer contains shade tolerant herbs such as *Galium aparine (Cleavers), Glechoma hederacea (Ground-ivy)* and *Urtica dioica* (Common Nettle).

Target Note 329. A hedge. This hedge is outgrown and reaches 6 m in height and 4 m wide. It grows alongside the canal footpath. There are frequent standard *Fraxinus excelsior* (Ash) trees along its length. Tree and shrub species include *Crataegus monogyna* (Hawthorn), but also *Sambucus nigra* (Elder) and *Rosa canina* (Dog-rose). The field layer contains shade tolerant herbs and grasses such as *Alliaria petiolata* (Garlic Mustard), *Arum maculatum* (Lords-and-Ladies), *Brachypodium sylvaticum* (False Brome), *Bryonia dioica* (White Bryony), *Primula vulgaris* (Primrose), *Galium aparine (Cleavers), Glechoma hederacea (Ground-ivy), Urtica dioica* (Common Nettle) and *Viola odorata* (Sweet Violet). The climber *Hedera helix* (Ivy) is also present.

Target Note 330. Bio fuel crop. This field is planted with *Miscanthus* × *giganteus* (Giant Miscanthus). The crop had been removed some days before the survey ready for the new re-growth. There are a number of weed species present both grasses and herbs. Grasses include *Agrostis capillaris* (Common Bent), *Agrostis stolonifera* (Creeping Bent) and *Poa trivialis* (Rough Meadow-grass) and the gramminoid *Juncus inflexus* (Hard Rush), is also present. Herbs include typical agricultural weeds and common grassland forbs. Weedy species include *Arctium minus* (Lesser Burdock), *Cerastium fontanum* (Common Mouse-ear),*Helminthotheca echioides* (Bristly Oxtongue), *Rumex obtusifolius* (Broad-leaved Dock), *Tripleurospermum inodorum* (Scentless Mayweed) and *Veronica serpyllifolia* (Thyme-leaved Speedwell) . Species more typical of grasslands include *Cerastium fontanum* (Common Mouse-ear), *Hypochaeris radicata* (Cat's-ear), *Leucanthemum vulgare* (Oxeye Daisy), *Plantago major* (Greater Plantain), *Trifolium pratense* (Red Clover), *Trifolium repens* (White Clover), and *Vicia sativa* (Common Vetch).

Target Note 331. Amenity planting of native shrubs. This planting is located on a slip road of the services to the M. Woody species dominate and include *Acer campestre* (Field Maple), *Corylus avellana* (Hazel), *Crataegus monogyna* (Hawthorn) and *Rosa canina* (Dog-rose), The field layer is grassy at the margins and with *Arrhenatherum elatius* (False Oat-grass) and *Holcus lanatus* (Yorkshire-fog). There are also tall herbs including *Artemisia vulgaris* (Mugwort), *Dipsacus fullonum* (Teasel) and *Rumex sanguineus* (Wood Dock). The sub-shrub *Rubus fruticosus* agg. (Bramble) is also present.

Target Note 332. Tall herb vegetation. This nettle-bed is shaded by *Salix fragilis* (Crack-willow) trees from the adjacent wood. It is dominated by *Urtica dioica* (Common Nettle), together with lesser proportions of *Alliaria petiolata* (Garlic Mustard), *Arctium minus* (Lesser Burdock), *Epilobium hirsutum* (Great Willowherb), *Cirsium arvense* (Creeping Thistle), *Galium aparine* (Cleavers), *Heracleum sphondylium* (Hogweed), *Rumex obtusifolius* (Broad-leaved Dock), *Stachys sylvatica* (Hedge Woundwort). The shrub *Sambucus nigra* (Elder) and the woodland grass *Schedonorus giganteus* (Giant Fescue) are also present.

Target Note 333. Mixed plantation . This double row of planted trees includes *Pinus sylvestris* (Scots Pine), and shrub species cut as a hedge on one side. Other woody species include *Crataegus monogyna* (Hawthorn), *Sambucus nigra* (Elder), *Ulmus procera* (English Elm). There are tall herbs, many of which are resistant to Rabbit grazing and include *Bryonia dioica* (White Bryony), *Cirsium arvense* (Creeping Thistle), *Conium maculatum* (Hemlock), *Galium aparine* (Cleavers) and *Urtica dioica* (Common Nettle).

Other Junction Improvements

[No surveys have been undertaken at these sites to date]

APPENDIX C: LEGISLATION

General

This section briefly describes the legal protection afforded to the protected species referred to in this report. It is for information only and is not intended to be comprehensive or to replace specialised legal advice. It is not intended to replace the text of the legislation, but summarises the salient points.

Badger

Meles meles (Badger) is protected in Britain under the *Protection of Badgers Act 1992* and *Schedule 6* of the *Wildlife and Countryside Act 1981* (as amended).

The legislation affords protection to Badgers and Badger setts, and makes it a criminal offence to:

- wilfully kill, injure, take, possess or cruelly ill-treat a Badger, or to attempt to do so;
- interfere with a sett by damaging or destroying it;
- to obstruct access to, or any entrance of, a Badger sett; or
- to disturb a Badger when it is occupying a sett.

Bats

All species of British bat are protected by *The Wildlife and Countryside Act 1981 (as amended),* extended by the *Countryside and Rights of Way (CRoW) Act 2000*. This legislation makes it an offence to:

- intentionally kill, injure or take;
- possess or control;
- intentionally or recklessly damage, destroy or obstruct access to a breeding site or resting place; and
- intentionally or recklessly disturb whilst the animal occupies a breeding site or resting place.

Bats are also European Protected Species listed on *The Conservation (Natural Habitats, & c.) Regulations 2010 (as amended).* This legislation makes it an offence to:

- deliberately capture, injure or kill;
- deliberately disturb, including in particular any disturbance which is likely (a) to impair their ability - (i) to survive, to breed or reproduce, or to rear or nurture

their young; or (ii) hibernate or migrate, where relevant; or (b) to affect significantly the local distribution or abundance of the species to which they belong.

- damage or destroy a breeding site or resting place; and
- possess, control, transport, sell, exchange, or offer for sale or exchange.

Birds

Birds (general protection)

All species of bird are protected under *Section 1* of the *Wildlife and Countryside Act 1981* (as amended). The protection was extended by the CRoW Act 2000. The legislation makes it an offence to intentionally:

- kill, injure or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
- take or destroy an egg of any wild bird.

Birds (specially protected species)

Certain species of bird are listed on *Schedule 1* of the *Wildlife and Countryside Act 1981* (as amended) and receive protection under *Sections 1(4)* and *1(5)* of the Act. The protection was extended by the CRoW Act 2000. The legislation confers special penalties where the above mentioned offences are committed for any such bird and also make it an offence to intentionally or recklessly:

- disturb any such bird, whilst building its nest or it is in or near a nest containing dependant young; or
- disturb the dependant young of such a bird.

Common Reptiles

Zootoca vivipara (Common Lizard), *Natrix natrix* (Grass Snake), *Anguis fragilis* (Slow-worm), and *Vipera berus* (Adder) are listed under *Schedule 5* of the *Wildlife and Countryside Act 1981* (as amended), in respect of *Section 9(5)* and part of *Section 9(1)*. This protection was extended by the CRoW Ac (2000). Under the above legislation it is an offence to:

- intentionally or deliberately kill or injure any individual of such a species; or
- sell or attempt to sell any part of the species alive or dead.

Dormouse

The Dormouse is protected by *The Wildlife and Countryside Act 1981 (as amended),* extended by the *Countryside and Rights of Way Act 2000*. This legislation makes it an offence to:

- Intentionally kill, injure or take a dormouse;
- Possess or control any live or dead specimen or anything derived from a dormouse (unless it can be shown to have been legally acquired);
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a dormouse; or
- Intentionally or recklessly disturb a dormouse while it is occupying a structure or place which it uses for that purpose.

The Dormouse is also European Protected Species listed on *The Conservation (Natural Habitats, & c.) Regulations 2010 (as amended).* This legislation makes it an offence to:

- Deliberately capture or kill a dormouse;
- Deliberately disturb a dormouse;
- Damage or destroy a breeding site or resting place of a dormouse;
- Keep, transport, sell or exchange, or offer for sale or exchange a live or dead dormouse or any part of a dormouse.

Great Crested Newt

The Great Crested Newt (*Triturus cristatus*) is listed on *Schedule 5* of the *Wildlife and Countryside Act 1981* (as amended), and receives full protection under Section 9. This species is also listed as a European Protected Species on *Schedule 2* of the *Conservation (Natural Habitats, etc.) Regulations 2010* which gives it full protection under *Regulation 39.* Protection was extended by the CRoW Act 2000. Under the above legislation it is an offence to:

- kill, injure or take an individual of such a species;
- possess any part of such species either alive or dead;
- intentionally or recklessly damage, destroy or obstruct access to any place or structure used by such species for shelter, rest, protection or breeding;
- intentionally or recklessly disturb such a species whilst using any place of shelter or protection; or
- sell or attempt to sell any such species.

The Great Crested Newt is included as a Priority Species in the UK Biodiversity Action Plan (UKBAP) and also as a species of principal importance for the conservation of biological diversity in England under Section 74 of the CRoW Act.

Water Vole

Arvicola amphibius (Water Vole) is fully protected under *Section 9* of *Schedule 5* of the *Wildlife and Countryside Act 1981* (as amended). Protection was extended by the *Countryside and Rights of Way Act 2000*.

Under this legislation, it is an offence to:

- intentionally kill, injure or take (capture) a Water Vole;
- possess or control a live or dead Water Vole, or any part of a Water Vole;
- intentionally or recklessly damage, destroy or obstruct access to any structure or place which Water Voles use for shelter or protection, or to intentionally or recklessly disturb Water Voles while they are using such a place; or
- sell, offer for sale or advertise for live or dead Water Voles.

The Water Vole is included as a Priority Species in the UK Biodiversity Action Plan (UKBAP).

White-Clawed Crayfish

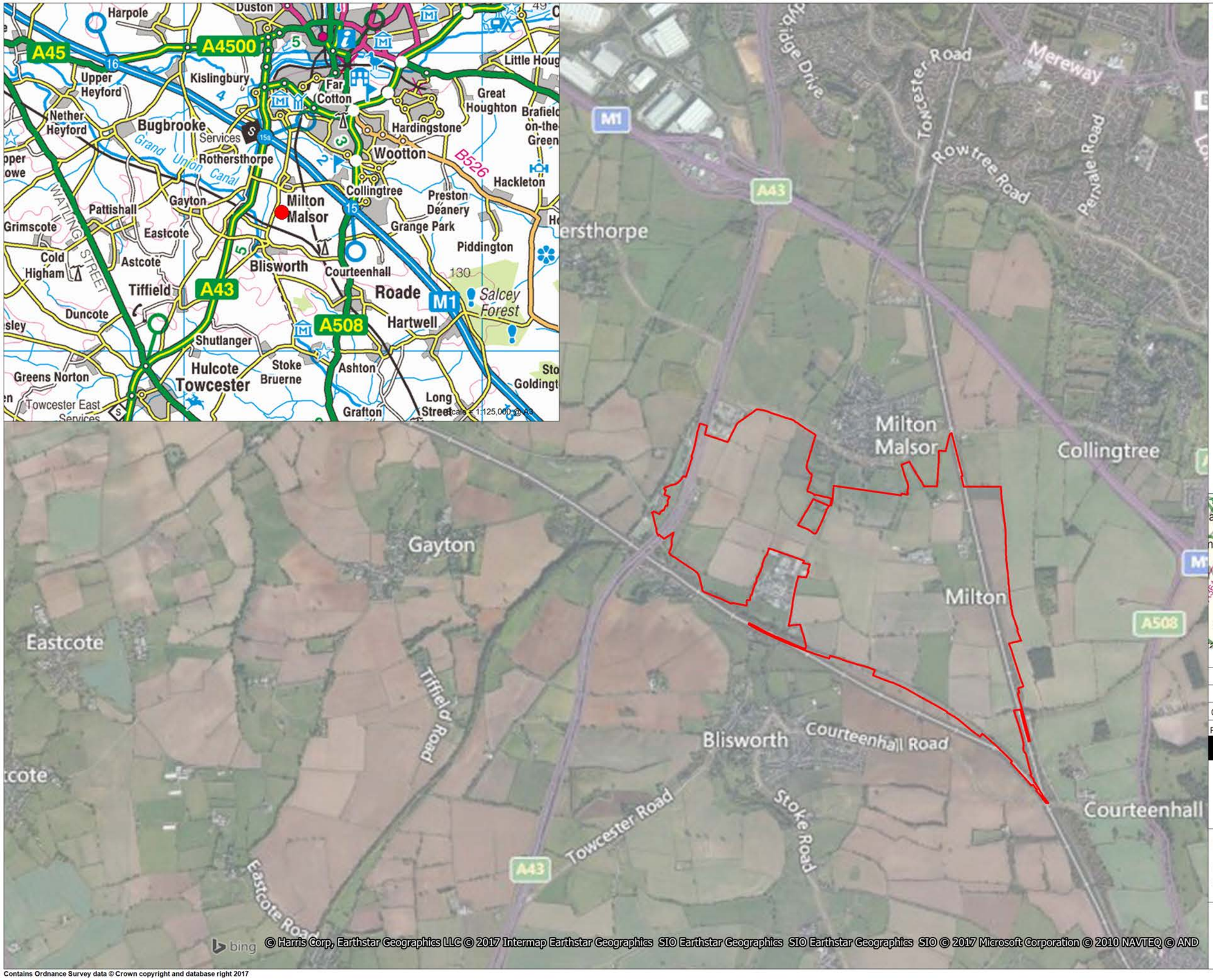
The White-clawed Crayfish is afforded partial protection under Schedule 5 of the Wildlife and Countryside Act 1981 section 9(1) and section 9(5) (as amended by the Countryside and Rights of Way Act 2000) against taking from the wild and sale. In addition crayfish habitat is protected under the European Habitats and Species regulations Annexe II and V, implemented in the UK by the Habitats and Species Regulations 1996.

The White-clawed Crayfish is classed as globally threatened on the IUCN/WCMC red data list and the Bern Convention Appendix III. It is also a UK Biodiversity Action Plan priority species.

Any actions that might impact on White-clawed Crayfish must first be agreed with the Natural England and/or the Environment Agency (EA).

APPENDIX D: FIGURES

Figure B1.1 – Site Location Plan
Figure B1.2 – Site Location Plan
Figure B2.1 – Phase 1 Habitat Maps (1-4)
Figure B2.2 – Phase 1 Habitat Map
Figure B3.1 – HSI Survey Results
Figure B3.2 – HSI Survey Results



Site boundary (July 2017)

Rev	Date	Description	Drn	Chk	App
00	13.07.17	855950	SP	RG	RE

Rail Central

RSK

Figure B1.1

Main SRFI Site
Site Location Plan

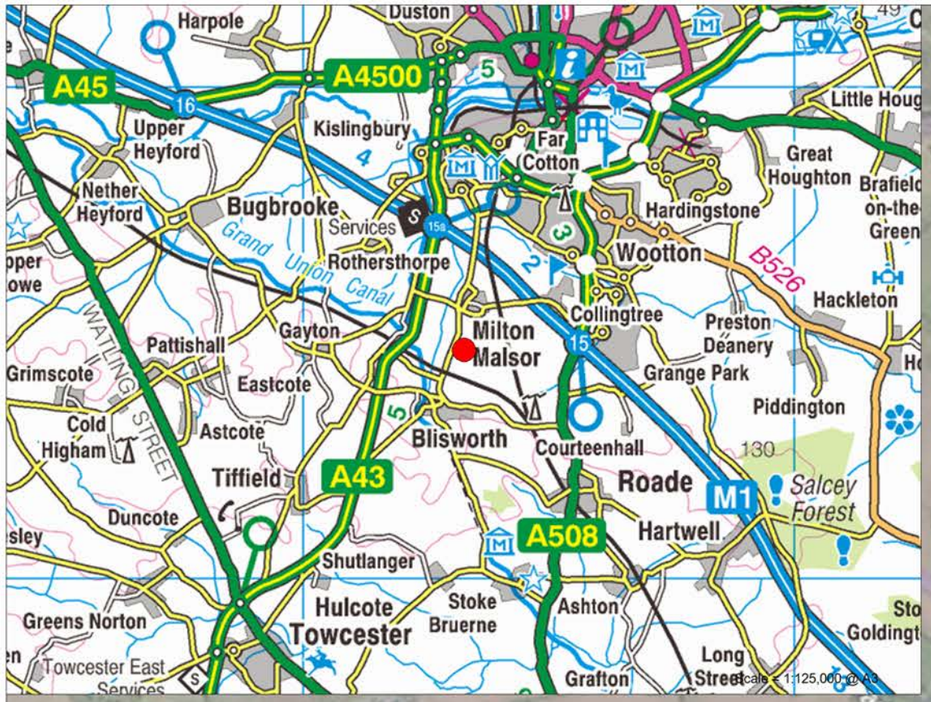
0 750
Metres
Scale = 1:25,000 @ A3

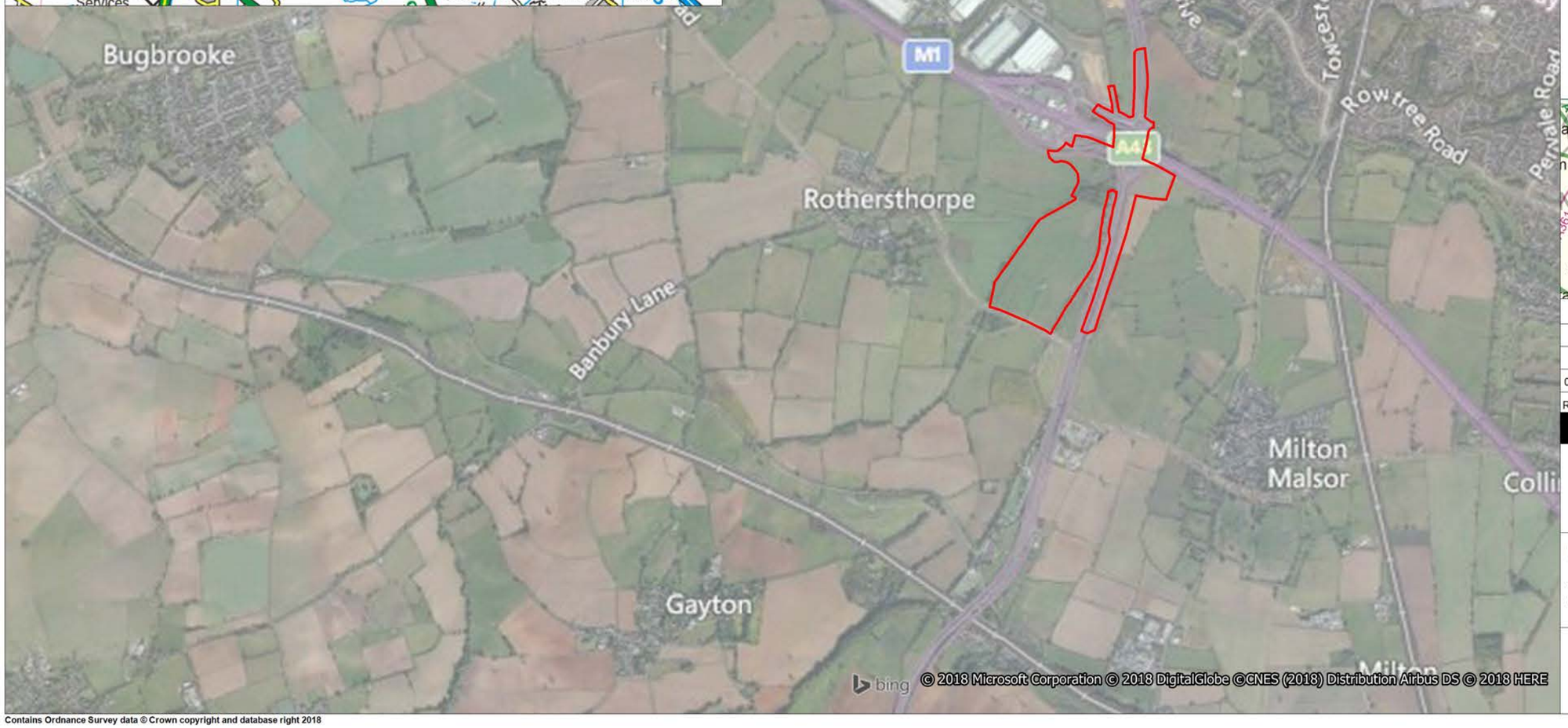
N W E S

REV 00

File Name : T:\Projects\Projects 855941 - 855960\855950 - Armtrack\07 GIS\10 - Workspaces

Site boundary (Jan 2018)





Rev	Date	Description	Drn	Chk	App
00	29.01.18	855950	SP	RG	RE

Rail Central

RSK

Figure B1.2

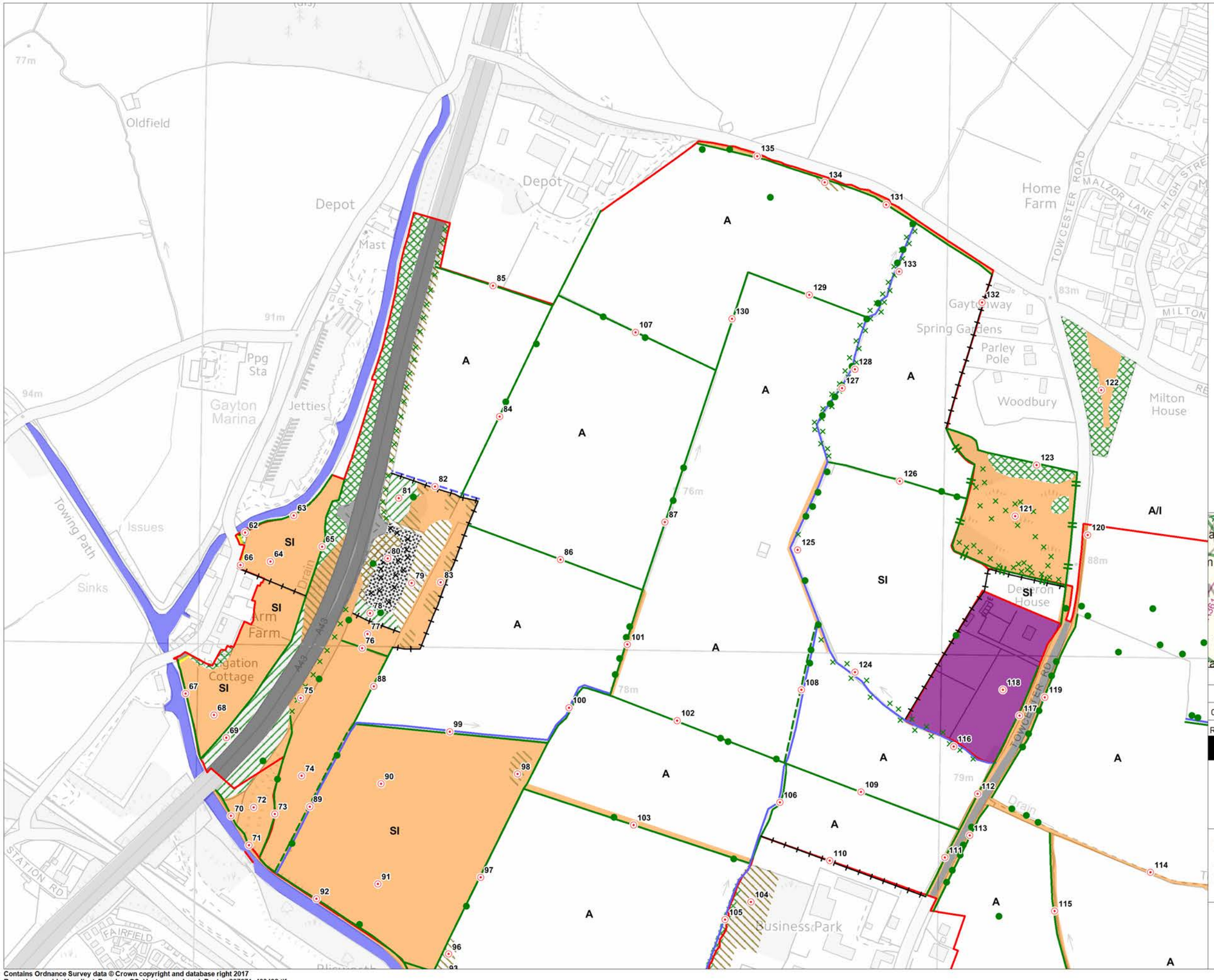
Junction 15a
Site Location Plan

0 750
Metres
Scale = 1:25,000 @ A3

N W E S

REV 00

File Name : U:\Ecology\855000s\855950 - Armtrack (Rail Central)



Site boundary (July 2017)
Broad-leaved semi-natural woodland
Broad-leaved plantation woodland
Dense / continuous scrub
Scattered scrub
Scattered broad-leaved tree
Unimproved neutral grassland
SI Semi-improved neutral grassland
I Improved grassland
SI Semi-improved grassland
Tall ruderals and rough grassland
Tall ruderals
Standing water
Running water
A Arable field
A/I Arable field / improved grassland
Amenity grassland
Ephemeral / short perennial
Introduced shrub
Intact hedge
Gappy hedge
Hedge with trees
Coniferous hedge
Fence
Wall
Dry ditch
Building
Bare ground
Hardstanding
Botanical target notes
No access

Rev	Date	Description	Drn	Chk	App
00	13.07.17	855950	SP	RG	RE

Rail Central

RSK

Figure B2.1

Phase 1 Habitat Survey
Map 1 of 4

0 150
metres
Scale = 1:5,000 @ A3

N W E S

REV 00

File Name : T:\Projects\Projects 855941 - 855960\855950 - Armtrack (Rail Central)\07 GIS

Rev	Date	Description	Drn	Chk	App
00	13.07.17	855950	SP	RG	RE

Rail Central

RSK

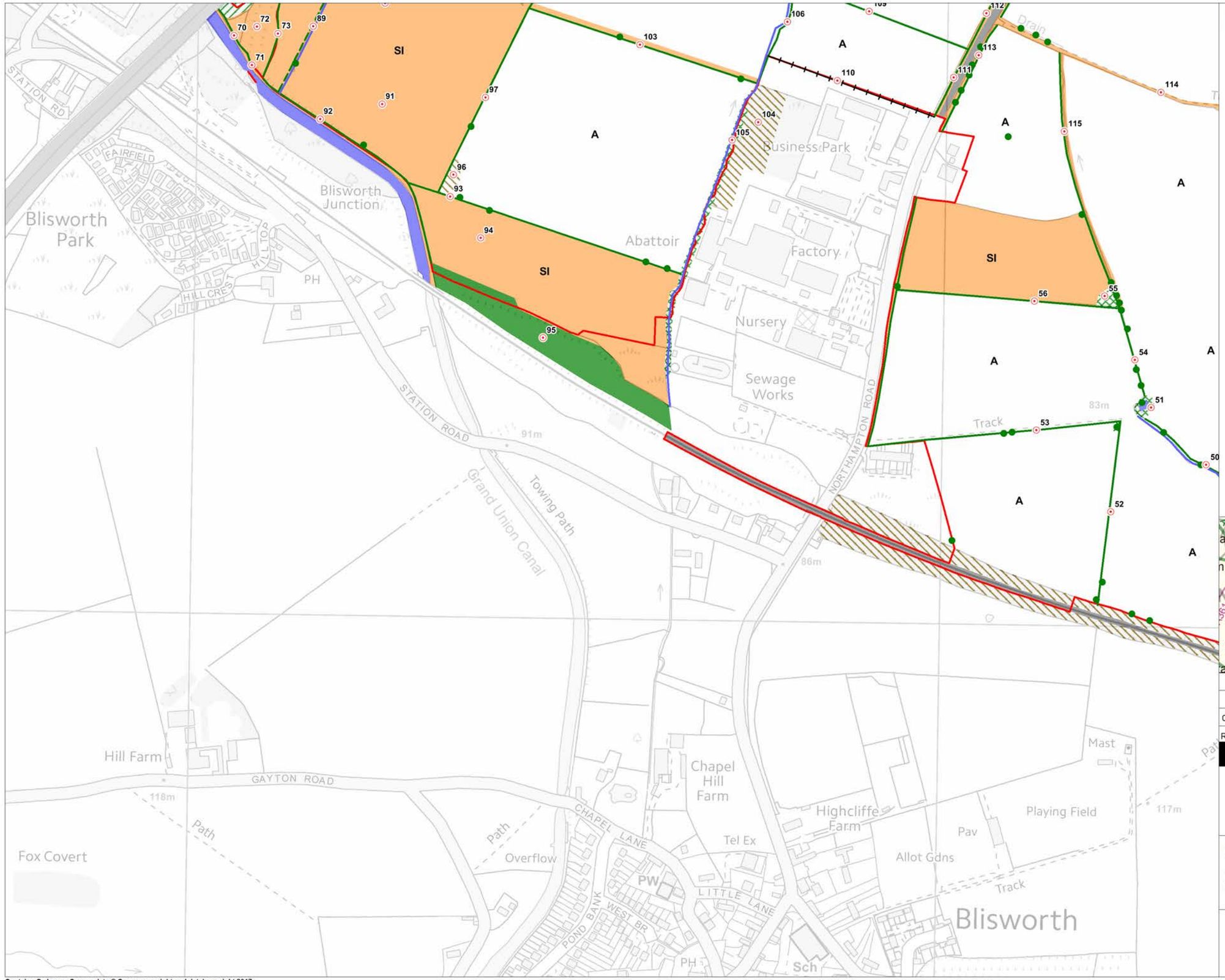
Figure B2.1

Phase 1 Habitat Survey
Map 2 of 4

0 150
metres
Scale = 1:5,000 @ A3

REV 00

File Name : T:\Projects\Projects 855941 - 855960\855950 - Armtrack (Rail Central)\07 GIS



Site boundary (July 2017)
Broad-leaved semi-natural woodland
Broad-leaved plantation woodland
Dense / continuous scrub
Scattered scrub
Scattered broad-leaved tree
Unimproved neutral grassland
Semi-improved neutral grassland
I Improved grassland
SI Semi-improved grassland
Tall ruderals and rough grassland
Tall ruderals
Standing water
Running water
A Arable field
A/I Arable field / improved grassland
Amenity grassland
Ephemeral / short perennial
Introduced shrub
Intact hedge
Gappy hedge
Hedge with trees
Coniferous hedge
Fence
Wall
Dry ditch
Building
Bare ground
Hardstanding
Botanical target notes
No access

Rev	Date	Description	Drn	Chk	App
00	13.07.17	855950	SP	RG	RE

Rail Central

RSK

Figure B2.1

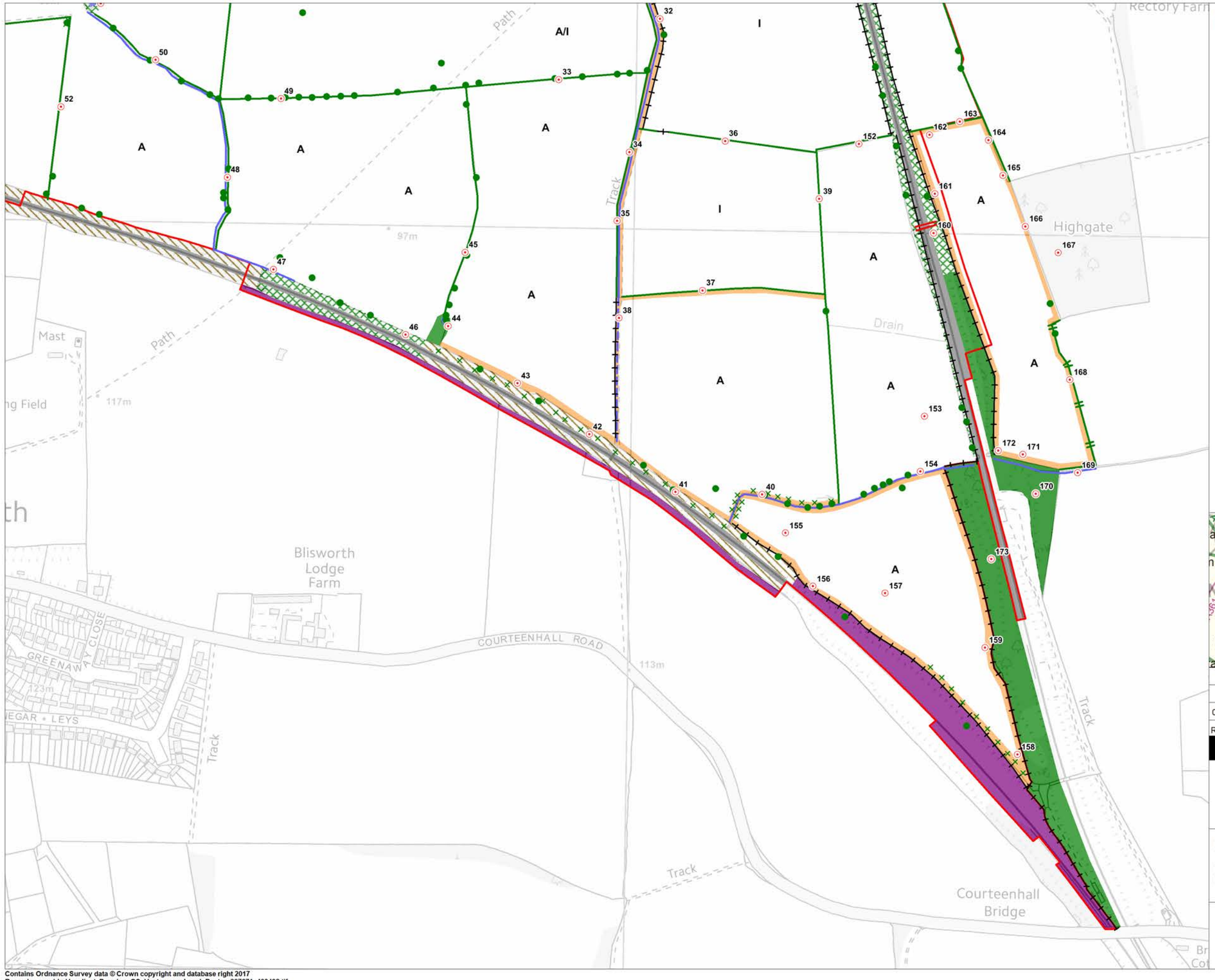
Phase 1 Habitat Survey
Map 3 of 4

0 150
metres
Scale = 1:5,000 @ A3

N W E S

REV 00

File Name : T:\Projects\Projects 855941 - 855960\855950 - Armtrack (Rail Central)\07 GIS



Rev	Date	Description	Drn	Chk	App
00	13.07.17	855950	SP	RG	RE

Rail Central

RSK

Figure B2.1

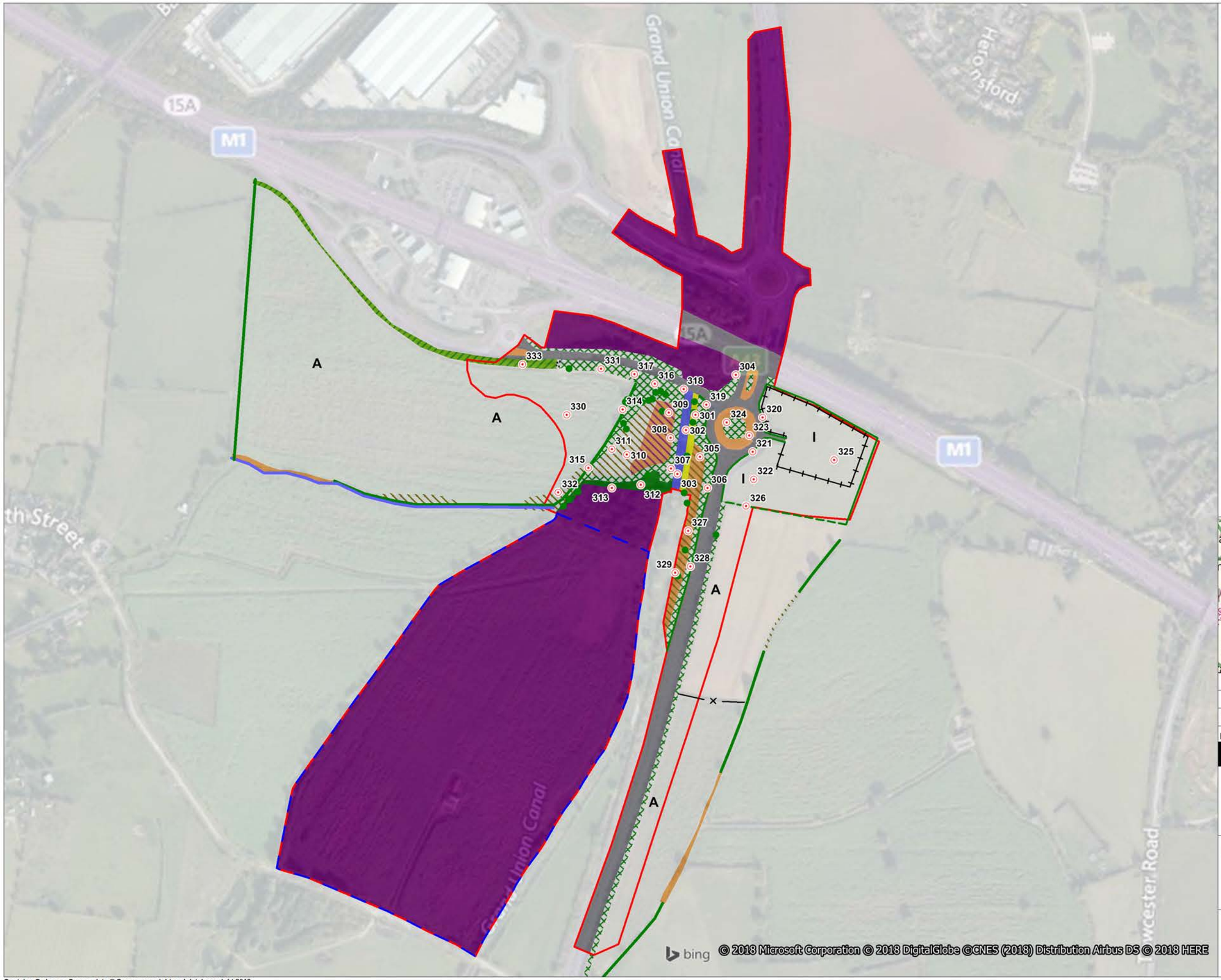
Phase 1 Habitat Survey
Map 4 of 4

0 150
metres
Scale = 1:5,000 @ A3

N W E S

REV 00

File Name : T:\Projects\Projects 855941 - 855960\855950 - Armtrack (Rail Central)\07 GIS



Site boundary (Jan 2018)
Ecological mitigation area
Broad-leaved semi-natural woodland
Mixed plantation woodland
Dense / continuous scrub
Scattered broad-leaved tree
Rough grassland
I Improved grassland
Marshy grassland
Tall ruderal and rough grassland
Tall ruderals
Running water
A Arable field
Intact hedge
Boundary removed
Bare ground
Hardstanding
Botanical target notes
No access to date

Rev	Date	Description	Drn	Chk	App
00	29.01.18	855950	SP	RG	RE

Rail Central

RSK

Figure B2.2

Phase 1 Habitat Survey

0 180
metres
Scale = 1:6,000 @ A3

N W E S

REV 00

File Name : U:\Ecology\855000s\855950 - Armtrack (Rail Central)

Site boundary (July 2017)

500m buffer

HSI Score 2015 - Average

HSI Score 2015 - Below average

HSI Score 2015 - Poor

Dry 2015

No Access 2015

Behind major barrier to movment - no further survey

Rev	Date	Description	Drn	Chk	App
00	13.07.17	855950	SP	RG	RE

Rail Central

RSK

Figure B3.1

HSI Survey Results

0 450

metres

Scale = 1:15,000 @ A3

N W E S

REV 00

File Name : T:\Projects\Projects 855941 - 855960\855950 - Armtrack (Rail Central)\07 GIS

Site boundary (Jan 2018)

500m buffer

Ecological mitigation area

Dry 2017

No Access 2017

Behind major barrier to movment - no further survey

Shelfleys

Rothersthorpe

Milton Malsor

Grand Union Canal (Northampton Arm)

Service Area

Depot

Junction 15a

Gas Valve Compound

The Lodge

Grange Wood Park

Merefield

Car Park

The Counties Crematorium

Shepherd's Lodge

Spring Farm

St John's Farm

Strouds Farm

Castle Farm

Church Farm

Manor Farm

The Poplars

Workings

Oldfield

Lock

Drawbridge

Tunnel

1

2

3

4

5

6

7

Wellingborough

Towcester

Silverstone

Northampton

Rev	Date	Description	Drn	Chk	App
00	29.01.18	855950	SP	RG	RE

Rail Central

RSK

Figure B3.2

HSI Survey Results

0 300

metres

Scale = 1:10,000 @ A3

N W E S

REV 00

File Name : U:\Ecology\855000s\855950 - Armtrack (Rail Central)