



Oxfordshire Railfreight Limited

Proposed Oxfordshire Strategic Rail Freight Interchange

ECOLOGICAL APPRAISAL & PROTECTED SPECIES SURVEYS

WORKING DRAFT April 2022

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This document is work in progress and summarises ecological analysis completed to date.

1.0 INTRODUCTION

- 1.1 Oxfordshire Railfreight Ltd. commissioned FPCR Environment and Design Ltd. to complete an ecological assessment of an area of land at Ardley, Bicester (central OS grid reference SP533263).
- 1.2 The objective of the study was to determine habitats and species present within the site and to make an initial assessment of their ecological value and any potential ecological constraints to future industrial development including the demolition of some of the on-site buildings. Additional objectives were, where appropriate, to identify the need for additional surveys and to consider opportunities for ecological mitigation and enhancements within any future development design.

Development Proposals

- 1.3 The Proposed Development comprises a Strategic Rail Freight Interchange with associated infrastructure and industrial units (referenced to herein as the 'Main Site') and associated Highway Works (referred to collectively herein as the Highway Works').
- 1.4 Full details of the Proposed Development are provided separately in Chapter 3: Proposed Development. In brief, the Proposed Development consists of the following:
 - An intermodal freight terminal and associated infrastructure including container storage and HGV parking, rail sidings to serve individual warehouses, management building and refuelling facility;
 - Up to 603,850 sq m (gross internal area) of warehousing and ancillary buildings, with additional floorspace provided in the form of mezzanines;
 - New road infrastructure and works to the existing road network, including the provision of a new Ardley Bypass, delivered as part of wider improvements to M40 Junction 10 which will bridge over the Chiltern Main railway line, Middleton Stoney Relief Road to comprise a single carriageway road that will provide a link from the B4030, Heyford Park Link Road which will provide a link from the B430 north of Middleton Stoney to Heyford Park and related traffic management measure;
 - Relocation of the Severn Trent Green Power IVC Composting facility;
 - Strategic landscaping and tree planting, including diverted public rights of way and new foot and cycle links and associated drainage; and
 - Earthworks and demolition of existing structures on the SRFI site.
- 1.5 This report includes and assessment of habitats and proposals for suitable mitigation.

Site Location and Context

- 1.6 The application site, as defined by the 'Order Limits' (Figure 1), is located to the south of Ardley. The 'Main Site' is located between the B430 and the disused RAF Upper Heyford airfield which lies to the west and lies immediately south of the Chiltern Railway line. The Main site is dominated by arable and semi-improved grassland used for grazing, with hedgerows trees, scrub and semi-improved grassland at the field margins. The Ashgrove farmstead lies in the north-east of the Main Site which comprises several farm buildings and residences and the Seven Trent

Green Power 'In Vessel Compositing' facility lies within the southern east. Agricultural fields extent from the southern boundary and form much of the surrounding landscape. To the east of the Main site and the B430 is the Viridor Ardley Energy Recovery Facility ('Viridor ERF') and Ardley Landfill Site and to the south of the waste facilities is an active minerals quarry. Other habitats present within the Main Site include small plantation woodlands, four waterbodies, watercourses and areas of hardstanding and amenity/ornamental habitats associated with buildings.

- 1.7 The Highways Works part of the application site include land on the eastern and western sides of the M40 Junction 10 which largely comprises arable land with planted tree groups associated with screening functions of highways infrastructure. Other habitats include grassland road verges, scrub and ponds. The proposed 'Ardley Bypass' is located to the north-east of the Main Site and crosses arable fields bound by native hedgerows, as well as the Chiltern Railway line. To the south-east of the Main Site the proposed 'Middleton Stoney Relief Road' includes arable fields and native hedgerows, a section of the Gagle Brook and road verges associated with the B4030.

2.0 METHODOLOGY

Desktop Study

- 2.1 In order to compile existing baseline information for the study area, relevant ecological information was requested from Thames Valley Environmental Records Centre (TVERC) in 2018 and updated in 2020 and 2021.
- 2.2 In addition, the following resources were interrogated for additional information and context:
- Multi Agency Geographic Information for the Countryside (MAGIC) website¹;
 - Colour 1:25,000 OS base maps²; and
 - Aerial photographs from Google Earth³.
- 2.3 The geographical extent of the search area for biodiversity information was related to the significance of sites and species and potential zones of influence which might arise from development within the site. The consultation exercise was completed with information using the following scales, considered to be appropriate, analysed:
- 15km around the site boundary for sites of International Importance (e.g. Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site);
 - 2km around the site boundary for statutory sites of National or Regional Importance (e.g. Sites of Special Scientific Interest (SSSI) and National Nature Reserves); and
 - 1km around the site for non-statutory designated sites of County Importance (e.g. Sites of Importance for Nature Conservation (SINC) / Local Wildlife Sites (LWS), and protected or otherwise notable species records (including species of Principal Importance under S41 of the Natural Environment and Rural Communities (NERC) Act (2006)⁴ within the last 20 years.

Field Survey

Flora

Extended Phase 1 Habitat Survey

- 2.4 Habitats within the application site were surveyed on the following dates:
- Main Site – 22nd June 2020 which represented update of the survey of the northern half of the Main Site that had previously been completed in February 2018 and inclusion of the southern area of the Main Site. An update of the whole Main Site was completed on 17th / 18th May 2021 which included an experienced botanist with a Field Identification Certificate (FISC) level 4.
 - Highway Works - 28th / 29th June 2021 and 11th / 12th August.
- 2.5 Habitats have been classified based on the broad habitat types present using the system published by the UK Joint Nature Conservation Committee⁵, but where considered appropriate, with additional information collected beyond that required to determine the Phase 1 Habitat type.

¹ [Online]. www.natureonthemap.naturalengland.org.uk/MagicMap.aspx

² [Online]. www.ordnancesurvey.co.uk

³ [Online]. www.maps.google.co.uk

⁴ *The Natural Environment and Rural Communities Act 2006*. [Online]. London: HMSO Available at: <http://www.legislation.gov.uk/ukpga/2006/16/contents> [Accessed 27/10/2020]

⁵ JNCC. (1990). *Handbook for Phase 1 habitat survey – a technique for environmental audit*. Peterborough: JNCC

The survey was also extended to assess the suitability of the habitats and other features to support protected and notable fauna species. This involved a systematic walk over of the site by an experienced ecologist to classify broad habitat types and to particularly identify any Habitats of Principal Importance for the conservation of biodiversity as listed within Section 41 (S41) of Natural Environment and Rural Communities (NERC) Act 2006⁶. The abundance of species was quantified using the DAFOR scale, ranging from Dominant (>75%) to Abundant (75-51%), through Frequent (50-26%) and Occasional (25-11%) to Rare (10-1%). Whilst the plant species lists obtained should not be regarded as exhaustive, sufficient information was obtained to determine broad habitat types.

- 2.6 Consideration was also given to non-native invasive species, such as giant hogweed *Heracleum mantegazzianum*, Himalayan balsam *Impatiens glandulifera* or Japanese knotweed *Fallopia japonica*, and as described in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

Hedgerows

- 2.7 Hedgerows were surveyed using the Hedgerow Evaluation and Grading System (HEGS)⁷. The aim of the assessment is to allow the rapid recording and ecological appraisal of any given site in the UK, and to allow the grading of the individual hedgerows present, in order to identify those which are likely to be of greatest significance for wildlife. This method of assessment includes noting down: canopy species composition, associated ground flora and climbers; structure of the hedgerow including height, width and gaps and associated features including number and species of mature tree and the presence of banks, ditches and grass verges.
- 2.8 Using the HEGS methodology each hedgerow can then be given a grade. These grades are used to assign a nature conservation value to each hedgerow as follows:
- Grade -1, 1, 1+ High to Very High Value
 - Grade -2, 2, 2+ Moderately High to High Value
 - Grade -3, 3, 3+ Moderate Value
 - Grade -4, 4, 4+ Low Value
- 2.9 Hedgerows graded -2 or above are suggested as being a nature conservation priority.
- 2.10 The hedgerows were also assessed for their potential ecological value under the Hedgerow Regulations 1997 (Statutory Instrument No: 1160). Briefly, each hedgerow is evaluated by determining both the average number of woody native species present per 100m and the number of hedgerow associated features. These results were compared against the nature conservation criteria of the Hedgerow Regulations to ascertain whether a hedgerow is classed as 'Important' under these regulations. An assessment of archaeological importance as defined under the Hedgerow Regulations 1997 was beyond the scope of this assessment.
- 2.11 All hedgerows were also assessed as to whether they qualified as Habitats of Principal Importance (Priority Habitats), i.e. they consisted of 80% or more native species.

⁶ The Natural Environment and Rural Communities Act 2006. [Online]. London: HMSO Available at: <http://www.legislation.gov.uk/ukpga/2006/16/contents> [Accessed 26/04/2022]

⁷ Clements, D. and Toft, R. 1992. *Hedgerow Evaluation and Grading System (HEGS), A methodology for the ecological survey, evaluation and grading of hedgerows.*

Fauna

2.12 During the Phase 1 Habitat Survey of the site, observations, signs of or suitable habitat for any species protected under Part I of the Wildlife and Countryside Act 1981 (as amended), the Conservation of Habitats & Species Regulations 2017 (as amended) and the Protection of Badgers Act 1992 were recorded. Consideration was also given to the existence and use of the site by other notable fauna such as Schedule 1 bird species, breeding birds, species of Principle Importance under Section 41 of the NERC Act (2006) and Local Biodiversity Action Plan (LBAP) or Red Data Book (RDB) species.

Bats

2.13 A suite of bat surveys including ground and aerial assessment of trees for their potential to support roosting bats and nocturnal surveys, internal/external and nocturnal surveys of buildings, and activity surveys including walked transect and static detector surveys were undertaken within the site in 2018, 2019, 2020 and 2021. The full details of the methodologies employed, and the results of these surveys are provided within the separate Land at Ardley Bat Report (FPCR, 2022). Bat activity surveys are continuing across the Highways Works areas in spring 2022.

[REDACTED]

Great Crested Newt *Triturus cristatus*

2.1 Aerial images and OS maps were reviewed for the presence of ponds within a 500m radius of the site and their potential connectivity to the site assessed. As part of the Phase 1 habitat survey a habitat suitability index (HSI) assessment was undertaken on accessible ponds at the time of the survey within 500m of the survey area where suitable habitat connectivity was identified using OS

mapping and aerial photographs. Habitats present within the site were assessed during the extended Phase 1 Habitat Survey for their potential to provide suitable areas of rest or shelter for GCN.

- 2.2 Targeted surveys of onsite ponds only were carried out comprising aquatic presence / absence surveys conducted between April – June 2018 (inclusive) and following the methods recommended by Natural England⁸. Update eDNA surveys were undertaken in 2020.
- 2.3 In 2021 targeted aquatic surveys of both onsite and offsite pond were undertaken between April – June 2021 (inclusive).
- 2.4 Details of the survey methodology and results of the above surveys are provided in the separate Land at Ardley Great Crested Newt Report (FPCR, 2022).
- 2.5 Pond surveys throughout the Highways Works areas and surrounding habitats are ongoing (April June 2022).

Reptiles

- 2.6 Habitats present within the site were considered for their potential suitability to support reptile populations, including the presence of features which provide opportunities for reptiles to bask, forage and/or hibernate, and areas of varied vegetation structure in sheltered locations with sunny aspects and connectivity to other suitable reptile habitats. This assessment was based on the methodology detailed in the Herpetofauna Workers Manual¹⁹ and the Froglife Advice Sheet²⁰.

Presence/ Absence Surveys

- 2.7 A reptile presence/absence survey was undertaken among on-site areas identified as offering potentially suitable reptile habitat. The survey was undertaken based on the methodology detailed in the Herpetofauna Workers Manual, the Froglife Advice Sheet, and Natural England guidance²¹. Survey methods involved a search for basking reptiles on / under naturally occurring and strategically positioned artificial refugia. These were placed in locations that offered the most suitable habitat for common reptiles, i.e. structurally diverse grassland habitats with areas of longer grassland/short vegetation and wetland features, two weeks prior to the initial survey. Natural and artificial refuges were then subsequently checked on seven survey occasions.
- 2.8 Guidelines recommend that surveys are undertaken during the following periods:
 - At temperatures of between 9°C & 18°C;
 - On sunny/cloudy days with little or no wind;
 - Between 07:00 & 11:00 hrs ('AM survey') and between 16:00 & 19:00 hrs ('PM survey') (Note: if temperature conditions are suitable the surveys can be undertaken outside of these periods);
- 2.9 In addition, industry guidelines also recommend:
 - Using regularly spaced corrugated tin sheeting/similar (0.5m²) as artificial refugia, with a black upper side;
 - Approaching refugia from a downwind direction, casting no shadow and making sure not to disturb basking animals when checking;

⁸ English Nature 2001. Great Crested Newt Mitigation Guidelines. English Nature.

- That lifting and replacing tins, to check for the presence of reptiles underneath, is undertaken with care to avoid potential harm to any animals present;
- That the location and number of tins are mapped to aid survey and avoid the possibility of leaving tins in situ upon completion of the survey.

Table 1: Reptile Survey Dates & Weather Conditions

Date	Start Time	Temperature °C	Cloud Cover %	Wind Beaufort Scale (0-12)	Other
27.08.21	09:00am	14	0-10	1/2	Bright
03.09.21	09:00am	16	70-80	1/2	Bright
06.09.21	09:10am	16	20-30	0	Sunny
17.09.21	08:45am	16	80-90	1/2	Bright
20.09.21	08:30pm	12	0-10	2/3	Bright, Clear, Sunny
23.09.21	16	0-10	2/3	Clear	16
29.09.21	08:50am	9	0-10	1/2	Bright

Population Assessment

2.10 Where reptiles are confirmed present, the populations are assessed in accordance with the population level criteria as stated in the Key Reptile Site Register²². This system classifies reptile populations into three categories (Table 2) based on the total number of adult animals observed during individual survey occasions.

Table 2: Key Reptile Site Survey Assessment Categories (HGBI, 1998)*

Species	Low Population (No. of Individuals)	Good Population (No. of Individuals)	Exceptional Population (No. of Individuals)
Adder	<5	5 – 10	>10
Common lizard	<5	5 – 20	>20
Grass snake	<5	5 – 10	>10
Slow worm	<5	5 – 20	>20

*Figures in the table refer to the maximum number of adults seen by observation and / or under tins (placed at a density of up to 10 per hectare, by one person in one day)

Breeding Bird Survey

2.11 Breeding bird surveys of the Main Site original boundary were carried out between April and June 2018. 2020 surveys covered the new parcels of land only. An update BBS of both survey areas was then carried out in May 2021. A single survey of the Highway Works area was carried out in June 2021, with additional surveys planned for April and May 2022.

2.12 The survey methodology was largely based on that of territory mapping⁹, whereby standard BTO species codes and symbols for bird activities were used to identify birds and denote activity, sex and age where appropriate. Surveys were undertaken between 05.00 and 11.00 in suitable weather conditions, paying particular attention to features such as hedgerows, trees, areas of scrub and woodland. The full details of these surveys are provided in the Breeding Bird Survey Report (FPCR, 2022).

⁹ Bibby, C.J., N.D. Burgess & D.A. Hill, 2000: Bird Census Techniques: 2nd Edition. London: Academic Press

Winter Bird Survey

- 2.13 Winter bird surveys of the Main Site were carried out in January, February, November and December 2019. Wintering surveys of the Highway Works area were conducted in December 2021 and January and February 2022.
- 2.14 The methodology was again largely based on that of territory mapping. Surveys were undertaken between approximately 09.00 and 16.00 in suitable weather conditions, paying particular attention to features such as hedgerows, trees, areas of scrub and woodland. The full details of these surveys are provided in the Winter Bird Survey Report (FPCR, 2022).

Riparian Mammals

- 2.15 Water vole *Arvicola amphibius* and otter *Lutra lutra* surveys were undertaken on all suitable watercourses / ditches, including Padbury Brook Tributary, Gagle Brook Tributary and Gagle Brook. All watercourses were surveyed on 16th and 17th June 2021 and then again on the 8th September 2021. Surveys were carried out by suitably experienced ecologists.

Water Vole

- 2.16 Standard methodology outlined within The Water Vole Mitigation Handbook¹⁰ was used which involved searching the banks/margins of the brook and tributaries for evidence of:
- *Latrines* - distinct piles of water vole droppings found near nest sites, at the ranges of territorial boundaries and where the animals enter and leave the water;
 - *Burrows* - burrow entrances are typically wider than high with a diameter between 4-8cm. Generally these burrow entrances are located at the water's edge;
 - *Feeding Stations* - areas with distinct neat piles of chewed lengths of vegetation cut at 45 degrees along pathways or haul out platforms along the water's edge;
 - *Footprints* - identifiable prints in soft margins of the watercourse;
 - *Runways* - low tunnels that are pushed through the vegetation and often leading to burrows or feeding stations.
- 2.17 Descriptions of the watercourse were also made to aid any enhancement or mitigation recommendations required.

Otter

- 2.18 Survey methodology assessed the likely status of otter within the site following the methodology detailed in the New Rivers and Wildlife Handbook (RSPB/NRA, 1995).
- 2.19 Due to the unlikely event of actual observation of otter during surveys, these concentrated on locating field signs indicating otter presence or use. Such field signs include:
- *Spraints* – characteristic sweet-smelling, black tar-like (where fresh/relatively recent i.e. within a few weeks) or grey crumbly (when old) faecal deposits usually containing fish scales, bones and occasionally invertebrate exoskeleton and bird feathers.

¹⁰ Dean, M., Strachan, R., Gow, D. and Andrews, R. 2016. *The Water Vole Mitigation Handbook* (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

- *Footprints* – In good substrate typically asymmetrical and showing five toes arched around a large pad and, depending on substrate, webbing and claw marks. Poorer, generally coarser substrates do not often enable the identification of otter footprints.
- 2.20 Additional signs of otter presence may occur, although without additional evidence are usually not conclusive proof of current otter presence:
- *Feeding remains* – Remains of fish
 - *Slides/haul-outs* – Routes into and out of the water, which are usually associated with terrestrial routes such as short cuts around meanders or along traditionally, used otter paths/routes.
 - *Couches/hovers* – above ground resting place. Usually associated with cover such as dense scrub, rushes or reed, flood debris or fallen trees. Many couches are rarely used whilst others more so. Difficult to prove use without radio tracking.
 - *Holts* – below ground resting site usually associated with sprinting. Sometimes used with greater frequency than couches and can be important for breeding (natal holts) where other signs are usually absent. Notoriously difficult to find or prove without radio tracking.
- 2.21 Descriptions of the watercourse were also made to aid any enhancement or mitigation recommendations required.

Other Species

- 2.22 The potential for other protected and/or notable species was assessed during the Phase 1 habitat survey.

Limitations

- 2.23 Sections of grassland verge flanking the M40 and small sections flanking junction 10 were not accessible to direct survey. Descriptions were made from viewing within binoculars, inference from data collected through survey of neighbouring verges of the A508 and any available desk study data. From this sufficient information was available to provide an adequate assessment of these habitats and to provide recommendations for mitigation.
- 2.24 Hedgerow H57 was not accessible to direct survey due to its location to the east of the busy Baynard's Green roundabout. Furthermore, it is relevant that this native hedge is associated with the verge of junction 10 of the M40 and likely to be of recent origin. Therefore, it is considered that sufficient information is available to evaluate the ecological importance of H57 and to provide recommendations for mitigation.
- 2.25 Small stretches of the Ashgrove Brook and the Padbury Brook Tributary were inaccessible due to dense bankside vegetation. It was considered that sufficient areas of these watercourses were surveyed to determine the presence/absence of water vole/otter.
- 2.26 Through the evolution of the project during 2021, it was not possible to access all ponds within the Highway Works area. The main limitation that this poses is that no 2021 data for any ponds within 500m or within this part of the sited was collected and desk study data has been relied upon as the only source of information. Additional great crested newt surveys will be conducted in 2022 to address this and are currently ongoing. Similarly, a full suite of bat activity and

breeding bird surveys is yet to be complete with a spring activity transect and static detector survey and two further breeding bird surveys to be undertaken in 2022.

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3.0 RESULTS

Desktop Study

Sites with a Statutory International Nature Conservation Designation and Sites on the National Site Network (Figure 1a)

- 3.1 There is a single statutory site of international importance present within 15km of the site. Oxford Meadows SAC lies approximately 13.6km to the south of the Application Site and supports lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*), an Annex I habitat for which it is considered to be one of the best examples in the UK. The SAC furthermore is the only known outstanding locality for the Annex II species creeping marshwort *Apium repens*.
- 3.2 The Proposed Development lies outside of the Impact Risk Zones (IRZs) identified for the four constituent SSSIs encompassed by the Oxford Meadows SAC: Cassington Meadow SSSI, Yarnton and Pixey Meads SSSI, Wolvercote Meadow SSSI and Port Meadow SSSI. IRZs reflect the particular sensitivities of individual SSSIs in conjunction with any corresponding European site underpinned by the SSSI designation and provide a rapid risk assessment that considers whether a proposed development is likely to affect a SSSI.

Sites with a Statutory Nature Conservation Designation (Figure 1b)

- 3.3 Ardley Cutting and Quarry SSSI, is notified for its geological and biological interest lies partly within the Main Site, along the north-eastern boundary. The geological interest of the SSSI concerns Jurassic rock exposures whereas the biological interest primarily comprises limestone (calcareous) grassland, along with scrub, ancient woodland and wetland habitats. This designation also supports fauna interest including calcareous grassland butterflies such as brown argus *Aricia agestis* and Duke of Burgundy *Hamearis lucina* and part of a GCN population
- 3.4 The site falls within four SSSI IRZs of Ardley Cutting and Quarry SSSI in which large infrastructure including warehousing / industry where a net additional gross internal floor space is > 1000m² or any development needing its own water supply is recognised as a development type that NE considered to represent a potential risk to the SSSI given its distance from the application site.
- 3.5 There are no other designated statutory sites of national importance within 2km of the Application Site that are designated for their nature conservation value. Ardley Trackways SSSI is located approximately 360m south-east of the site and is designated for its geological interest and is not considered further in this report.

Non-Statutory Designations (Figure 1b)

- 3.6 A single non-statory site lies within the site boundary and nine non-statutory sites are present within 1km radius of the site; which are detailed in Table 3 below.
- 3.7 The Application Site is located almost entirely within the recently established Ardley and Heyford Conservation Target Area (CTA). The CTA has five targets: i) calcareous grassland, ii) hedgerows, iii) grassland management, iv) great crested newt, and v) geological conservation.

Table 3: Non-Statutory Designated Sites

Site Name (Ref: Fig 1b)	Designation	Distance and Orientation from Site	Summary of Designation
Upper Heyford Airfield (3)	LWS	Adjacent to western boundary	Supports species-rich calcareous areas, along with small areas of broadleaved plantation woodland and water tanks. Notable species include bee orchid <i>Ophrys apifera</i> , dwarf thistle <i>Cirsium acaule</i> , skylark <i>Alauda arvensis</i> , corn bunting <i>Emberiza calandra</i> , grey partridge <i>Perdix perdix</i> , tree sparrow <i>Passer monanus</i> and GCN.
Ardley Fields Quarry (4)	LWS	Adjacent to the north eastern boundary of the Main Site	A restored quarry which supports improved grassland, rough grassland, young planted trees, species-rich grassland, ponds and wet ditches.
Ardley Fields Ponds West (6)	LWS	15m east	Restored area of grassland with ponds on ex-landfill which support breeding GCN populations and aquatic plants.
Stoke Wood (13)	LWS	200m east	A good-sized woodland block encompassing ancient woodland as well as more recently established woodland. The adjacent eastern track supports a good population where silver-wash fritillaries <i>Argynnis pahia</i> and white admiral <i>Limenitis Camilla</i> have been recorded.
Ardley Fields Ponds East (5)	LWS	670m east	Restored area of grassland with ponds on ex-landfill which support breeding GCN populations and aquatic plants.
Trow Pool (12)	LWS	990m east	Two shallow ponds that have formed via the damming of a small stream. The larger pool is used for fishing and the smaller pool is surrounded by dense vegetation. Rare bottle sedge <i>Carex rostrata</i> has been recorded on site as well as invasive New Zealand Pygmyweed <i>Crassula helmsii</i> .
Ardley Road Verge Nature Reserve (10)	DWS	Within and adjacent to south part of eastern boundary	The verge and associated grassland supports rank grassland, rough calcareous grassland, scrub and hedgerows. The sward is grass dominated by includes species-rich areas with a range of broadleaved herbs, including species typical of unimproved grassland such as field scabious <i>Knautia arvensis</i> , greater knapweed <i>Centaurea scabiosa</i> , meadow vetchling <i>Lotus pratensis</i> and lady's bedstraw <i>Galium verum</i> . The wider central section of the site supports a population of the rare plant meadow clary <i>Salvia pratensis</i> .
The Heath (7)	pDWS	Adjacent to south-west boundary	Comprises mature broadleaved woodland where ground flora mostly comprises dog's mercury <i>Mercurialis perennis</i> with a population of spurge laurel <i>Daphne laureola</i> and small patches of bluebell <i>Hyacinthoides non-scripta</i> and wood

Site Name (Ref: Fig 1b)	Designation	Distance and Orientation from Site	Summary of Designation
			anemone <i>Anemone nemorosa</i> .
Trackway adjacent to The Gorse (8)	pDWS	Adjacent to south- western boundary	A green lane with species-rich hedgerows. The path side verge has rough grassland with frequent woodland herbs which include dog's mercury, surge laurel and a population of over 250 early purple orchids <i>Orchis mascula</i> .
Kennel Copse (9)	pDWS	100m west	A woodland fragment that supports several ancient woodland indicator flora. A brook flows north from Crowfoot Pond.
Ardley and Upper Heyford (11)	CTA	Across the site	Encompasses a limestone plateau between Ardley and Upper Heyford and supports approximately 50% of the calcareous grassland in the Cherwell District.
Tusmore and Shellswell Park (14)	CTA	200m east	Encompasses the parks and woodland at Tusmore and Shellswell Parks and a number of ancient woodland near Stoke Lynne, including Stoke Wood LWS.
Key: LWS – Oxfordshire Local Wildlife Site, DWS – Cherwell District Wildlife Site, pDWS – Proposed Cherwell District Wildlife Site, CTA – Conservation Target Area			

Protected and Notable Species

- 3.8 Several protected and noted species records were returned from TVERC from within 1 km of the site. These mainly comprised herpetofauna and bird records. Five records of smooth newt *Lissotriton vulgaris* (2018) and two common frog *Rana temporaria* (2018) were located within the Main Site associated with pond P3. [REDACTED]

A summary of the records of relevance to the study is provided below. The recorded locations of species included are shown at Figures 2a & 2b.

Amphibians and Reptiles

- 3.9 A number of amphibian records were returned, including common frog *Rana temporaria*, common toad *Bufo bufo*, palmate newt *Lissotriton helveticus*, smooth newt and GCN. Of these, the closest is a GCN record located approximately 10m to the west within Upper Hayfield Airfield LWS, dated 2017.
- 3.10 In addition, a search of MAGIC identified two GCN licences to the east of the site, although the details of exact locations, ponds and population sizes are unknown.
- 3.11 A small number of reptile records were returned from within 1km of the site, comprising common lizard *Zootoca vivipara* and grass snake *Natrix natrix*. Of these, the closest record is for common lizard located approximately 50m west of the site, also within Upper Hayfield Airfield LWS, dated 2017.

Bats

- 3.12 A small number of bat records were returned which included field records of Daubenton's bat *Myotis daubentonii* (2008), brown long-eared bat *Plecotus auritus* (2001-2010) and an unidentified bat species (2008). Dropping records of common pipistrelle and brown long-eared

bat were also returned, dated from 2015. Of these, the closest record comprised a brown long-eared bat record from 2001 located approximately 780m to the west.

- 3.13 During survey work undertaken by a third party consultancy in 2008 however, a brown long-eared bat and possible pipistrelle *Pipistrellus* sp. roost were recorded within one of the buildings within the site (evidence in the form of bat droppings and moth wings), albeit no bats were recorded emerging from this building during nocturnal surveys undertaken.

Terrestrial Mammals

- 3.15 Three records of brown hare *Lepus europaeus* (2010-2015) were returned, the closest located approximately 300m north of the Heyford Park Junction site area.
- 3.16 A single hedgehog *Erinaceus europaeus* (2019) was returned located approximately 360m to the south-west.
- 3.17 No records of water vole *Arvicola amphibius* were returned, however a single sprint record of otter *Lutra lutra* was returned approximately 950m to the east associated with Trow Pool LWS dated from 2008.
- 3.18 A single polecat *Mustela putorius*, located approximately 750m north of the site and dated 2003.

Birds

- 3.19 A number of protected and notable bird species were returned by the desktop study, including species listed under Schedule 1 of the Wildlife and Countryside Act 1981 (*as amended*), amber / red Birds of Conservation Concern 4 (BoCC¹¹) or under Section 41 of the NERC Act 2006. Species including corn bunting, dunnock *Prunella modularis*, fieldfare *Turdus pilaris*, grey partridge, house sparrow *Passer domesticus*, lapwing *Vanellus vanellus*, marsh tit *Poecile palustris*, meadow pipit *Anthus pratensis*, skylark, song thrush *Turdus philomelos* and yellowhammer *Emberiza citrinella* (for full list see Figure 2b). The closest records returned comprised 16 species located approximately 50m north of the site boundary within the Ardley Cutting and Quarry SSSI (dated 2007 – 2015).
- 3.20 In addition, there is an anecdotal record (from the current occupant) of barn owl *Tyto alba* within a building within the site.

Plants

- 3.21 A small number of records of notable plant species listed on the Oxfordshire's Threatened Plants¹² list were returned with dates ranging between 2005 and 2018. Species included bottle sedge, marsh pennywort *Hydrocotyle vulgaris*, many-leaved sedge *Carex divulsa* subsp. *leersii*, pale St John's-wort *Hypericum montanum*, pale sedge *Carex pallescens*, night-flowering catchfly *Silene noctiflora*.

¹¹ Eaton MA, Aebischer N., Brown A., Hearn R., Lock L., Musgrove A., Noble D., Stroud D. and Gregory R.D. 2015. Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds* 108:708-746.

¹² Erskine, S., Killick, J. and Lambrick, C. 2018. *Oxfordshire's Threatened Plants* Pieces Publications.

- 3.22 A small number of England Red List Species were also returned which included dwarf spurge *Euphorbia exigua*, bloody crane's-bill *Geranium sanguineum* and hoary plantain *Plantago media*. Of these, the closest records comprised a bloody crane's-bill record from within the adjacent Ardley Road Verge Nature Reserve DWS
- 3.23 Three records of meadow clary and six records of bluebell *Hyacinthoides non-scripta*, species listed on Schedule 8 of the Wildlife and Countryside Act, were also returned from within the Ardley Road Verge Nature Reserve DWS and Stoke Wood LWS.

Invertebrates

- 3.24 A small number of notable invertebrate records were returned dated between 2003 and 2018 and included records of dingy skipper and small heath *Coenonympha pamphilus* butterflies, in addition to beetle and moth records. These were mostly associated with the Ardley Cutting and Quarry SSSI (for full list see Figure 2a).

Invasive Species

- 3.25 A small number of non-native and invasive plant species were also provided and included records of Nuttall's waterweed *Elodia nuttalli* (2008), Canadian waterweed *Elodea canadensis* (2008) and New Zealand pumyweed (2003 & 2019), all associated with Trow Pool LWS.
- 3.26 In addition, two records of signal crayfish *Pacifasticus leniusculus* (2008) were also recorded from the LWS.

Field Survey

Habitats/Flora

- 3.27 Habitat descriptions of the site are provided below. The locations of the habitats described are provided in Figure 3, and the list of botanical species recorded is provided in Appendix A.

Arable Land

- 3.28 Arable compartments by their nature supported little semi-natural vegetation and have limited structural and botanical diversity. These compartments were generally large, recorded to be sown with wheat *Triticum* sp., oat *Avena sativa*, barley *Hordeum vulgare* and rapeseed *Brassica napus* over the survey period with a single field of flax *Linum usitatissimum* recorded to the north of the Padbury roundabout in 2021. Narrow semi-improved grassland margins were present at the edges of the arable fields (generally approximately 1-2m wide and increasing to 5-6m in some corners within the Main Site) which were recorded to be largely unmanaged during the survey period but were noted to be cut at the time of harvest in 2021. Occasional arable weeds were recorded encroaching into the arable field from the margins at the time of survey and included black-grass *Alopecurus myosuroides*, common field speedwell *Veronica persica* and shepherd's purse *Capsella bursa-pastoris*.
- 3.29 The semi-improved grassland sward was typically comprised of grasses and typical arable edge / hedge base species which included locally abundant false-oat grass *Arrhenatherum elatius* and occasional cock's-foot *Dactylis glomerata* with localised patches of annual meadow-grass *Poa annua*, barren brome and soft brome *Bromus hordeaus* and rare occurrence of perennial ryegrass *Lolium perenne*. Herbaceous species included locally frequent patches of common nettle *Urtica dioica*, locally occasional field bindweed *Convolvus arvensis*, rare occurrence of field

forget-me-not *Myosotis arvensis*, broadleaved dock *Rumex obtusifolius*, cut-leaved crane's-bill *Geranium dissectum*, scarlet pimpernel *Anagallis arvensis* and scentless mayweed *Tripleurospermum inodorum*.

- 3.30 The margins of the arable fields that surrounded the Severn Trent Green Power Station were noted to be more botanically diverse during the survey in 2020 with additional species including rare occurrence of bird's-foot trefoil *Lotus corniculatus*, common fumitory *Fumaria officinalis*, field scabious, goat's-beard *Aruncus diocius*, lesser stitchwort *Stellaria graminea* and a single bee orchid recorded at TN1.

Grassland

Improved Grassland

- 3.31 Small areas of improved grassland were present within the site within the Ashgrove farmstead, which were recorded to be grazed by a mixture of cattle and sheep at the time of the survey and a linear field compartment within the south of the Main Site. The grassland sward was recorded to be grazed short (c.5cm) and dominated by coarse grasses including perennial rye-grass, false oat-grass and cock's-foot. Herb and ruderal species were also recorded present within the sward, comprising frequent white clover *Trifolium repens* and occasional or rarely occurring species including ribwort plantain *Plantago lanceolata*, daisy *Bellis perennis*, broad-leaved dock, creeping thistle *Cirsium arvense* and spear thistle *Cirsium vulgare*.

Poor Semi-improved grassland

- 3.32 Three fields grassland fields within the northern half of the Main Site differed slightly from the improved grassland fields due to a more diverse range of grasses (including frequent soft brome, locally frequent creeping bent and rare occurrence of smooth meadow-grass) and a higher occurrence of common herbs such as bulbous buttercup, common mouse-ear, lesser trefoil. In damper areas adjacent to a ditch rare occurrence of hard rush and occasional creeping buttercup were noted. These fields also exhibited a short sward and were subject to either cattle or sheep grazing and during additional survey work a small number of bee orchids were recorded at TN2.
- 3.33 Species-poor semi-improved grassland fields were also present immediately south of the road that bisects the main site. The sward was unmanaged at the time of the initial survey in 2020 and was dominated by false-oat grass with a uniform sward to 1m in height. Additional grass species included locally occasional cock's-foot and creeping bent *Agrostis stolonifera*, occasional soft brome and rare occurrence of red fescue *Festuca rubra* agg. and Yorkshire fog *Holcus lanatus*. Herb species were recorded in localised patches and included occasional and rarely occurring bird's-foot trefoil, common centaury *Centaureum erythraea*, common mouse-ear *Cerastium fontanum*, creeping buttercup *Ranunculus repens*, lesser trefoil *Trifolium dubium*, perforate St John's-wort *Hypericum perforatum* and ribwort plantain *Plantago lanceolata*. A small number of pyramidal orchids *Anacamptis pyramidalis* were recorded at TN3 within a localised patch of shorter sward. At the time of the update survey in 2021 the sward had previously been cut and the sward was 5-10cm in height and additional rarely recorded species included common sorrel *Rumex acetosa*, glaucous sedge *Carex flacca*, sweet vernal grass *Anthoxanthum odoratum* and a small number of bee orchids.

- 3.34 A series of roundabouts and associated grass road verges were present within the northern part of the Highway Works area within the vicinity of Junction 10 of the M40 which appeared to be representative of this habitat type. These areas were typically either unmanaged, though most of the roundabout were regularly cut and supported a species-poor sward with locally occasional to abundant perennial rye-grass, occasional white clover, false oat-grass and bristly ox-tongue *Helminthotheca echioides* and frequent ribwort plantain. As a reflection of underlying freely draining lime-rich loamy soils, the presence of woolley thistle *Cirsium eriophorum*, pyramidal orchid and quaking grass *Briza media* which are species commonly recorded in calcareous conditions. These species in the context of the other species and habitat recorded are however not indicators of calcareous grassland classification in these areas. Other larger linear areas adjacent to planting screening appeared to potentially have been sown with a seed-mix with increased abundances of species such as red clover and ox-eye daisy and a pyramidal orchid was recorded within the area surrounding plantation woodland north of the Ardley roundabout at TN4.

Semi-Improved Neutral Grassland

- 3.35 Small areas of grassland north of the railway line and surrounding ponds P51 and P52 were noted as semi-improved neutral grassland. These had not received any improvement, and some were periodically grazed, however these grass dominated areas were relatively small comprising locally abundant false oat-grass, occasional cock's-foot and locally occasional patches of smaller cat's tail *Phleum bertolonii*. A mix of other grasses were also present including ox-eye daisy, common bent, soft-brome, crested dog's-tail *Cynosurus cristatus*, red fescue and Yorkshire fog with herbs including yarrow, wild carrot, wild parsnip, lady's bedstraw *Galium verum*, mouse-ear hawkweed and perforate St John's-wort. A patch of giant horsetail *Dequisetum telmateia* was recorded at the top of the slope adjacent to the fence line separating the woodland edge (TN5).
- 3.36 A compartment of rough semi-improved grassland was recorded to the south of the railway line within the Viridor ERF site (TN6) where the sward was dominated by false-oat grass with occasional ruderal species distributed throughout the sward and included common ragwort *Jacobae vulgaris*, creeping thistle and spear thistle. A higher abundance of herbs were recorded immediately south of the railway boundary fence where the sward was much shorter and included occasional and rarely recorded black medic *Medicago lupulina*, creeping cinquefoil, mouse-ear hawkweed *Hieracium pilosella*, red clover *Trifolium pratense* and a bee orchid. A fenced-off area of the sward to the south of pond P20 was characterised by abundant common couch *Elytrigia repens* with locally frequent creeping bent, occasional Yorkshire fog and timothy *Phleum pratense* and rare occurrence of wild parsnip *Pastinaca sativa*. Other areas of rough grassland included compartments to the east of the M40 which were also unmanaged and the sward dominated by false oat-grass with encroaching bramble and other scrub species.
- 3.37 A small number of road verges in the northern of the Highway Works area to the north of Baynards Green roundabout (TN7) and along the southern part of the B430 were noted to have a good diversity of species. At T7 the sward was characterised by frequent false-oat grass with patches of cock's-foot to 0.5m in height. Herb species were dominated by ox-eye daisy with locally frequent black medic, common knapweed and ox-eye daisy, locally occasional common ragwort, cut-leaved crane's-bill, ribwort plantain with approximately ten pyramidal orchids scattered along the verge. Road verges in the south were noted to support less ruderal species and were dominated by false-oat-grass with locally frequent patches of meadow-vetchling, frequent common knapweed and St

John's-wort, locally occasional patches of agrimony *Agrimonia eupatoria* and rare occurrence of field scabious.

- 3.38 A grassland field in the south of the site to the east of Middleton Road (TN8) supported a semi-improve neutral sward which supported frequent yellow oat-grass, occasional crested dog's-tail, Yorkshire fog and false oat-grass and locally occasional red fescue. Herb species were notably more diverse than other areas and included frequent ox-eye daisy, occasional common trefoil and ribwort plantain with rare occurrence of common vetch *Vicia sativa*, smooth tare *Ervum tetraspermum*, grass vetchling *Lathyrus nissolia* and yellow rattle *Rhinanthus minor*. Correspondance with the landowner confirmed that the field had once been part of a Higher Level Stewardship scheme, but has been out of the scheme for at least 15 years. In addition, a small number of pyramidal orchids were noted within the wider part of the field outside of the Order Limits.

SSSI Calcareous Grassland

- 3.39 The railway bank that partially lies within the Main Site north-eastern boundary was notified as a SSSI for its geological and biological interest in 1988. The SSSI citation notes unimproved limestone grassland as a key feature and describes this as being "...a characteristically tall sward either dominated by upright brome *Bromopsis erectus* or a mixture of brome and tor-grass *Brachypodium pinnatum* (Syn. *Brachypodium rupestre*).", and gives examples of key species associated with limestone grassland that occur within the sward.
- 3.40 The two National Vegetation Classification (NVC) grassland communities CG3 *Bromus erectus* lowland calcareous grassland and CG5 *Bromus erectus-Brachypodium pinnatum* grassland which the SSSI designation refers to^{Error! Bookmark not defined.} were not evident and there has possibly been a transition to the CG4 *Brachypodium pinnatum* grassland. However, in the localised areas of short species-rich grassland that were noted to be heavily grazed by rabbit, other NVC calcicolous grassland communities of nature conservation importance were present.
- 3.41 In many areas the sward was formed by a mesotrophic grassland community rather than a calcicolous type, but specifically stands highly indicative of the National Vegetation Classification (NVC) MG1d False Oat-grass (*Arrhenatherum elatius*) grassland, Wild Parsnip (*Pastinaca sativa* ssp. *sylvestris*) sub-community, and MG1e False Oat-grass grassland, Common Knapweed (*Centaurea nigra*) sub-community. These are the more species-rich sub-communities of false oat-grass grassland, particularly MG1e. MG1d characteristically occurs on calcareous soils over calcareous bedrock, and whilst MG1e occurs over a range of bedrock types, these include calcareous¹³. Whilst none of these areas had any correlation with published NVC communities, they still represent species-rich limestone grassland, and are of considerable significance.

To account for changes in the Order Limits since the 2020 survey, further detailed botanical survey are scheduled for June 2022. Full details of surveys to date are provided within the Ardley Cutting & Quarry SSSI Botanical Survey report (FPCR, 2022).

¹³ Rodwell, J.S. (Ed.), Pigott, C.D., Ratcliffe, D.A., Malloch, A.J.C., Birks, H.J.B., Proctor, M.C.F., Shimwell, D.W., Huntley, J.P., Radford, E., Wigginton, M.J., and Wilkins, P. 1992. *British Plant Communities Volume 3 Grasslands and Montane Communities*. Cambridge: Cambridge University Press.

Ardley Road Verge Nature Reserve DWS

- 3.42 The verge supports a mosaic of rank grassland, rough calcareous grassland, scrub and hedgerows. The narrower section of the verge supported rough species-poor grassland dominated by false oat-grass and cock's-foot and supported ruderal species such as hogweed and common nettle. An old road alignment runs from north to south to the west of the wider central verge area and supported patches of moss and a short sward ephemeral sward has begun to establish at the edges of the hardstanding and included species such as dove's-foot crane's-bill, herb robert *Geranium robertianum* and fat hen *Chenopodium album*.
- 3.43 The wider area of grassland was unmanaged and becoming heavily encroached by bramble *Rubus fruticosus* agg., blackthorn *Prunus spinosa* and elder scrub *Sambucus nigra*, with some young self-seeded ash *Fraxinus excelsior* standards. The sward was dominated by grass species, however it supported a diverse range of herb species which included locally frequent yarrow and ground-ivy, locally occasional black medic, creeping cinquefoil, greater knapweed, red clover, mugwort *Artemisia vulgaris* with rare occurrence of field scabious and night-flowering catchfly *Silene noctiflora*. Anthills and rabbit warrens were also recorded throughout the sward and a small population of meadow clary, located within two small fenced-off areas were recorded at TN9.

Tall Ruderal Vegetation

- 3.44 Small areas of tall ruderal vegetation were present within the Main Site at field boundaries and locally disturbed areas, dominated by willowherb, with frequently or occasionally occurring species including common nettle and creeping thistle.
- 3.45 An embankment above a road verge south of the road that bisects the main site (TN10) supported a mosaic of scrub, ruderal and ephemeral species which comprised locally frequent patches of garlic mustard *Alliaria petiolata* and hare's-foot clover *Trifolium arvense*, occasional patches of black medic, bramble, occasional common comfrey *Symphytum officinale*, creeping thistle and hemlock *Conium maculatum* and rare occurrence of weld *Reseda luteola*, wild teasel *Dipsacus fullunum*, green alkanet *Pentaglottis sempervirens* and a mullein *Verbascum* sp.

Scrub

- 3.46 Small areas of scattered and dense scrub was recorded within the Main Site. Scattered scrub was largely present at the site boundaries and included species such as dog-rose *Rosa canina* agg., hawthorn *Crataegus monogyna*, bramble and elder. Areas of dense scrub were dominated by bramble, along with species such as hawthorn, cherry *Prunus avium* and elder.
- 3.47 Areas of dense areas of scrub were also recorded at the peripheries of fields north of the railway line and more formerly planted areas on roundabouts where species included hawthorn, hazel *Corylus avellana*, dogwood *Cornus sanguinea* and blackthorn.

Hedgerows

- 3.48 The network of hedges bounding the overall site and individual fields is formed by 91 individual hedges. These were nearly all species poor, averaging four or fewer woody species per average 30m section of hedgerow with the exception of hedgerows H3, H6, H44, H48, H50, H54, H56, H65 and H70 which had five or more species. Hedgerows H48, H50 and H65 were located adjacent to public rights of way, had good connectivity and a number of mature trees along its

length were assessed as 'Important' according to the 'wildlife and landscape' criteria of the Hedgerow Regulations 1997. The majority appeared to have been subject to management in the past, albeit had not been managed recently at the time of survey. Most hedges had a relatively good structure and few gaps consequently, the majority of the hedges have at least moderate ecological value when considered against the HEGS criteria. All hedgerows were considered to qualify as both Habitats of Principle Importance under S41 of the NERC Act (2006) and local BAP habitats, supporting over 80% native species. A summary of the extent and ecological value of on-site hedgerows is provided in Appendix B.

- 3.49 All hedgerows contained abundant hawthorn with varying amounts of other species including blackthorn, elder, elm *Ulmus* sp., hazel, dog-rose and ash. Other species recorded less frequently included field maple *Acer campestre*, sycamore *Acer pseudoplatanus* and spindle *Euonymus europaeus*.
- 3.50 Flora recorded at hedge bases was largely ruderal in its composition with common robust grasses such as false oat-grass and barren brome together with bramble, common nettle, ground-ivy, cleavers and ivy *Hedera helix* all frequent and often abundant throughout the hedge network.

Woodlands

- 3.51 The majority of tree cover comprised small plantations or tree groups at the peripheries of arable field compartments and screening belts/groups in association with the M40 junction.

Plantation Woodland

- 3.52 Across the Main Site, ten small blocks of plantation woodland were present within the site (W1 – W8 & W9 – W10 on Figure 3). Blocks W1, W3 and W5 comprised mixed plantation woodland where the canopy species included semi-mature specimens of occasional sycamore, Scot's pine, ash, aspen, English oak and European larch with dense leylandii at the edges of W1. Understorey species included occasional elder, hawthorn and field maple and ground flora was species-poor, either dominated by grasses (consistent with those recorded in adjacent grassland areas) or dominated by bare ground with occasional lords-and-ladies, common nettle, cow parsley, ground-ivy, garlic mustard and ivy.
- 3.53 Blocks W2, W4, W8, W9 and W10 comprised broadleaved plantation woodland which often formed linear areas at field boundaries and/or followed the watercourse. Canopy species included ash, crack willow *Salix x fragilis*, English oak, goat willow, Norway maple, alder, silver birch, common lime, with sparse understoreys comprised of hawthorn, bramble, English elm and hazel. Ground flora was similar to that above.
- 3.54 Block W8 comprised a hybrid black poplar plantation with some additional self-seeded trees and coppice hazel adjacent to the watercourse. Ground flora was largely dominated by bramble, common nettle and garlic mustard, however indicators of more established woodland were rarely recorded which included dog's-mercury and enchanters nightshade.
- 3.55 Several verge tree groups comprised of early-mature and mature trees to create a buffer between the existing highway and farmland were recorded in the north of the Highway Works area, along with formal planted groups situated on roundabouts which were often in dense scrappy forms. Species within these areas included ash, blackthorn, English oak, field maple, hawthorn, silver birch, sycamore, wild cherry, hazel, holly elder, Scot's pine, white willow, common lime and beech. These areas supported some seedlings where areas of the canopy

were more open with and planting lines were often visible with regular spacing of planted specimens. Ground flora was largely species poor, particularly where planting was dense due to heavy shading from the canopy, with more open areas dominated by grasses.

- 3.56 Small broadleaved plantation blocks were also located the edges of arable fields to the north and south of Ardley Road which had an even age structure and were comprised of frequent ash and field maple with occasional hazel, blackthorn, hawthorn and rare occurrence of holly and English oak. Ground flora was species-poor and dominated by garlic mustard and ivy.
- 3.57 Of these areas W2, W8 and W9 within the Main Site and W29, W31 and W33 within the northern Highway Works area identify as Deciduous Woodland Priority Habitat on MAGIC. However, these areas do not identify as Priority Habitat on the map received from TVERC and as these areas were formerly planted, often with clear planting lines and canopy cover of any one species was not more than 25%¹⁵ and did not affiliated with any NVC community. Therefore, these areas are not considered to meet the Priority Habitat criteria¹⁶.

Semi-natural Broadleaved Woodland

- 3.58 A small part of the northern edge of The Heath pDWS lies within the Order Limits (W7, Figure 3), south of the road that bisects the Main Site. The designation comprises a mature broadleaved woodland primarily comprised of planted sycamore with occasional ash, English oak, beech and elder. Ground flora included dog's-mecury, bramble and cleavers.
- 3.59 An area of mixed lowland deciduous woodland borders the Gagle Brook and a small area of this lies within the Middleton Stoney Relied Road area. Canopy species comprised frequent ash with occasional sycamore, crack willow and horse-chestnut and rare occurrence of hybrid black poplar and beech with an understorey of hawthorn, blackthorn, elder and wych elm. Established ivy cover was present and the arboricultural survey recorded evidence of ash dieback caused by *Chalara faxinea* and horse chestnut leaf miner *Cameraria ohridella*¹⁷. Ground flora was dominated by ivy with locally frequent cow parsley, occasional bramble and rare occurrence of wood avens, hedge woundwort and herb robert.
- 3.60 The western edge of Sycamore Grove woodland lies within the proposed Highway Works area which comprised a mix of early mature and mature ash and sycamore with occasional silver birch and a sparse shrub layer of field maple, hawthorn and blackthorn beneath. Regeneration was noted throughout with scattered ash and sycamore seedlings and ground flora included locally frequent patches of dog's-mecury.

Trees and Tree Lines

- 3.61 Numerous scattered/standard trees (largely associated with hedgerows) and tree lines were recorded across the site. These comprised largely semi-mature to mature specimens including abundant/frequent ash, English oak and horse-chestnut *Aesculus hippocastanum*, along with occasionally or rarely occurring goat willow, rowan *Sorbus aucuparia*, beech, larch and Scot's pine. Most standard trees were in good condition and provided diversity of habitat structure, with

¹⁵ Carey, P. & Butcher, B. 2018. *UK Habitat Classification Field Key*.

¹⁶ JNCC 2008. UK Biodiversity Action Plan Priority Habitat Descriptions. *Lowland Mixed Deciduous Woodland* [Online] Available from: <https://data.jncc.gov.uk/data/2829ce47-1ca5-41e7-bc1a-871c1cc0b3ae/UKBAP-BAPHabitats-30-LowlandMixedDecWood.pdf> [Accessed 14/01/22]

¹⁷ FPCR 2022. Ardley Strategic Rail Freight Interchange Oxfordshire. *Arboricultural Assessment*

a number of them also exhibiting branch socket cavities, hollowing and dead wood within their canopies.

Buildings, Hardstanding and Other Structures

- 3.62 A number of buildings and associated hardstanding were present within the north-east of the Main Site. These comprised a mixture of stone, metal and wooden structures currently in use as residential properties, outbuildings, barns and workshops. The buildings were recorded to support negligible vegetation at the time of survey. Full building descriptions are provided in the separate Bat Report (FPCR 2022).
- 3.63 A small dilapidated barn was present within a sheep grazed improved field to the south of the main area of buildings and hardstanding. This building comprised corrugated metal walls and roof, with several missing panels. This building supported dense ivy growth internally and on the roof.
- 3.64 The areas of hardstanding were largely comprised of concrete, tarmac and hardcore, which supported limited vegetation. A section in the north west of the hardstanding was recorded to have become overgrown with dense scrub in the form of bramble and areas of tall ruderal vegetation including creeping thistle, common nettle and willowherb *Epilobium* sp.
- 3.65 A single square, brick construction was present within the middle of a cattle grazed species-poor semi-improved grassland field in the southern half of the Main Site. This supported no roof, door or windows. Internally, this structure was dominated by bare ground with improved grassland at the margins.
- 3.66 The Severn Trent facility is located within the southern half of the Main Site and comprises a building used as a reception, an office and welfare facility, composting tunnels, weighbridge, bio filter and maturation pad.
- 3.67 The bridge in the north-easter part of the Highway Works area that crossed over the railway track supported a small number of species that had established within gaps in the mortar and included rough hawk's-beard, rosebay willowherb *Chamaenerion angustifolium*, Canadian fleabane and male fern.

Amenity Grassland / Planting

- 3.68 Areas of amenity grassland and planting were present within the site in association with buildings and a small area of public open space at the Ardley Road/B430 junction. The amenity grassland was recorded to be species poor and largely managed, being mown short at the time of survey.
- 3.69 In addition, amenity species were present within garden areas associated with the buildings within the Main Site.

Waterbodies

- 3.70 Three ponds were present within the Main Site (P1-P3 in Figure 3), a double concrete water tank (P4) was present within an area of dense scrub in the north-west and a swimming pool (P5) was associated with the residential building at the Ashgrove farmstead. The three ponds supported some marginal/emergence species at the edges which included soft rush and encroaching grasses with limited/no aquatic vegetation recorded. Pond P2 was heavily poached by cattle and a small watercourse (see relevant description below) flowed into and out of pond P3.

- 3.71 Waterbody P4 comprised two open concrete lined square tanks set into the ground, within an area of dense scrub in the north west of the site. The tanks were recorded to supported water at the time of survey, albeit the depth of water could not be established due to lack of access (scrub area surrounded by a chain link fence). One of the tanks was covered in duckweed, whilst the other supported occasional duckweed.
- 3.72 SP1 comprised a disused swimming pool within the vicinity of the farm buildings which had steep concrete walls and was surrounded by paving stones and a metal rail fence. SP1 supported a shallow depth of water and a patch of vegetation including bulrush *Typha* sp. at the time of the initial survey and was recorded to be dry during subsequent surveys.
- 3.73 Two attenuation basins (P50 & P51 in Figure 3) are located to the south of the Padbury Roundabout. P50 was heavily vegetated with small visible areas of open water. Stands of abundant common reed *Phragmites australis* and locally frequent yellow flag iris *Iris pseudacorus* were recorded at towards the edges of the bank which spread out towards the centre whilst locally frequent patches of common club rush *Schoenoplectus lacustris* and occasional water starwort *Callitriche stagnalis* were recorded closer to the margins. P52 supported larger areas of open water and similar plant communities.

Watercourses

- 3.74 Padbury Brook Tributary passes through the north-western corner of the Main Site with arable crop on both bank tops, with a 2m field margin along the right bank and hedgerow H40 on the left bank. The channel was approximately 3m wide with occasional frequent willowherb recorded along the margin and a shallow water depth of less than 10cm at the time of the survey.
- 3.75 Ashgrove Brook, which comprises a tributary of the Gaggle Brook, supported a shallow depth of water (c.20cm) runs through the centre of the Main Site, flowing gently in a southerly direction from the edge of woodland W1 to the southern site boundary. The channel varied in nature along its length and was recorded to be between 1-3m wide and 0.5-2m deep. Occasional aquatic vegetation was recorded within this watercourse. The base of the watercourse was silty and the banks supported a mixture of vegetation including species-poor semi improved grassland, tall ruderal vegetation and plantation woodland.
- 3.76 A wet ditch which forms a limb of the upper reaches of the Ashgrove Brook was present along the length of hedgerow H5 that supported shallow (c.20cm) standing water at the time of survey. This ditch was approximately 0.5m wide and 1m deep with steep banks, supporting semi-improved grassland on the southern bank and hedgerow on the northern bank. Frequent aquatic and emergent vegetation was recorded within the ditch, along with occasional hard rush recorded at the margins.
- 3.77 A section of the Gaggle Brook is located within the Middleton Stoney Relied Road area and runs through an area of woodland. The water depth was approximately 20cm and the channel was approximately 3m wide with gentle sloping banks between 0.5-1m in height. The substrate was primarily comprised of earth with some leaf litter and aquatic/marginal vegetation included occasional stands of fool's water-cress *Apium nodiflorum* in area where the canopy was more open, otherwise the channel was mostly bare due to the dense shading.

Fauna

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Bats

Bat Roost Assessment - Trees

- 3.82 A total of 70 trees within the site Order Limits were assessed as being potentially suitable to support roosting bats during the ground assessments to date. Following subsequent aerial inspections and nocturnal surveys of trees likely to be impacted by the proposals, 23 trees were assessed as having low suitability to support bats, and 10 were assessed as having moderate suitability. No trees with high potential to support roosting bats were identified within the works area. The remaining trees were either located outside of the footprint of the proposed works or were downgraded to negligible roost potential following detailed survey.

Bat Roost Assessment - Buildings

- 3.83 Twelve buildings (B1-B12) were identified within the Site Order Limits which lie within the Main Site within the Ashgrove farmstead and Severn Trent Green Power Composting Facility. Some buildings comprised distinct sections, which were assessed individually and as part of the whole building. Following internal/external building assessments and nocturnal surveys buildings/sections B1e, B1f, B2a, B3a and B11 were assessed as having low potential to support roosting bats, B1b, B1c, B3e, and B3f were categorised as having moderate potential, B5 and B10 with high potential.
- 3.84 Nocturnal surveys in 2019 and 2021 recorded small numbers of individual common pipistrelle bats entering and emerging from roosts associated with the third-floor dormer window and chimney base of building section B1a. Evidence of roosting bats was recorded within building section B1d in the form of pipistrelle and brown long-eared bat droppings, feeding remains, and a single common pipistrelle returning to roost under the eaves in 2021. Building B1 was therefore confirmed to support a brown long-eared bat feeding roost and occasional (non-maternity) common pipistrelle roosts each used by small numbers of individuals.
- 3.85 Full survey results are provided in the separate Bat Report (FPCR 2022).

Foraging and Commuting Bats

- 3.86 The site is dominated by arable land/semi-improved grassland which is considered to be of negligible value to foraging and commuting bats. Habitats providing foraging and commuting opportunities for bat species are present within the site however, in the form of woodlands, hedgerows, scrub, trees and ponds.
- 3.87 Site surveys recorded the following bat species using the on-site habitats: common pipistrelle, soprano pipistrelle bat, Nathusius' pipistrelle bat, *Myotis* sp., noctule/*Nyctalus* sp., barbastelle, brown long-eared bat, and serotine. This species assemblage is considered closely similar in composition to that described by the desk study data, with the exception that the desk study had additionally identified the presence of Daubenton's bat locally.
- 3.88 Common pipistrelle is one of the UK's most common and widespread bat species and was the most frequently encountered across the site during both the transect survey and static detectors surveys. Soprano pipistrelle, noctule, *Nyctalus* sp. and *Myotis* bats also frequently utilising habitats present. Low numbers of barbastelle were recorded during static detector surveys in 2020 and 2021 and extremely low numbers of Nathusius' pipistrelle (two registrations in July 2018 and two more in June 2021) and serotine were recorded (serotine in April 2020 and July 2021).
- 3.89 The highest levels of activity were associated with woodland edges and hedgerows throughout the main site, main southern extension and junction works areas, including hedgerows H5, H6, H11, H13, H18, H20, H29, H49, H51, H76 and H77 and tree/shrub cover along the Gagle Brook.
- 3.90 Full survey results are provided in the separate Bat Report (FPCR, 2022).
- 3.91 Bat activity surveys are continuing across the Highways Works areas.

Breeding Birds

- 3.92 During the 2018 breeding bird surveys of the original Main Site boundary, 47 species were recorded, of which 22 were considered confirmed or probable breeders. The remaining species were either possible or non-breeding species. Of the 47 species recorded, 15 are considered notable (i.e., appearing on either the BoCC red / amber lists, Species of Principal Importance or the Wildlife and Countryside Act 1981 (as amended)).
- 3.93 During the 2020 surveys, which covered the additional Main Site areas only (see Breeding Bird Survey Plan), a total of 53 species were recorded, of which 27 species were considered confirmed or probable breeders. Of the 53 species recorded, 19 were considered notable.
- 3.94 Results from the 2021 update survey (which covered both the original Main Site boundary and the additional Main Site areas) suggested that the breeding bird assemblage had not undergone a significant change since 2018. Additional notable species recorded included merlin *Falco columbarius*, which was recorded flying over the site.
- 3.95 Habitats within the Main Site, including open arable farmland, pasture, and woodland, provided breeding habitat for a number of farmland specialist and generalist species. Arable fields provided breeding opportunities for skylark *Alauda arvensis* and yellow wagtail *Motacilla flava*, both of which were confirmed breeders. Additional notable species recorded in association with arable habitats include corn bunting *Emberiza calandra*, yellowhammer *Emberiza citrinella*, linnet *Linaria cannabina*, starling *Sturnus vulgaris*, hobby *Falco subbeteo*, sparrowhawk *Accipiter nisus*

and kestrel *Falco tinnunculus*. Hedgerows, trees and small strips of woodland which bound the field compartments provided breeding and foraging opportunities for a range of common and widespread generalist and woodland species. Notable species included dunnock *Prunella modularis*, mistle thrush *Turdus viscivorus*, bullfinch *Pyrrhula pyrrhula*, spotted flycatcher *Muscicapa striata*, stock dove *Columba oenas* and song thrush *Turdus philomelos*.

- 3.96 Full survey results are provided in the separate Breeding Bird Report (FPCR 2022).
- 3.97 Breeding bird surveys of the Highway Works area are ongoing, and a full evaluation of the results will be provided at a later stage. A single survey was carried out in June 2021, and a further 2 surveys will be carried out in April and May 2022.
- 3.98 The single breeding bird survey of the Highway Works area carried out in 2021 recorded 33 species, including 7 confirmed (6) or probable breeders (1). It should be noted that the breeding status cannot always be fully determined from a single survey, therefore the number of probable breeders in the Highway Works area is likely much higher. Of the 33 species recorded, 12 were considered notable.
- 3.99 The Highway Works area is predominantly agricultural, with some woodland and wetland habitats. The results were largely in line with results from the Main Site, with the bird assemblage recorded being typical of the habitats present. Arable habitats supported notable farmland species such as skylark, yellow wagtail, linnet and yellowhammer, whilst woodland and scrub habitats supported stock dove, kestrel, song thrush, dunnock and bullfinch.

Wintering Birds

- 3.100 The Main Site supported 55 wintering bird species, of which 24 were considered notable. The wintering bird assemblage consisted largely of common, widespread species, with notable species including grey partridge *Perdix perdix*, lapwing *Vanellus vanellus*, barn owl *Tyto alba*, merlin, skylark and yellowhammer. The over-wintering farmland birds such as grey partridge, lapwing, stock dove, skylark, linnet and yellowhammer, were largely associated with open arable habitats and field margins. Other species such as redwing *Turdus iliacus*, fieldfare *Turdus pilaris*, dunnock and bullfinch *Pyrrhula pyrrhula* were associated with hedgerows and scrub.
- 3.101 Three winter bird surveys were undertaken of the Highway Works area between November 2021 and February 2022. Results identified 60 species, of which 34 were considered notable. Arable fields and associated marginal habitats supported good numbers of farmland bird species such as skylark, meadow pipit *Anthus pratensis*, yellowhammer, linnet, corn bunting and grey partridge, whilst woodland and scrub habitats provided winter foraging and roosting habitat for wren *Troglodytes troglodytes*, fieldfare, redwing, starling, song thrush, dunnock, mistle thrush and bullfinch. Other notable species recorded include woodcock *Scolopax rusticola*, teal *Anas crecca*, snipe *Gallinago gallinago*, black-headed gull *Chroicocephalus ridibundus*, red kite *Milvus milvus*, barn owl and reed bunting *Emberiza schoeniclus*.

Reptiles

- 3.102 The majority of habitats on site were considered to provide sub-optimal refuge and foraging opportunities for native reptile species due to the managed nature of the arable and open grassland habitats that dominated the site. The arable land was intensively managed and the grassland grazed short and lacked the structural diversity required.
- 3.103 Limited opportunities were present for this species group however at the field perimeters, in the form of the grassland field margins, woodland edges, ponds/watercourses and hedgerows and the presence of common lizard and grass snake in the local area was confirmed by the desktop study.
- 3.104 The locations of the 432 artificial reptile refugia are shown in Figure 4. The surveys recorded common lizard on 22 occasions across the Main Site and Highways Works areas (peak count 4 adults), grass snake on five occasions (peak count two adults), and one adult slow worm. The survey results are summarised in Table 4 and locations shown at Figure 4. As such it is considered that the current application site supports a low population of common lizards, grass snakes and slow worms in accordance with Table 2.

Table 4: Reptile Survey Results

Date	Species						
	Adult M Common Lizard	Adult F Common Lizard	Unknown Adult Common Lizard	Juvenile Common Lizard	Adult Grass Snake	Juvenile Grass Snake	Adult M Slow Worm
21.07.21	0	1	0	0	0	0	0
27.08.21	0	0	3	0	2	0	0
03.09.21	0	0	3	0	1	0	0
06.09.21	0	1	0	0	0	0	1
17.09.21	1	0	1	2	0	1	0
20.09.21	0	0	0	0	0	0	0
23.09.21	0	2	2	1	1	0	0
29.09.21	1	0	3	1	0	0	0

Great Crested Newts

Terrestrial Habitats

- 3.105 The on-site habitats, dominated by intensely managed arable land and grazed semi-improved grassland, provide limited terrestrial opportunities for GCN, though habitats of elevated value to this species are present with the site in the form of woodland, hedgerows, narrow semi-improved field margins, tussocky grassland within the Viridor ERF site and scrub.

Aquatic Surveys

- 3.106 Seven waterbodies were present within the site boundary (P1, P2, P3, P4, P20 P50 & P51). GCN were absent from P1, P2, P3, P4 and P20 in 2021, whereas ponds P50 and P51 could not be surveyed in 2021. Initial surveys during the 2022 period have confirmed the presence of GCN within ponds P50 and P51.

- 3.107 A further 63 ponds occurred within 500m of the site boundary (Figure 5). Access was sought and gained to 35 ponds and 12 water tanks which were subject to aquatic surveys for the presence / absence of GCN in 2021. GCN were confirmed to be present in the majority of ponds within the Viridor land to the east and the Upper Heyford GP Lit land to the west. From analysis of the data it was concluded that the site sat in between three separate offsite GCN meta populations with ponds P50 and P51 located within the Highway Work areas of the site forming part of a fourth metapopulation. Whilst the Main Site provided some suitable terrestrial habitats, the limited suitability of breeding habitat within the site meant that the links between these meta populations was restricted due to sheer distance and lack of suitable ponds within the Main Site.

Riparian Mammals

Habitat Assessment / Results

Padbury Brook Tributary

- 3.108 During the June 2021 survey, the Padbury Brook Tributary was 50-100cm wide with a very shallow water level, rarely getting deeper than 10cm. A tall hedgerow runs along the northern bank of this watercourse, whilst the southern bank is dominated by tall (c1m) grasses and herbaceous vegetation. This bankside vegetation provides some foraging potential for water vole but also caused a moderate level of overshadowing. In September 2021, the watercourse had dried completely and there was no water in the channel.
- 3.109 No evidence of water vole or otter was recorded along the Padbury Brook Tributary. Two mammal burrows were recorded, but due to the presence of rat droppings nearby these burrows were considered to be that of rat.

Ashgrove Brook

- 3.110 In June 2021, the Ashgrove Brook was largely similar in morphology and surrounding habitat to the Padbury Brook Tributary. Water level was highly variable, with some areas being completely dry, whilst other areas resembling ephemeral pools. At its largest, this watercourse was around 1 meter wide and approximately 10-20cm deep. At one point the watercourse flows into a pond, surrounded by trees and scrub. Hedgerows and/or trees run alongside the entire length of this watercourse, and in some areas is completely surrounded by woodland. In these woodland areas bankside vegetation is heavily suppressed and mostly consists of ivy and bramble. Water level was greatly reduced during the September 2021 survey, with approximately half of the watercourse being dry.
- 3.111 No evidence of water vole or otter was recorded along the Ashgrove Brook.

Gagle Brook

- 3.112 The surveyed section of the Gagle Brook was completely surrounded by tall, mature woodland, meaning bankside vegetation growth was limited, consisting mainly of sparse ivy. One small (c.10m) stretch contained thick (c.100% cover) in-channel growth of a watercress species. The channel was 1-2m wide with a maximum depth of approximately 30-40cm.
- 3.113 Crayfish remains were found within the Gagle Brook, as well as a mammal hole several meters from the water's edge which potentially could be used by otter. The absence of any other otter signs nearby makes it difficult to determine whether this was indeed an otter holt, or whether it

was used by some other mammal. The fact that no spraints were found along the Gagle Brook, as well as the holes proximity to a well-used public footpath make it unlikely that this hole constitutes an active otter holt.

Other Notable Species

- 3.114 During the suite of survey work across the site a small number of brown hare *Lepus europaeus* were observed within the site, two observed along a hedgerow in the north of the main site on 10th May 2020 and a single hare commuting across a grassland field within a central grassland field on 17th May 2021. Habitats within the site were also considered to provide some potential for commuting and foraging hedgehog.
- 3.115 No evidence of hazel dormouse *Muscardinus avellanarius* was observed anywhere within the application site during the suite of survey work completed and no records were returned from the desktop study. The agricultural boundary hedgerows were considered to provide poor potential habitat due to their intense management and poor structure and as such, the site is not considered suitable to support a viable population of dormice and no further surveys area required.
- 3.116 Seven common and widespread butterfly species were recorded over the suite of survey work, basking and foraging over the grassland within the main site and commuting along arable hedgerows. These included peacock *Aglais io*, small tortoiseshell *Aglais urticae*, meadow brown *Maniola jurtina*, small white *Pieris rapae*, marbled white *Melanargia galathea*, brimstone *Gonepteryx rhamni* and red admiral *Vanessa atalanta*. A single small heath *Coenonympha pamphilus*, which is a S41 listed species, was recorded with the grassland field to the south of the road that bisects the Main Site in May 2020.
- 3.117 At the time of writing, discussions are ongoing with Natural England to propose a series of butterfly transects to follow UK Butterfly Monitoring Scheme (UKBMS) methodology, which would cover a circular route adjacent to the railway embankments and include areas of calcareous grassland on the northern side of the cutting.

4.0 DISCUSSION AND RECOMMENDATIONS

Sites with a Statutory International Nature Conservation Designation and Sites on the National Sites Network

- 4.1 Oxford Meadows SAC is an Internationally important site located c.13.6km to the south of the Proposed Development and therefore there will be no direct loss of habitats from the SAC as a result of the development. There are no direct terrestrial and hydrological links between the Proposed Development and the SAC for wildlife. Threats to this lowland hay meadow habitat from outside of the boundary are identified¹⁸ as human induced changes to hydraulic conditions, surface water pollution and invasive species. Development at the Site is unlikely to have any influence on these factors.
- 4.2 The Proposed Development lies outside of the Impact Risk Zones (IRZs) identified for the four constituent SSSIs encompassed by the Oxford Meadows SAC: Cassington Meadow SSSI, Yarnton and Pixey Meads SSSI, Wolvercote Meadow SSSI and Port Meadow SSSI. IRZs reflect the particular sensitivities of individual SSSIs in conjunction with any corresponding European site underpinned by the SSSI designation and provide a rapid risk assessment that considers whether a proposed development is likely to affect a SSSI.
- 4.3 Given the intervening distance between the Proposed Development and the Oxford Meadows SAC IRZ, the only potential pathway by which the construction phase could adversely affect the integrity of the SAC is via an impact on air quality acting on the SAC.

Sites with a Statutory National Nature Conservation Designation Value

- 4.4 Ardley Cutting and Quarry SSSI is located along and adjacent to the northern Main Site boundary and the proposed development will connect to the existing railway running through this SSSI. As such, three sections of the SSSI will be lost to the proposed development which will result in the direct loss of small areas of scrub, woodland, calcareous grassland and lowland meadow grassland, with further direct loss from within required construction zones. The remainder of this designation will be subject to direct effects such as dust, pollution and noise.
- 4.5 The sections of SSSI located within the site and to be affected by the proposed railway connection in the west and proposed bridge in the east were noted to be heavily encroached and overgrown with scrub. This SSSI unit has been classified by Natural England as 'Unfavourable Recovering'¹⁹. Although a sections of this SSSI will be lost, these will be mitigated for through the creation of new, and larger, areas of calcareous grassland on new cuttings created for the rail connection. Suitable methods to be employed include translocating material from areas lost, and/or the sowing of grassland seed collected from the SSSI. Areas of newly created calcareous grassland will be appropriately managed in the long term (for example via annual mowing in early spring or late summer) so that it does not become overgrown with scrub. As these new cuttings will form part of the site, access for management will not be hindered by the current access restrictions and therefore there will be more effect management than current.
- 4.6 At the time of writing further detailed botanical survey of areas to be impacted are scheduled for June 2022 to accommodate for changes within the Order Limits areas and there are ongoing discussions with Natural England via their Discretionary Advice Service to determine how impacts can be further minimised and mitigated for.

¹⁸ <https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0012845.pdf>

¹⁹ <https://designatedsites.naturalengland.org.uk/UnitDetail.aspx?UnitId=1022421>

Non-Statutory Designated Sites

- 4.7 Non-statutory sites are referred to in the National Planning Policy Framework (NPPF) as local sites and do not receive statutory protection. These sites do however receive policy protection as reflected in the NPPF, which suggests that Local Sites can have a fundamental role to play in meeting overall national biodiversity targets and that appropriate weight should be attached to designated sites when making planning decisions. The NPPF also requires recognition of the contribution that local sites make to wider ecological networks.
- 4.8 There is one designated DWS and a CTA within the site. A further three LWS and three pDWS were noted adjacent to the site and a further three LWS and additional CTA within 1km of the site. Ardley and Heyford CTA, Ardley Road Verge Nature Reserve DWS and the LWS have been assessed as being of County level value, while the potential DWSs have been identified as being of Local level value.
- 4.9 There will be some direct habitat loss from Ardley Road Verge Nature Reserve DWS, however the proposed footpath/cycle path has been designed to route through the defunct pull-in road of the B430 and avoid the area of rough calcareous grassland which supports a population of Meadow Clary. Currently the population of this rare Schedule 8 plant is vulnerable due to its location within a road verge with regular disturbance from dust deposition and pollution from road traffic, as well as the risk of potential vandalism as it is currently located close to a layby.
- 4.10 The development will provide significant additional areas of calcareous grassland and there will be opportunities to expand the currently population through a two-step mitigation strategy as outlined below which will require a licence from Natural England to facilitate.
- 4.11 Meadow Clary Strategy
- 4.12 The following outlines the proposed mitigation measures to ensure the protection and potential to expand the current meadow clary population within the site. This will be a two-step strategy: (i) Translocation to new location within the development, (ii) Germination of plants from seed from existing population (back-up to maintain the genetic stock should translocation fail).
- 4.13 (i) *Translocation*
- Soil analysis will be undertaken from around current population and soil analysis in potential receptor area to ensure appropriate soil conditions are created at the receptor site;
 - The receptor site will likely comprise the north-west corner of the site to ensure that the grassland habitat is of sufficient size to enable the translocated population to expand;
 - Translocation is best to be undertaken late winter/early spring (mid-Feb to mid-March) as any slight root damage will heal relatively quickly as the spring growth surge starts, works will avoid working in frosty conditions;
 - Dig out around the individual plants using a hand spade digging around the rosette and a spade depth deep to ensure that the rosette comes out with a large bulb of soil attached underneath. This step will be delayed following very dry conditions to avoid soil loss from around the bulb;
 - Soil bulbs will be wrapped in damp sacking or similar and place the lifted plant in a bucket/trug or similar, and transported to the receptor area;

- A hole of the size to match the root ball will be dug and attached soil on the plant and loosened with the base with a fork;
- Re-plant in the hole ensuring that the rosette is at ground level the same as before;
- Aftercare: The translocation timing should mean that there should not be any problem with soil moisture and watering should be unnecessary. However, if exceptionally dry conditions do occur during spring, plants will be checked every other week for drought stress and water very thoroughly, but with the avoidance of where possible watering as this will encourage the roots to go down to find moisture. Management will match that of the current population.
- Monitoring: Annually for 3 years to monitor establishment of translocated plants and to see if there has been any population growth from seed shed by the moved plants.

(ii) Saving and Sowing Seed

- Seed will be collected from the existing stock during summer/early autumn (timing of seed set will be variable depending on the conditions), ensuring that collection is taken before seed fall happens;
- Divide collected seeds into two halves. To reduce risk and increase chances of success, seed to be grown in two different locations by two different people;
- Collect sufficient topsoil from the location of the existing population, sufficient to fill two seed trays (one for each half of the seed);
- Sterilise the collected soil;
- Sow the seeds straightaway in the autumn to mimic when they would naturally fall and come into contact with the soil);
- Sow on the surface of the sterilised soil and lightly cover with sterilised soil. Important to not bury too deep (should only be covered with a few mm of soil otherwise germination will be reduced significantly);
- When big enough, seedlings will be pricked out into small pots filled with loam and grow on, re-potting as needed. Continue to grow on during the second year following germination;
- Plant out in in receptor area to increase the population, the spring after the second year of growing on. If there is surplus stock, plants will be offered to the local Wildlife Trust who might be interested in planting up a second population if it is known and recorded that this is stock grown from the known population.

- 4.14 There will be habitat loss from the Ardley and Upper Heyford CTA including areas of key habitats that are considered to be of importance within the CTA for retention, enhancement and creation for biodiversity objectives. These include calcareous grassland, hedgerows, grassland that supports ground nesting birds and terrestrial habitat for great crested newts including copses and wooded strips. Development of the site will also remove future opportunities for creation of calcareous grassland priority habitat. Mitigation for the loss of habitats will comprise the provision of approximately 14ha of calcareous grassland located along new embankments along the railway line and within an adjacent field within the north-west of the Main Site. Proposals also include the provision of suitable terrestrial and breeding habitat as part of GCN mitigation proposals as outlined below.

- 4.15 There will be some localised habitat loss from Ardley Fields Quarry LWS which overlaps with the Ardley Cutting and Quarry SSSI and will be mitigated for as outlined above.
- 4.16 There will be no direct habitat loss from Upper Heyford Airfield LWS, The Heath pDWS, Trackway adjacent to the Gorse pDWS or Kennel Copse pDWS which lie adjacent to the Main Site, however given their location there is potential for indirect impacts including physical damage to vegetation, in particular the root systems of trees, and the compaction of soil which can lead to direct mortality or alter the species and structural diversity of vegetation. They may also be at risk of accidental pollution events, dust deposition, and noise. The proposed development incorporates a non-development semi-natural buffer (min. 15m) however, within which habitats such as woodland and semi-improved grassland will be established. Given the incorporation of the buffer planting and with the adoption of best practice measures, no significant adverse direct effects on these non-statutory designations are anticipated.
- 4.17 The remaining non-statutory designated sites which comprise Ardley Fields Ponds East LWS, Ardley Field Ponds West LWS, Trow Pool LWS, Stoke Wood LWS, Kennel Copse pDWS, and Tusmore and Shelswell Park CTA lie sufficiently distant that there will be no risk of direct physical damage to retained vegetation and soils. However, impacts can result from accidental pollution events through spillages into wetland features, or increases in silt due to inappropriate design of site drainage, which can in turn lead to impacts upon off-site receptors by reducing water quality. Although Ardley Fields Ponds East LWS is located on the opposite side of the B430 there is potential for accidental pollution events to impact the ecological value of this designation.
- 4.18 Furthermore, there is potential for the accidental pollution of the Tusmore and Shelswell Park CTA as an upper tributary of the Padbury Brook flows from the Proposed Development through this CTA. Pollution impacts to these receptors could significantly reduce the capacity of habitats to support fauna through altered vegetation structure, or the increase in mortality rates as a result of the lethal effects of silt or toxic pollutants. As such, it is important that measures are taken to maintain and protect the integrity of the watercourses and associated wetland habitats within the site, to also protect connected flora and fauna offsite. Part of this protection shall be implemented by the adherence to an appropriate CEMP and LEMP. Within the CEMP, measures to ensure that habitats are protected from pollution will be stipulated. These will include observation of the relevant Pollution Prevention Guidelines listed below, to ensure construction works are undertaken in an environmentally responsible manner.
- PPG1: General Guide to the Prevention of Pollution;
 - PPG2: Above Ground Oil Storage Tanks;
 - PPG3: Use and Design of Oil Separators in Surface Water Drainage Systems;
 - PPG6: Working at Construction and Demolition Sites;
 - PPG21: Pollution Incident Response Planning.
- 4.19 The magnitude of the distance separating the site from all other non-statutory sites is considered sufficient to ensure that there will be no impacts to these features during construction.
- 4.20 In terms of the completed development, the proposals comprise a rail freight scheme with associated industrial/business units. Therefore, it is not anticipated there would be an increase in recreational pressure on the Upper Heyford Airfield LWS or any more distant non-statutory designated site.

Habitats

- 4.21 The following provides an assessment of those habitats that, except where indicated otherwise, fall outside the boundary of designated sites of nature conservation interest.
- 4.22 The degree to which habitats receive consideration within the planning system relies on a number of mechanisms, including:
- Inclusion within specific policy, for example veteran trees and ancient woodland within the NPPF;
 - A non-statutory site designation (e.g. LWS);
 - Identification as Habitats of Principal Importance for the conservation of biodiversity as listed within Section 41 of NERC; and
 - Habitats identified as being a Priority Habitat within the Local Biodiversity Action Plan (Oxfordshire LBAP).
- 4.23 Under the National Planning Policy Framework (NPPF) development should seek to contribute a net gain in biodiversity with an emphasis on improving ecological networks and linkages where possible.
- 4.24 The retention and protection of key ecological features within the site; retained areas of the Ardley Cutting and Quarry SSSI and Ardle Road Verge Nature Reserve DWS as described above ensures that these policies and safeguards are being met.
- 4.25 The dominant habitats within the site, comprising arable land and pasture grassland, along with semi-improved grassland field margins, buildings and hardstanding are considered to be of limited botanical and ecological interest. The loss of these habitats would not result in significant adverse impacts to ecology and nature conservation.
- 4.26 The woodlands, hedgerows, semi-mature to mature trees, watercourse and ponds present within the site are of greater ecological value and provide foraging and shelter resources, and wildlife corridors through and around the site. Wherever possible these have been incorporated within the green infrastructure, connecting to the Ardley Cutting and Quarry SSSI, DWS and adjacent pDWSs, as outlined in the Parameters Plan; however, there will inevitably be some loss or fragmentation to achieve a design layout that is function and sustainable.
- 4.27 The hedgerows and trees at the site boundaries are largely retained within the proposed scheme, along with Ashgrove Brook, woodlands W2 and W5 and ponds P2 and P3. The retained habitats should be appropriately protected during development (using heras fencing or similar with appropriate signage) and enhanced within the green infrastructure.
- 4.28 A number of the hedgerows, along with pond P1 and woodlands W1, W3 and W4 will be lost or partially lost to facilitate the development. Losses will be compensated via new tree, woodland and hedgerow planting using locally native species. It is further recommended that a series of new ponds are created within the habitat corridors proposed as part of the development.
- 4.29 The majority of hedgerows are to be lost from the Main Site and small sections within the Highway Works Areas. To compensate for the loss, additional native species planting will be provided throughout the green infrastructure and open space to add greater value than what is to be lost. The retained hedgerows will be included within green linkages and will be “gapped up” with native species; this will increase species diversity, strengthen the hedgerows and improve

- the corridor for a range of foraging and commuting wildlife and provide nesting opportunities for breeding birds.
- 4.30 Preference will be given planting species of local provenance within the hedgerows and woodland that will be nectar and fruit producing species to provide foraging for insects, birds and mammals. Species should include alder *Alnus glutinosa*, beech *Fagus sylvatica*, silver birch *Betula pendula*, wych elm *Ulmus glabra*, gean cherry *Prunus avium*, hornbeam *Carpinus betulus*, English oak *Quercus robur*, rowan *Sorbus aucuparia*, goat willow *Salix caprea*, hawthorn *Crataegus monogyna*, hazel *Corylus avellana*, field maple *Acer campestre*, blackthorn *Prunus spinosa*, dogwood, *Cornus sanguinea*, elder *Sambucus nigra*, guelder rose *Viburnum opulus*, field rose *Rosa arvensis* and dog rose *Rosa canina*.
- 4.31 Management of the hedgerows should be undertaken in an ecologically sensitive manner to enhance the nature conservation value. Such management will include:
- Allowing the hedgerow to reach at least a height of 3m. Once reached the hedgerow can be 'topped out' to maintain the height or to suit circumstances, with a width of at least 1-2m;
 - A proportion of trees within the hedgerow such as English oak *Quercus robur* and field maple *Acer campestre* should be allowed to mature into standard trees to provide nesting and foraging opportunities for local wildlife and a varied habitat structure; and
 - Grassland along the hedgerow base should be allowed to grow to provide a graduated sward height and habitat.
- 4.32 The hedgerows and trees along the field boundaries of the Main Site are largely to be retained within the proposed scheme, along with Ashgrove Brook, woodlands W2 and W5 and pond P3. The retained habitats will be appropriately protected during development (using heras fencing or similar with appropriate signage which will be detailed within a CEMP) and enhanced within the green infrastructure.
- 4.33 The maintenance of tree root protection areas throughout construction will also ensure that trees are adequately protected. The protection measures should include consideration of *BS5837 Trees in Relation to Construction Recommendations: 2012 for trees and hedges*, which also applies to hedgerows with trees present (see the separate Arboricultural Report (FPCR 2022)).
- 4.34 Due to the considerable size and scale of the scheme there is the need for an extensive drainage network, which shall provide the opportunity to create wetland features and balancing facilities that will provide further gains for biodiversity through increasing the overall habitat diversity on site.
- 4.35 At the detailed design stage enhancements should be incorporated to the design to enrich retained features, create areas of native species planting and secure long-term management of these habitats as part of the overall green infrastructure package.

Protected and Notable Species

- 4.36 Principal pieces of legislation protecting wild species are Part 1 of the Wildlife and Countryside Act 1981 (as amended) (WCA) and the Conservation of Habitats and Species Regulations 2017 (as amended). Some species, for example badgers, also have specific protective legislation (Protection of Badger Act 1992). The impact that this legislation has on the Planning system is

outlined in ODPM 06/2005 Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System.

- 4.37 This guidance states that as the presence of protected species is a material consideration in any planning decision, it is essential that the presence or otherwise of protected species, and the extent to which they are affected by proposals is established prior to planning permission being granted. Furthermore, where protected species are present and proposals may result in harm to the species or its habitat, steps should be taken to ensure the long-term protection of the species, such as through attaching appropriate planning conditions for example.
- 4.38 In addition to protected species, there are those that are otherwise of conservation merit, such as species of principal importance for the purpose of conserving biodiversity under the NERC Act (2006). These are recognised in the NPPF, which advises that when determining planning applications LPA's should aim to conserve and enhance biodiversity by applying a set of principles including:
 - If significant harm resulting from a development cannot be avoided, adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
 - Development proposals where the primary objective is to conserve or enhance biodiversity should be supported, whilst the opportunities to incorporate biodiversity improvements in and around developments should be encouraged.
- 4.39 The implications of the survey findings on the potential developmental design are outlined below, along with opportunities to enhance the site for a range of species.

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Bats

- 4.43 Bats and their habitats are protected under the Wildlife and Countryside Act 1981 (*as amended*) and by the Conservation of Habitats and Species Regulations 2017 (*as amended*). In summary this makes it an offence to damage destroy or obstruct any place used by bats for breeding and shelter, disturb a bat, or kill, injure or take a bat. Seven bat species are listed as Species of Principal Importance under the provisions of the NERC Act 2006.
- 4.44 A summary of the impacts and subsequent recommendations in relation to bats is set out below, See the separate Bat Survey Report (FPCR 2022) for further details.

Bat Roost Assessment - Trees

- 4.45 Retained trees with a high or moderate bat roosting potential will be incorporated into the green infrastructure. A 10m buffer will where possible be implemented surrounding retained trees to reduce the likely effects from lighting. Additionally, trees with high/moderate bat roost potential should be included within dark corridors for bats where possible.
- 4.46 No removal of trees with high roost potential is proposed. Where trees with moderate potential (but no evidence of roosting bats recorded during detailed surveys) are to be removed this will be undertaken in accordance with a suitably precautionary method statement in order to ensure legal compliance. This document will cover the appropriate mitigation measures to ensure that bats are adequately protected during tree works. In brief, this will include precautionary nocturnal surveys and / or aerial tree climbing inspections prior to works to ensure the sensitive removal of the trees only when these are confirmed to be unoccupied by bats. Providing that no bats are present the tree will be section felled by experienced arborists under the supervision of an appropriately licensed bat worker. In the event that bats are confirmed to be present then works will be halted until an appropriate Natural England derogation licence is put in place. This licence would detail the appropriate timing and safe working practices necessary to ensure that the risk to bats is minimised and that suitable alternative roosting sites are provided. These measures would be sufficient to ensure that (should bats be present) the Favourable Conservation Status (FCS) of the local bat population is not altered.
- 4.47 The inclusion of a variety of bat boxes as detailed within the separate Bat Report will provide new potential roosting sites for bats within the local area and will be located around the development site on suitable trees and particularly within retained woodland blocks within the Main Site which will link to new blocks of tree planting.

Bat Roost Assessment – Buildings

- 4.48 Buildings B1 (confirmed roosts), B5 and B10 (buildings with high potential to support roosts) are to be retained within the scheme, however B1 and is to be renovated to form part of a Farm Campus, and B10 is to be renovated and converted to a site office .
- 4.49 As the presence of a bat roost is a statutory constraint to development if it is not possible to proceed with the above works and retain the roost sites and associated entrances unmodified, the proposed renovation of buildings B1a/B1d would proceed under the strict terms of a Natural England Licence to allow derogation from the law. The licencing process will entail the submission of a method statement and mitigation details to Natural England for agreement and would include the following:
- Pre-works check of suitable roosting features using endoscopes, torches and inspection mirrors, as appropriate;

- Toolbox talk, setting out legislation, the potential presence of roosting bats, the agreed method statement and what to do if a roosting bat is found;
 - Works supervised by a licenced or accredited bat worker;
 - Suitable features to be removed by hand / using hand tools; and
 - Provision of appropriate long-term roost replacements such as bat boxes.
- 4.50 Proposed works to building B10 comprise minor roof repairs, the installation of new windows below the roof level, and the removal of a conservatory. Once the detailed proposals for the roof repairs and associated works are identified these will be assessed for their potential to impact the roof structure and/or supporting walls. If appropriate these structures will then be subject to nocturnal surveys and an updating internal assessment to further assess their potential to support roosting bats. In the event that the presence of a bat roost is confirmed a Natural England Licence would be secured as above to allow works to proceed.
- 4.51 These measures are considered sufficient to ensure that the FCS of local bat populations is maintained.

Foraging and Commuting Bats

- 4.52 From the completed survey work the following bat species were identified using the habitats across the survey area: common pipistrelle, soprano pipistrelle bat, Nathusius' pipistrelle bat, *Myotis* sp., noctule/*Nyctalus* sp., barbastelle, brown long-eared bat, and serotine. The most frequently recorded species during both the transect and static detector surveys was common pipistrelle. From the completed surveys the habitats within the site are likely to form part of the natural foraging range for such as species, though are not considered to provide a significant resource to the local bat population, which will forage over a wider area.
- 4.53 Barbastelle is an Annex II species, generally rare across the UK and mainly present in southern and central counties of the England. The total registrations of this species represented less than 1% of the total static data recorded in 2020 and 2021 and the features utilised by this species form a small proportion of the barbastelle foraging range as this species is known to forage over a large territory of mixed habitats, and do not provide a significant commuting route for this species.
- 4.54 The development scheme will provide enhancements for the local bat populations via the provision of attenuation ponds and creation of species-rich grassland and extensive areas of new native hedgerow, woodland and tree planting, together with retained habitat features that have been incorporated into a green corridors along the western and eastern boundaries and through the centre of the Main Site and linking to a larger areas of open space in the south and north-west.
- 4.55 A c.30m section of broadleaf woodland will be removed from along each bank of the Gagle Brook to enable the construction of the Middleton Stoney Relief Road and associated earthworks, resulting in the fragmentation a mature habitat corridor that represents an important feature for local bat populations. The loss of existing tree cover within this area will be minimised as far as possible, and post construction new mixed native tree species planting will be established up each road embankment to partially close the gap made in this feature. The proposed green infrastructure at this point links to a continuous corridor of native tree and shrub planting that will extend along the length of the relief road from the B430 to Middleton Stoney, providing alternative commuting and foraging opportunities for bats through the local landscape.

- 4.56 Where road construction will create gaps in existing hedgerows unlit 'hop-overs' will be created to encourage bats to increase their flight altitude over the gap to reduce the potential for road traffic mortalities.
- 4.57 All retained habitats will be buffered from the development with an appropriate lighting scheme implemented (see details within the separate Bat Report), along with connectivity to offsite habitats retained / enhanced through native planting.
- 4.58 Connectivity around the site perimeter and linking to off-site habitats will thus be maintained to provide suitable corridors of movement for bats and other local wildlife.

Birds

- 4.59 A summary of the impacts and subsequent recommendations in relation to breeding and wintering birds is set out below, see the separate Breeding Bird Report (FPCR 2022) and Wintering Bird Report (FPCR 2022) for further details.

Breeding Birds

- 4.60 The loss of arable and pasture habitats will result in impacts on the farmland specialist population. The provision of an open grassland buffer will provide some additional foraging habitat for these species.
- 4.61 During the construction phase, short term impacts are expected upon generalist species mistle thrush and dunnock. However, these impacts will reduce in magnitude upon the establishment of buffer planting. Under current planning proposals the woodland in which the spotted flycatcher pairs were recorded is to be retained however, residual impacts from the development including noise and increased disturbance may negatively impact the pairs during the construction phase. The proposed retained and created landscape buffer and corridor will likely compensate the remaining generalist species using this habitat, especially as the planting becomes established.
- 4.62 The inclusion of mitigation in the form of permanent nesting spaces and buffer planting will reduce the impact upon barn owl and house sparrow, however unavoidable impacts upon kestrel are expected.
- 4.63 The retention of the large pond will continue to support the assemblage of birds recorded in this habitat. Although two of the smaller ponds on site will be lost as part of the development, no wetland species were recorded utilising these features.

Wintering Birds

- 4.64 It is anticipated that the total loss of the arable and pasture fields will have an impact on yellowhammer and skylark, both of which overwinter within the Main Site in county important numbers. Similarly, the proposals will lead to impacts on the other farmland specialists recorded, including grey partridge, stock dove and barn owl. The loss of the farm buildings will also remove barn owl probable nesting and roosting sites, as discussed in the breeding bird report. No significant impacts are predicted for starling, fieldfare, redwing, lesser black-backed gull due to the creation of suitable winter foraging and roosting sites.
- 4.65 For the generalist species which inhabit the hedgerows and woodland, including the locally important song thrush, bullfinch and dunnock, the development will likely result in short to mid-term impacts during construction due to habitat loss. However, the planting within the proposed

landscape buffer and corridor will compensate for this habitat loss since these species will readily inhabit urban habitats.

- 4.66 The habitat loss and permanent disturbance caused by the proposed construction of roads will impact wintering skylark, yellowhammer and corn bunting, and to a lesser extent grey partridge, starling and meadow pipit. No significant impacts on song thrush, redwing, fieldfare and linnet are expected. A farmland bird strategy is recommended within the Highway Works area in order to reduce the scale of impact on the farmland specialist species.

Reptiles

- 4.67 All common reptile species, including slow-worm, common lizard and grass snake are partially protected under Section 9(1) and 9(5) of Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). This legislation protects these animals from:
- Intentional killing and injury;
 - Selling, offering for sale, possessing or transporting for the purpose of sale or publishing advertisements to buy or sell a protected species.
- 4.68 All common reptile species, including common lizard, are species of principal importance under S41 of the NERC Act.
- 4.69 From the completed survey work low populations of common lizard (maximum count of 4), grass snake (maximum count of 2) and slow worm (single individual) have been identified within the site. As such the site does not meet the criteria for a Key Reptile Site²⁰.
- 4.70 Common lizard, grass snake and slow worm are relatively widespread regionally, particularly where suitable habitat exists. Where these animals are confirmed as present on land that is to be affected by development guidance recommends that:
- The animals will be protected from injury or killing during construction operations;
 - Mitigation will be provided to maintain the conservation status of the species locally.
- 4.71 Suitable on-site habitats for common lizard and slow worm include semi-improved grassland fields and field margins, tall ruderal vegetation, scrub and hedgerows. The site also has linkages to suitable offsite habitat including the railway line which is likely to be utilised as a corridor. The watercourses additionally provide a potential commuting route for grass snake.
- 4.72 The development will result in the removal of semi-improved grassland, hedgerows and small areas of existing scrub. The provision of a mosaic of new habitats including linear scrub and tree planting, grassland creation, provision of ponds and associated wetland habitats and new native hedgerows will provide new areas of suitable habitat for the small numbers of common lizard, grass snake and slow worm present, and will link to similar habitats in the wider area.
- 4.73 Given that the use of habitats is likely to be no more than occasional, the loss of habitat is not considered significant. However, without mitigation there is a low risk that site clearance options may result in an increased incidence of common lizard, grass snake and slow worm mortality through accidental killing or injury. Although this impact is considered to be of minor significance, mitigation measures are required to ensure legal compliance. The following section provides best practice to ensure that these species are not harmed during the proposals.

²⁰ Froglife (1999). *Froglife Advice Sheet 10: Reptile Survey*. Froglife, Halesworth

Mitigation

- 4.74 In order to ensure that these species come to no harm during development it is recommended displacement and sensitive removal of potential refuges from areas of affected suitable habitat. This would involve removing all potential refuges by hand and directional strimming under the supervision of a suitably qualified ecologist.
- 4.75 The following outlines the method for removal of reptile hibernation features within the application site boundary:
- The removal of the potential hibernation features described above will only take place during suitable weather conditions (daytime temperatures exceeding 9°C) within the reptile active season, which runs mid-March to mid-October, inclusive;
 - The removal of potential hibernation features, including dismantling of rubble piles and requires the supervision of a suitably qualified ecologist; and
 - A fingertip search of the working area will be made immediately prior to any further groundworks to ensure that reptiles are absent from the area of work. Further operations will only continue once reptiles are confirmed to be absent from the working area.
- 4.76 Directional displacement will be applied to the clearance of suitable habitat located the site. This approach will involve the following key steps:
- Displacement shall only be undertaken during suitable weather conditions; (daytime temperature 9°C or higher) within the reptile active season, i.e. mid-March - mid-October, inclusive;
 - Grassland will first be strimmed directionally to a height of 100mm and 1-2 hours later it will be reduced to 50mm. All strimming will be carried out from the centre of the working areas towards the retained / off-site areas of suitable reptile habitat;
 - All arisings will be completely removed from the working area to prevent potential areas of refugia from being used by reptiles moving across the area;
 - A fingertip search of the working area will be made immediately prior to any ground works to ensure that all common reptiles are absent from the area of work. Further operations will only continue once common reptile species have been confirmed to be absent from the working area; and
 - A sward height of 100mm will then be maintained until clearance (top soil stripping) is complete.

Great Crested Newt

- 4.77 UK and European legislation fully protect GCN and their terrestrial habitat. GCN are also Priority Species under Section 41 of the NERC Act.
- 4.78 Survey work to date identified a small number of GCN within ponds P50 and P51 within the northern part of the proposed highway works area which are to be retained, though due to the distance from the highway mitigation works there is the potential that these may be directly affected by the proposals through pollution if appropriate mitigation is not put in place. Ongoing surveys will determine the population size which at present is small is assumed to form part of a meta-population. GCN have not been identified within ponds P1-P4 or P20 and ponds P3 is to be retained within the development scheme.
- 4.79 Three additional metapopulations, two exceptional and one good, are located to the east and west of the site. Waterbodies from each metapopulation occur within 250m of proposed works

area, therefore in the absence of appropriate mitigation the proposals have potential to impact upon all four.

- 4.80 The site is dominated by arable land and intensely grazed improved grassland, considered to provide suboptimal opportunities for GCN. Suitable terrestrial habitat for this species is present within the site however in the form of woodlands, scrub and hedgerows network within the site.
- 4.81 Therefore, mitigation measures will be required under a Natural England European Protected Species Licence (EPSL) to legitimise impacts to on-site terrestrial habitats considered likely to be used by GCN.
- 4.82 The presence of the population has informed the development design to provide sufficient retained habitats for the proposed GCN mitigation and enhancement strategy. In summary, this strategy involves the trapping and translocating GCN from the appropriate development areas into a receptor site which is proposed within the north-west corner of the Main Site adjacent to the Upper Heyford airfield and the field in which ponds P38-P41 are located, with temporary exclusion fencing preventing any movement back into the developable area during the construction works.
- 4.83 New habitats which will include ponds, tussocky and wildflower grassland and native scrub planting will be incorporated into retained habitats within 0-50m of the offsite metapopulations which will provide terrestrial habitat and good connectivity into the wider landscape. Additional habitat enhancements will be provided by the provision of appropriate landscape planting, hibernacula and log piles, and long-term management of these areas.
- 4.84 The full details of the strategy are subject to reaching agreement with Natural England licensing which is currently underway through their Discretionary Advice Service (DAS) at the time of writing; however, there is sufficient opportunity within the site green infrastructures to accommodate appropriate habitat creation/enhancement to mitigate for the loss of GCN terrestrial habitats, and to provide an overall increase in the quantity and connectivity of optimal/high quality habitats over current levels. Consequently, it is considered that the proposed strategy is sufficient to compensate for the impacts of the development and will ensure the long-term maintenance of the FCS of this species. Full details are of the provided within the GCN survey report (FCPR, 2022).

Riparian Mammals

- 4.85 The Padbury Brook Tributary and Gagle Brook Tributary were considered to offer limited potential for otter and water vole due their low water level, their tendency to dry out completely, low levels of emergent/bankside plants and high levels of overshading. The Gagle Brook offered limited suitability for water vole due to the high level of overshading and lack of emergent/bankside vegetation. The Gagle Brook did offer some suitability for otter due to its larger size, and the presence of crayfish remains and a nearby hole indicate that otter may use this stretch of the brook. Otters have extensive territories which may extend up to 35km and 25km for males and females, respectively, hence it is considered somewhat likely that the Gagle Brook forms part of an otter territory.
- 4.86 It is recommended that a pre-works checking survey be carried out along the Gagle Brook prior to the commencement of any works affecting the watercourse or habitats within 8m of the watercourse.

- 4.87 The current plans indicate that the surveyed stretch of the Gaggle Brook will be used for infrastructure, and will most likely form the route of a road. The construction of a bridge will therefore be required. The use of clear-span bridges is recommended in order to minimise direct impacts to the brook. It is also recommended that a sensitive lighting scheme is implemented along the stretches of road which run close to/over the Gaggle Brook to minimise light spillage.
- 4.88 Pollution events could potentially impact water quality and sensitive bankside flora and so indirectly impact upon the local otter population. All standard site precautionary and best practice measures will be adopted to ensure that any potential pollution risk is minimised, and in the event one occurs procedures are in place and followed to ensure that a 'clean up' operation is enforced as soon as possible to reduce the significance and detrimental effect on otters and their habitats.
- 4.89 Appropriate good working practices should be adopted during construction to further reduce the risk of harm to individual otter. Prior to the commencement of works the location of site compounds and contractors access routes should be agreed with the ecologist and positioned to minimise disturbance to otters. Areas to avoid include an 8m width buffer around each of the above watercourses. The following key precautions should also be followed:
- Site operatives will be made aware of the presence of otters and the need for a duty of care when working in close proximity to Ramsley Brook, Diseworth Brook and Watercourse D12;
 - Pipes over 250mm in diameter will be capped overnight to prevent otters entering;
 - Where deep excavations are left open over-night, shallow, sloping batters and/or covers will be used to prevent animals becoming trapped in the working area; and
 - Working operations within the 20m of the above watercourses will be limited to daylight hours.
- 4.90 Depending on the outcome of the follow-up survey, additional recommendations/mitigation measures may be required, for example if it is considered that the observed hole is in use by otter.

Other Notable Species

- 4.91 A small number brown hare, a species of Principal Importance under S41 of the Natural Environment and Rural Communities (NERC) Act (2006), were recorded within the site during the survey work undertaken across the site.
- 4.92 Given the low numbers recorded, it is considered that the site is part of the wider range of the local brown hare population, whilst suitable habitat will remain present within the site surrounds. As such, brown hare are not considered to pose a constraint to the proposed development.
- 4.93 The site provides some suitable habitat for hedgehog, though given the wide availability of similar habitat and the surrounding countryside the loss of the site to development is not considered to have a significant effect of the resources available for this species. The potential presence of hedgehog is therefore not considered to be an ecological constraint.
- 4.94 Habitats including hedgerows and grassland vegetation present within the site are suitable for use by a range of common and widespread invertebrates, including the six butterfly species recorded during the site survey. Such habitats are common within the wider countryside however, as are the larval food plants including nettles, fine grasses and mustard plants. The loss of habitats of value to butterflies and other invertebrates can be mitigated and compensated for within the landscaping scheme, for example via the establishment of a smaller area of species-rich grassland. The inclusion of plug plants of the larval foodplants of butterflies associated with

the SSSI including small blue, brown argus, dark green fritillary, green hairstreak and Duke of Burgundy would also provide additional mitigation for any loss of habitat from within the SSSI. Plant species will include kidney vetch, common rock-rose *Helianthemum nummularium*, bird's-foot trefoil, common dog-violet *Vioa riviniana*, cowslip *Primula veris* and primrose *P.vulgaris*. Therefore, invertebrate species are not considered to be a constraint to the development.

Habitat Creation and Enhancement Recommendations

- 4.95 In line with the NPPF, it is recommended that the development results in a net gain in value for wildlife by incorporating biodiversity in and around the development via the use of ecological enhancement measures.
- 4.96 The Planning Layout includes the following opportunities within the scheme:
- Extensive semi-natural buffers along the western and northern boundaries to protect the retained areas of the adjacent designated sites. These areas are to comprise a mix of native scrub and woodland planting along with hedgerow and/or wildflower grassland creation to create a continuous green corridor linking around the site perimeter;
 - Areas of calcareous grassland will be provided within the Conservation Target Area on newly created areas of cutting banks with a more extensive area created in the north-west corner to provide mitigation for impacts on the SSSI;
 - Enhancement of the retained watercourses through complimentary planting and sympathetic management to provide a variety of bank top features and introduce microhabitats;
 - Conserved and enhanced planting and habitat creation around the retained buildings to be managed for biodiversity benefits; and
 - Opportunities to collect seed of meadow clary Schedule 8 plant and increase local population size within near areas of calcareous grassland.
- 4.97 In addition to the above, the following general recommendations are relevant for this specific site:
- Encouragement of planting of fruit tree and hedgerow shrubs to provide resources for invertebrates, including pollinating insects, and the fauna that preys upon them such as birds and bats;
 - Opportunities to provide a range of bat and bird boxes on suitable retained trees(see separate Bat and Breeding Bird Reports for full details);
 - Measures for protection of habitats (e.g. hedgerows, trees and ponds) during construction, and enhancement as part of the development proposals which will be provided as part of a Construction and Environmental Management Plan (CEMP) and Landscape and Ecological Management Plan (LEMP).

5.0 SUMMARY AND CONCLUSION

- 5.1 Ardley Cutting and Quarry SSSI is located adjacent to the northern site boundary and will be impacted by the proposed rail terminal link. Further detailed botanical surveys of the SSSI will be undertaken in order to inform a full mitigation strategy, which will include measures such as the creation of calcareous grassland within the proposed development, particularly along newly created cutting banks to the north of the rail terminal and within the north-west corner of the Main Site. Discussions are ongoing with Natural England through their DAS to confirm full mitigation requirements.
- 5.2 Ardley Road Verge Nature Reserve DWS is located within the south of the Main Site and there will be small amounts of direct habitat loss from the defunct pull-in road to facilitate a proposed footpath/cycle link. There will be opportunities to expand the population of the rare plant meadow clary that the DWS supports to receptor sites within the development area, and a mitigation strategy provided.
- 5.3 Hayford Airfield LWS is located adjacent to the western site boundary and will be buffered and protected from the proposed development by extensive linear areas of woodland and scrub planting around the site boundary which will be managed for wildlife in the long term.
- 5.4 The habitats within the site are dominated by managed agricultural land of no more than low ecological value and as such their loss is not a constraint to development. Habitats of greater ecological value will be retained where possible, with any losses mitigated through native woodland, scrub and hedgerow planting and the creation of areas of species-rich grassland, including areas of calcareous grassland within areas of open space and at the site boundaries.

- 5.6 A number of buildings within the site have been assessed as being of low to high suitability to support roosting bats. Building B1 supports a small common pipistrelle roost and B5 and B10 have high potential to support a similar roost, though none were confirmed during surveys. Across the Order Limits areas 70 trees were assessed as having low to high suitability to support roosting bats. Retained trees will be buffered and where possible incorporated into the wider green infrastructure. Any trees with moderate roost potential requiring removal will be felled in accordance with a method statement including precautionary nocturnal survey and/or aerial assessment. Should any roost be identified works to the relevant tree would commence only once a Natural England licence was obtained. Low potential trees that are to be lost to the development will be subject to soft felling techniques. No loss of trees with high roost potential is anticipated.
- 5.7 The site was recorded to support common and widespread foraging and commuting bats including small numbers of barbastelle, an Annex II species, and as such any habitat loss will be compensated through native species planting and an appropriate lighting scheme implemented.
- 5.8 Habitats within the site provide nesting opportunities for a range of bird species, with 19 notable species recorded within the site during the breeding bird surveys undertaken, including dunnock, skylark, yellowhammer, starling and yellow wagtail which were confirmed to be breeding. The proposed native species tree, shrub and grassland planting will compensate for habitat loss, and it

is recommended that compensatory breeding sites for barn owl, house sparrow and kestrel also be provided.

- 5.9 The site provides limited opportunities for reptiles, however small populations of common lizard, grass snake and a single slow worm were identified within the north of the Main Site within field margins south of the railway line. A precautionary vegetation clearance methodology will be followed to safeguard reptiles in the unlikely event of their presence at the time of construction.
- 5.10 Survey work to date has identified a small number of GCN within ponds P50 and P51 within the north of the proposed highway works which are to be retained and the population size is to be confirmed through ongoing surveys. The site largely comprises habitats of low suitability for this species and GCN have not been confirmed within any other onsite pond. Three GCN metapopulations border the site to the east and west however, therefore appropriate mitigation measures will be provided in accordance with the terms of a Natural England licence.
- 5.11 The opportunity exists to further enhance the habitats within the site which could include creation of native wildflower / calcareous grassland, woodland, ponds and hedgerows above and beyond that required to mitigate losses. Furthermore, the provision of bat and bird boxes on retained trees would provide enhanced roosting and nesting opportunities at the site level for a range of local fauna.

APPENDIX A: BOTANICAL SPECIES LIST

Common name	Scientific name	Abundance (DAFOR)
Arable and Field Margins		
Annual meadow-grass	<i>Poa annua</i>	LO/LF
Barley	<i>Hordeum vulgare</i>	LD
Barren brome	<i>Bromus sterilis</i>	LO/LF
Bird's-foot trefoil	<i>Lotus corniculatus</i>	R
Black medic	<i>Medicago lupulina</i>	R
Black-grass	<i>Alopecurus myosuroides</i>	R/LO
Bramble	<i>Rubus fruticosus</i>	R
Bristly ox-tongue	<i>Picris echioides</i>	R
Broad-leaved dock	<i>Rumex obtusifolius</i> agg.	R/O
Bulbous buttercup	<i>Ranunculus bulbosus</i>	R
Charlock	<i>Sinapis arvensis</i>	R
Cleavers	<i>Galium aparine</i>	R/O
Cock's-foot	<i>Dactylis glomerata</i>	R/O
Coltsfoot	<i>Tussilago farfara</i>	R
Common bent	<i>Agrostis capillaris</i>	LF
Common fumitory	<i>Fumaria officinalis</i>	R
Common knapweed	<i>Centaurea nigra</i>	R
Common mallow	<i>Malva sylvestris</i>	R
Common mouse-ear	<i>Cerastium fontanum</i>	R
Common nettle	<i>Urtica dioica</i>	R/LF
Common ragwort	<i>Jacobae vulgaris</i>	R
Cow parsley	<i>Anthriscus sylvestris</i>	R/LF
Cowslip	<i>Primula veris</i>	R
Creeping bent	<i>Agrostis stolonifera</i>	LF
Creeping buttercup	<i>Ranunculus repens</i>	R
Creeping soft-grass	<i>Holcus mollis</i>	R
Creeping thistle	<i>Cirsium arvense</i>	R
Curled dock	<i>Rumex crispus</i>	R
cut leaved crane's-bill	<i>Geranium dissectum</i>	R
Daisy	<i>Bellis perennis</i>	R
Dandelion	<i>Taraxacum</i> sp. agg.	R
Dove's-foot cranesbill	<i>Geranium molle</i>	R
False oat-grass	<i>Arrhenatherum elatius</i>	R/LA
Field bindweed	<i>convolvus arvensis</i>	LO
Field forget-me-not	<i>Myosotis arvensis</i>	R
Field madder	<i>Sherdaria arvensis</i>	R
Field pansy	<i>Viola arvensis</i>	R

Common name	Scientific name	Abundance (DAFOR)
Field scabious	<i>Knautia arvensis</i>	R
Field speedwell	<i>Veronica persica</i>	R
Flax	<i>Linum usitatissimum</i>	LA
Garlic mustard	<i>Alliaria petiolata</i>	R
Germander speedwell	<i>Veronica chamaedrys</i>	R
Goat's-Beard	<i>Aruncus diocius</i>	R
Greater plantain	<i>Plantago major</i>	R
Ground-ivy	<i>Glechoma hederacea</i>	R
Groundsel	<i>Senecio vulgaris</i>	R
Hawksbeard	<i>Crepis</i> sp.	R
Hedge woundwort	<i>Stachys sylvatica</i>	R
Hedgerow crane's-bill	<i>Geranium pyrenaicum</i>	R
Herb robert	<i>Geranium robertianum</i>	R
Hogweed	<i>Heracleum sphondylium</i>	R
Hop trefoil	<i>Trifolium campestre</i>	R
Lesser burdock	<i>Arctium minus</i>	R
Lesser stitchwort	<i>Stellaria graminea</i>	R
Lesser trefoil	<i>Trifolium dubium</i>	R
Meadow vetchling	<i>Lathyrus pratensis</i>	R
Mugwort	<i>Artemisia vulgaris</i>	R
Oat	<i>Avena sativa</i>	LD
Oxeye daisy	<i>Leucanthemum vulgare</i>	LO
Parsley piert	<i>Aphanes arvensis</i>	R
Perennial rye-grass	<i>Lolium perenne</i>	R
Rapeseed	<i>Brassica napus</i>	LD
Red fescue	<i>Festuca rubra</i> agg.	LO
Ribwort plantain	<i>Plantago lanceolata</i>	R
Rough meadow-grass	<i>Poa trivialis</i>	LO
Scarlet pimpernel	<i>Anagallis arvensis</i>	R
Scentless mayweed	<i>Tripleurospermum inodorum</i>	R
Shepherd's purse	<i>Capsella bursa-pastoris</i>	R
Smooth sow-thistle	<i>Sonchus olearaceus</i>	R/LF
Soft-brome	<i>Bromus hordeaceus</i>	O/LA
Spear thistle	<i>Cirsium vulgare</i>	R
Spotted medic	<i>Medicago arabica</i>	R
Sticky mouse-ear	<i>Cerastium glomeratum</i>	R
Thyme-leaved speedwell	<i>Veronica serpyllifolia</i>	R
Upright hedge parsley	<i>Torilis japonica</i>	R
Weld	<i>Reseda luteola</i>	R
Wheat	<i>Triticum</i> sp.	D

Common name	Scientific name	Abundance (DAFOR)
White campion	<i>Silene latifolia</i>	R
White clover	<i>Trifolium repens</i>	R
Wood avens	<i>Geum urbanum</i>	R
Woolly thistle	<i>Cirsium eriophorum</i>	R
Yarrow	<i>Achillea millefolium</i>	R
Yorkshire-fog	<i>Holcus lanatus</i>	R
Sticky mouse-ear	<i>Cerastium glomeratum</i>	R
Thyme-leaved speedwell	<i>Veronica serpyllifolia</i>	R
Upright hedge parsley	<i>Torilis japonica</i>	R
Weld	<i>Reseda luteola</i>	R
Wheat	<i>Triticum</i> sp.	D
White campion	<i>Silene latifolia</i>	R
White clover	<i>Trifolium repens</i>	R
Wood avens	<i>Geum urbanum</i>	R
Woolly thistle	<i>Cirsium eriophorum</i>	R
Yarrow	<i>Achillea millefolium</i>	R
Yorkshire-fog	<i>Holcus lanatus</i>	R
Improved Grassland		
Annual meadow-grass	<i>Poa annua</i>	F
Barren brome	<i>Bromus sterilis</i>	R/LO
Broad-leaved dock	<i>Rumex obtusifolius</i>	R
Bulbous buttercup	<i>Ranunculus bulbosus</i>	R
Cock's-foot	<i>Dactylis glomerata</i>	O/LF
Common chickweed	<i>Stellaria media</i>	LO
Common couch	<i>Elytrigia repens</i>	R
Common mouse-ear	<i>Cerastium fontanum</i>	R
Common nettle	<i>Urtica dioica</i>	LF
Common poppy	<i>Papaver rhoeas</i>	R
Cow parsley	<i>Anthriscus sylvestris</i>	LO
Creeping bent	<i>Agrostis stolonifera</i>	O
Creeping buttercup	<i>Ranunculus repens</i>	R
Creeping thistle	<i>Cirsium arvense</i>	R
Cuckoo flower	<i>Cardamine pratensis</i>	R
Curled dock	<i>Rumex crispus</i>	R
Cut-leaved crane's-bill	<i>Geranium dissectum</i>	R
Daisy	<i>Bellis perennis</i>	R
Dandelion	<i>Taraxacum</i> sp. agg.	R
Dove's-foot cranesbill	<i>Geranium molle</i>	R
False oat-grass	<i>Arrhenatherum elatius</i>	LO
Germander speedwell	<i>Veronica chamaedrys</i>	R

Common name	Scientific name	Abundance (DAFOR)
Ground-ivy	<i>Glechoma hederacea</i>	R
Hard rush	<i>Juncus inflexus</i>	R
Hedgerow crane's-bill	<i>Geranium pyrenaicum</i>	R
Hogweed	<i>Heracleum sphondylium</i>	R
Meadow foxtail	<i>Alopecurus pratensis</i>	R
Perennial rye-grass	<i>Lolium perenne</i>	A
Red fescue	<i>Festuca rubra</i> agg.	R
Ribwort plantain	<i>Plantago lanceolata</i>	R
Soft-brome	<i>Bromus hordeaceus</i>	LF
Spear thistle	<i>Cirsium vulgare</i>	R
White clover	<i>Trifolium repens</i>	LF
Wild teasel	<i>Dipsacus fullunum</i>	R
Yorkshire-fog	<i>Holcus lanatus</i>	R
Poor Semi-Improved Grassland		
Annual meadow-grass	<i>Poa annua</i>	LO
Barren brome	<i>Bromus sterilis</i>	LO
Bee orchid	<i>Ophrys apifera</i>	R
Bird's-foot trefoil	<i>Lotus corniculatus</i>	R
Bird's-foot trefoil	<i>Lotus corniculatus</i>	R
Black medic	<i>Medicago lupulina</i>	R/LF
Blackthorn	<i>Prunus spinosa</i>	R
Bramble	<i>Rubus fruticosus</i> agg.	R/LF
Bristly ox-tongue	<i>Picris echioides</i>	LO/LF
Broad-leaved dock	<i>Rumex obtusifolius</i>	R/LO
Bulbous buttercup	<i>Ranunculus bulbosus</i>	R
Canadian fleabane	<i>Erigeron canadensis</i>	R
Cat's-ear	<i>Hypochaeris radicata</i>	R
Cleavers	<i>Galium aparine</i>	R/LF
Cock's-foot	<i>Dactylis glomerata</i>	R/LF
Coltsfoot	<i>Tussilago farfara</i>	R
Common bent	<i>Agrostis capillaris</i>	LO/F
Common centaury	<i>Centaurea erythraea</i>	R
Common couch	<i>Elytrigia repens</i>	R
Common figwort	<i>Scrophularia nodosa</i>	R
Common knapweed	<i>Centaurea nigra</i>	R/LO
Common mallow	<i>Malva sylvestris</i>	R
Common mouse-ear	<i>Cerastium fontanum</i>	R/LO
Common nettle	<i>Urtica dioica</i>	R/LF
Common poppy	<i>Papaver rhoeas</i>	R
Common scurvy grass	<i>Cochlearia officinalis</i>	LF

Common name	Scientific name	Abundance (DAFOR)
Common sorrel	<i>Rumex acetosa</i>	R
Common vetch	<i>Vicia sativa</i>	R
Corn mint	<i>Mentha arvensis</i>	R
Cow parsley	<i>Anthriscus sylvestris</i>	R
Cow parsley	<i>Anthriscus sylvestris</i>	R
Cowslip	<i>Primula veris</i>	R
Creeping bent	<i>Agrostis stolonifera</i>	LO/LF
Creeping buttercup	<i>Ranunculus repens</i>	R/LO
Creeping cinquefoil	<i>Potentilla reptans</i>	R/LO
Creeping thistle	<i>Cirsium arvense</i>	R/LO
Crested dog's-tail	<i>Cynosurus cristatus</i>	R
Curled dock	<i>Rumex crispus</i>	R
Cut-leaved crane's-bill	<i>Geranium dissectum</i>	R
Daisy	<i>Bellis perennis</i>	R/LO
Dandelion	<i>Taraxacum</i> sp. agg.	R/LO
Dog rose	<i>Rosa canina</i> agg.	R
Dog's mercury	<i>Mercurialis perennis</i>	R
Dogwood	<i>Cornus sanguinea</i>	R
Dove's-foot cranesbill	<i>Geranium molle</i>	R
Elder	<i>Sambucus nigra</i>	R
False oat-grass	<i>Arrhenatherum elatius</i>	LF/LD
Field bindweed	<i>Convolvus arvensis</i>	R
Field forget-me-not	<i>Myosotis arvensis</i>	R/LO
Field horsetail	<i>Equisetum arvense</i>	R
Field speedwell	<i>Veronica persica</i>	R
Garlic mustard	<i>Alliaria petiolata</i>	R
Glaucous sedge	<i>Carex flacca</i>	R
Greater plantain	<i>Plantago major</i>	R
Green alkanet	<i>Pentaglottis sempervirens</i>	R
Ground-ivy	<i>Glechoma hederacea</i>	R/LO
Groundsel	<i>Senecio vulgaris</i>	R
Hard rush	<i>Juncus inflexus</i>	R
Hawk's-beard	<i>Crepis</i> sp.	R/LO
Hedge bedstraw	<i>Galium mollugo</i>	LO
Hedgerow crane's-bill	<i>Geranium pyrenaicum</i>	R
Hemlock	<i>Conium maculatum</i>	R
Herb-robert	<i>Geranium robertianum</i>	R
Hogweed	<i>Heracleum sphondylium</i>	R
Ivy	<i>Hedera helix</i>	O
Kidney vetch	<i>Anthyllis vulneraria</i>	R

Common name	Scientific name	Abundance (DAFOR)
Lady's bedstraw	<i>Galium verum</i>	R
Lesser burdock	<i>Arctium minus</i>	R
Lesser trefoil	<i>Trifolium dubium</i>	R/LO
Lords-and-ladies	<i>Arum maculatum</i>	O
Meadow barley	<i>Hordeum brachyantherum</i>	R/LO
Meadow fescue	<i>Festuca pratensis</i>	R
Meadow vetchling	<i>Lathyrus pratensis</i>	R
Mouse-ear hawkweed	<i>Hieracium pilosella</i>	LO
Mugwort	<i>Artemisia vulgaris</i>	R
Oxeye daisy	<i>Leucanthemum vulgare</i>	R/LF
Perennial rye-grass	<i>Lolium perenne</i>	R/LA
Perforate St John's-wort	<i>Hypericum perforatum</i>	R
Pineapple weed	<i>Matricaria discoidea</i>	R
Prickly sow-thistle	<i>Sonchus asper</i>	R
Purging buckthorn	<i>Rhamnus cathartica</i>	R
Pyramidal orchid	<i>Anacamptis pyramidalis</i>	R
Quaking grass	<i>Briza media</i>	R
Red campion	<i>Silene dioica</i>	R
Red clover	<i>Trifolium pratense</i>	R/LF
Red fescue	<i>Festuca rubra</i> agg.	R/LF
Red valerian	<i>Centranthus ruber</i>	R
Ribbed melilot	<i>Melilotus officinalis</i>	R
Ribwort plantain	<i>Plantago lanceolata</i>	R/LO
Rose	<i>Rosa</i> sp.	R
Rough chervil	<i>Chaerophyllum temulum</i>	LO
Rough meadow-grass	<i>Poa trivialis</i>	R
Scarlet pimpernel	<i>Anagallis arvensis</i>	R
Self-heal	<i>Prunella vulgaris</i>	R
Sheep sorrel	<i>Rumex acetosella</i>	R
Sheeps fescue	<i>Festuca ovina</i>	R
Shepherd's purse	<i>Capsella bursa-pastoris</i>	R
Smooth meadow-grass	<i>Poa pratensis</i>	R/LO
Smooth tare	<i>Vicia tetrasperma</i>	R
Soft-brome	<i>Bromus hordeaceus</i>	O/LF
Spear thistle	<i>Cirsium vulgare</i>	R
Spotted medic	<i>Medicago arabica</i>	LO
Sticky mouse-ear	<i>Cerastium glomeratum</i>	R
Sweet vernal grass	<i>Anthoxanthum odoratum</i>	LO
Tormentil	<i>Potentilla erecta</i>	R
Tufted hair-grass	<i>Deschampsia caespitosa</i>	R

Common name	Scientific name	Abundance (DAFOR)
Tufted vetch	<i>Vicia cracca</i>	LO
Upright brome	<i>Bromus erectus</i>	R
Wall barley	<i>Hordeum murinum</i>	R
Wall speedwell	<i>Veronica arvensis</i>	R
White clover	<i>Trifolium repens</i>	R
White clover	<i>Trifolium repens</i>	R/LO
Wild carrot	<i>Daucus carota</i>	R/LO
Wild parsnip	<i>Pastinaca sativa</i>	R/LO
Wild teasel	<i>Dipsacus follunum</i>	R
Willowherb	<i>Epibolium</i> sp.	O/LD
Wood bitter vetch	<i>Vicia orobus</i>	R
Woolly thistle	<i>Cirsium eriophorum</i>	R
Yarrow	<i>Achillea millefolium</i>	R
Yellow oat-grass	<i>Trisetum flavescens</i>	R/LO
Yellow rattle	<i>Rhinanthus minor</i>	R
Yorkshire-fog	<i>Holcus lanatus</i>	R/LO
Species-Poor Road Verges		
Autumn hawkbit	<i>Scorzoneroides autumnalis</i>	R
Bird's-foot trefoil	<i>Lotus corniculatus</i>	R
Bittersweet	<i>Solanum dulcamara</i>	R
Black medic	<i>Medicago lupulina</i>	R
Bramble	<i>Rubus fruticosus</i> agg.	R
Bristly ox-tongue	<i>Picris echioides</i>	LO
Bush vetch	<i>Vicia sepium</i>	R
Cock's-foot	<i>Dactylis glomerata</i>	R/LA
Common knapweed	<i>Centaurea nigra</i>	R/LO
Common nettle	<i>Urtica dioica</i>	R
Common ragwort	<i>Jacobae vulgaris</i>	R/LO
Common sorrel	<i>Rumex acetosa</i>	R
Cow parsley	<i>Anthriscus sylvestris</i>	LF
Creeping bent	<i>Agrostis stolonifera</i>	LF
Creeping buttercup	<i>Ranunculus repens</i>	R
Creeping cinquefoil	<i>Potentilla reptans</i>	R
Creeping thistle	<i>Cirsium arvense</i>	R
Curled dock	<i>Rumex crispus</i>	R
Dandelion	<i>Taraxacum</i> sp. agg.	O/F
Dove's-foot cranesbill	<i>Geranium molle</i>	R
False oat-grass	<i>Arrhenatherum elatius</i>	O/LF
Fat hen	<i>Chenopodium album</i>	R
Field bindweed	<i>Convolvus arvensis</i>	LO

Common name	Scientific name	Abundance (DAFOR)
Field forget-me-not	<i>Myosotis sylvatica</i>	R
Greater burnet	<i>Sanguisorba officinalis</i>	R
Greater knapweed	<i>Centaurea scabiosa</i>	R
Harebell	<i>Campanula rotundifolia</i>	R
Hare's-foot clover	<i>Trifolium arvense</i>	R
Hedge bedstraw	<i>Galium mollugo</i>	LF
Hogweed	<i>Heracleum sphondylium</i>	R
Large bindweed	<i>Calystegia sylvaticum</i>	LO
Meadow vetchling	<i>Lathyrus pratensis</i>	LO
Mugwort	<i>Artemisia vulgaris</i>	R
Oxeye daisy	<i>Leucanthemum vulgare</i>	R/LF
Perennial rye-grass	<i>Lolium perenne</i>	LO/LA
Perforate St John's-wort	<i>Hypericum perforatum</i>	R
Pyramidal orchid	<i>Anacamptis pyramidalis</i>	R
Red clover	<i>Trifolium pratense</i>	R
Red fescue	<i>Festuca rubra</i> agg.	R/LF
Ribwort plantain	<i>Plantago lanceolata</i>	LO/F
Rough meadow-grass	<i>Poa trivialis</i>	LO
Smaller cat's-tail	<i>Phleum bertolonii</i>	R
Smooth sow-thistle	<i>Sonchus olearaceus</i>	R
Spear thistle	<i>Cirsium vulgare</i>	R
St John's Wort	<i>Hypericum perforatum</i>	R
Timothy	<i>Phleum pratense</i>	LF
White clover	<i>Trifolium repens</i>	O
Wild carrot	<i>Daucus carota</i>	R
Wild parsnip	<i>Pastinaca sativa</i>	R
Yarrow	<i>Achillea millefolium</i>	R/LO
Yellow oat-grass	<i>Trisetum flavescens</i>	R
Yorkshire-fog	<i>Holcus lanatus</i>	R
Semi-Improved Neutral Grassland		
Autumn hawkbit	<i>Scorzoneroides autumnalis</i>	R
Bird's-foot trefoil	<i>Lotus corniculatus</i>	R/LF
Black medic	<i>Medicago lupulina</i>	O/LF
Bramble	<i>Rubus fruticosus</i> agg.	R/LF
Bristly ox-tongue	<i>Picris echioides</i>	R
Broad-leaved dock	<i>Rumex obtusifolius</i>	R
Canadian fleabane	<i>Erigeron canadensis</i>	R
Clustered dock	<i>Rumex conglomeratus</i>	R
Cock's-foot	<i>Dactylis glomerata</i>	R/LO
Common centaury	<i>Centaureum erythraea</i>	R

Common name	Scientific name	Abundance (DAFOR)
Common couch	<i>Elytrigia repens</i>	R
Common knapweed	<i>Centaurea nigra</i>	R/LF
Common mouse-ear	<i>Cerastium fontanum</i>	R
Common nettle	<i>Urtica dioica</i>	R
Common ragwort	<i>Jacobae vulgaris</i>	R/LO
Common vetch	<i>Vicia sativa</i>	R
Creeping bent	<i>Agrostis stolonifera</i>	LO/LF
Creeping buttercup	<i>Ranunculus repens</i>	O
Creeping cinquefoil	<i>Potentilla reptans</i>	LO
Creeping thistle	<i>Cirsium arvense</i>	R/O
Crested dog's-tail	<i>Cynosurus cristatus</i>	R
Curled dock	<i>Rumex crispus</i>	R
Cut-leaved crane's-bill	<i>Geranium dissectum</i>	R
Dandelion	<i>Taraxacum</i> sp. agg.	R
Dog rose	<i>Rosa canina</i> agg.	R
False oat-grass	<i>Arrhenatherum elatius</i>	O/LA
Field bindweed	<i>Convolvus arvensis</i>	R
Field forget-me-not	<i>Myosotis arvensis</i>	R
Field maple	<i>Acer campestre</i>	R
Field scabious	<i>Knautia arvensis</i>	R
Giant horsetail	<i>Equisetum telmateia</i>	LF
Glaucous sedge	<i>Carex flacca</i>	R
Great burnet	<i>Sanguisorba officianalis</i>	R
Greater plantain	<i>Plantago major</i>	R
Ground-ivy	<i>Glechoma hederacea</i>	R/LO
Hairy tare	<i>Vicia hirsuta</i>	R
Hard rush	<i>Juncus inflexus</i>	R
Hawthorn	<i>Crataegus monogyna</i>	R
Hop trefoil	<i>Trifolium campestre</i>	R
Lady's bedstraw	<i>Galium verum</i>	R
Marsh bedstraw	<i>Galium palustre</i>	R
Mouse-ear hawkweed	<i>Hieracium pilosella</i>	R
Oxeye daisy	<i>Leucanthemum vulgare</i>	R/LF
Perennial rye-grass	<i>Lolium perenne</i>	R
Perforate St John's-wort	<i>Hypericum perforatum</i>	R
Red clover	<i>Trifolium pratense</i>	R
Red fescue	<i>Festuca rubra</i> agg.	LO/LF
Red valerian	<i>Centranthus ruber</i>	R
Ribwort plantain	<i>Plantago lanceolata</i>	R
Rose	<i>Rosa</i> sp.	R

Common name	Scientific name	Abundance (DAFOR)
Rough meadow-grass	<i>Poa trivialis</i>	R/LO
Self-heal	<i>Prunella vulgaris</i>	R
Sheeps fescue	<i>Festuca ovina</i>	R
Silverweed	<i>Potentilla anserina</i>	LF
Smaller cat's-tail	<i>Phleum bertolonii</i>	LO
Smooth meadow-grass	<i>Poa pratensis</i>	R
Soft-brome	<i>Bromus hordeaceus</i>	LO
Spear thistle	<i>Cirsium vulgare</i>	R
Weld	<i>Reseda luteola</i>	R
White clover	<i>Trifolium repens</i>	R/LO
Wild carrot	<i>Daucus carota</i>	R/LF
Wild parsnip	<i>Pastinaca sativa</i>	R/LO
Wild teasel	<i>Dipsacus follunum</i>	R
Woolly thistle	<i>Cirsium eriophorum</i>	LO
Yarrow	<i>Achillea millefolium</i>	R/LF
Yellow oat-grass	<i>Trisetum flavescens</i>	LO/LF
Yorkshire-fog	<i>Holcus lanatus</i>	R/LF
Target Note 6		
Annual meadow-grass	<i>Poa annua</i>	LO
Autumn hawkbit	<i>Scorzoneroides autumnalis</i>	R
Bee orchid	<i>Ophrys apifera</i>	R
Bird's-foot trefoil	<i>Lotus corniculatus</i>	R
Black medic	<i>Medicago lupulina</i>	R
Blackthorn	<i>Prunus spinosa</i>	R
Bramble	<i>Rubus fruticosus</i> agg.	R
Cat's-ear	<i>Hypochaeris radicata</i>	LO
Cock's-foot	<i>Dactylis glomerata</i>	O
Common couch	<i>Elytrigia repens</i>	LA
Common knapweed	<i>Centaurea nigra</i>	R
Common mouse-ear	<i>Cerastium fontanum</i>	R
Common nettle	<i>Urtica dioica</i>	R
Common ragwort	<i>Jacobae vulgaris</i>	LO
Creeping bent	<i>Agrostis stolonifera</i>	LO/LF
Creeping buttercup	<i>Ranunculus repens</i>	R
Creeping cinquefoil	<i>Potentilla reptans</i>	R
Creeping thistle	<i>Cirsium arvense</i>	O
Crested dog's-tail	<i>Cynosurus cristatus</i>	R
Curled dock	<i>Rumex crispus</i>	R
Dandelion	<i>Taraxacum</i> sp. agg.	R
False oat-grass	<i>Arrhenatherum elatius</i>	F/LA

Common name	Scientific name	Abundance (DAFOR)
False-foxtail sedge	<i>Carex vulpina</i>	R
Germander speedwell	<i>Veronica chamaedrys</i>	R
Greater plantain	<i>Plantago major</i>	R
Hawthorn	<i>Crataegus monogyna</i>	R
Hedgerow crane's-bill	<i>Geranium pyrenaicum</i>	R
Meadow barley	<i>Hordeum brachyantherum</i>	R
Mouse-ear hawkweed	<i>Hieracium pilosella</i>	R
Oxeye daisy	<i>Leucanthemum vulgare</i>	R
Perennial rye-grass	<i>Lolium perenne</i>	R
Perforate St John's-wort	<i>Hypericum perforatum</i>	R
Prickly lettuce	<i>Lactuca serriola</i>	R
Red clover	<i>Trifolium pratense</i>	R
Red fescue	<i>Festuca rubra</i> agg.	R/LO
Ribwort plantain	<i>Plantago lanceolata</i>	R
Rough meadow-grass	<i>Poa trivialis</i>	R
Sheeps fescue	<i>Festuca ovina</i>	R
Soft-brome	<i>Bromus hordeaceus</i>	LO
Spear thistle	<i>Cirsium vulgare</i>	R
Timothy	<i>Phleum pratense</i>	R/O
Upright brome	<i>Bromus erectus</i>	R
Wild carrot	<i>Daucus carota</i>	R/LF
Wild parsnip	<i>Pastinaca sativa</i>	R/LO
Wild teasel	<i>Dipsacus fullonum</i>	R
Woolly thistle	<i>Cirsium eriophorum</i>	LO
Yarrow	<i>Achillea millefolium</i>	R/LF
Yellow oat-grass	<i>Trisetum flavescens</i>	R
Yorkshire-fog	<i>Holcus lanatus</i>	R/O
Target Note 7		
Autumn hawkbit	<i>Scorzoneroides autumnalis</i>	R/LF
Bird's-foot trefoil	<i>Lotus corniculatus</i>	R
Black medic	<i>Medicago lupulina</i>	LF
Bramble	<i>Rubus fruticosus</i> agg.	R/LF
Bristly ox-tongue	<i>Picris echioides</i>	R
Cleavers	<i>Galium aparine</i>	R
Cock's-foot	<i>Dactylis glomerata</i>	LF
Common centaury	<i>Centaurium erythraea</i>	R
Common knapweed	<i>Centaurea nigra</i>	R/LF
Common mallow	<i>Malva sylvestris</i>	R
Common mouse-ear	<i>Cerastium fontanum</i>	R
Common nettle	<i>Urtica dioica</i>	R/LO

Common name	Scientific name	Abundance (DAFOR)
Common poppy	<i>Papaver rhoeas</i>	R
Common ragwort	<i>Jacobae vulgaris</i>	R/O
Common vetch	<i>Vicia sativa</i>	R
Cowslip	<i>Primula veris</i>	R
Creeping thistle	<i>Cirsium arvense</i>	R/LF
Crested dog's-tail	<i>Cynosurus cristatus</i>	R
Curled dock	<i>Rumex crispus</i>	R
Cut-leaved crane's-bill	<i>Geranium dissectum</i>	LO
Daisy	<i>Bellis perennis</i>	R
Dandelion	<i>Taraxacum</i> sp. agg.	R
False oat-grass	<i>Arrhenatherum elatius</i>	F
Field bindweed	<i>Convolvus arvensis</i>	LO
Germander speedwell	<i>Veronica chamaedrys</i>	R
Hemlock	<i>Conium maculatum</i>	R
Hogweed	<i>Heracleum sphondylium</i>	R
Mint	<i>Mentha</i> sp.	R
Oxeye daisy	<i>Leucanthemum vulgare</i>	LF
Perforate St John's-wort	<i>Hypericum perforatum</i>	R
Pyramidal orchid	<i>Anacamptis pyramidalis</i>	LO
Ribwort plantain	<i>Plantago lanceolata</i>	LO/F
Rough meadow-grass	<i>Poa trivialis</i>	R/LO
Scentless mayweed	<i>Tripleurospermum inodorum</i>	LO
Self-heal	<i>Prunella vulgaris</i>	F
Silverweed	<i>Potentilla anserina</i>	LO
Spear thistle	<i>Cirsium vulgare</i>	R
White campion	<i>Silene latifolia</i>	R
White clover	<i>Trifolium repens</i>	R/LF
Wild parsnip	<i>Pastinaca sativa</i>	R
Wild teasel	<i>Dipsacus follunum</i>	R/LO
Willowherb	<i>Epibolium</i> sp.	R
Yarrow	<i>Achillea millefolium</i>	LO
Yellow oat-grass	<i>Trisetum flavescens</i>	R
Yellow toadflax	<i>Linaria vulgaris</i>	R
Yorkshire-fog	<i>Holcus lanatus</i>	R
Target Note 8		
Agrimony	<i>Agrimonia</i>	R
Bird's-foot trefoil	<i>Lotus corniculatus</i>	O
Black medic	<i>medicago lupulina</i>	F
Bramble	<i>Rubus fruticosus</i> agg.	R
Bristly ox-tongue	<i>Helminthotheca echioides</i>	R

Common name	Scientific name	Abundance (DAFOR)
Cocks-foot	<i>Dactylis glomerata</i>	LO
Common broomrape	<i>Orobanche minor</i>	R
Common cat's-ear	<i>Hypochaeris radicata</i>	R
Common centaury	<i>Centaureum erythraea</i>	R
Common knapweed	<i>Centaurea nigra</i>	R
Common ragwort	<i>Jacobaea vulgaris</i>	R
Common vetch	<i>Vicia sativa</i>	R
Crested dog's-tail	<i>Cynosurus cristatus</i>	O
Curled dock	<i>Rumex crispus</i>	R
Cut-leaved crane's-bill	<i>Geranium dissectum</i>	R
Dandelion	<i>Taraxacum</i> sp. agg.	R
Dog rose	<i>Rosa canina</i> agg.	R
False oat-grass	<i>Arrhenatherum elatius</i>	O
Field bindweed	<i>Convolvulus arvensis</i>	R
Field forget-me-not	<i>Myosotis arvensis</i>	R
Goat's-Beard	<i>Aruncus diocius</i>	R
Grass vetchling	<i>Lathyrus nissolia</i>	R
Hawthorn saplings	<i>Crataegus monogyna</i>	R
Hogweed	<i>Heracleum sphondylium</i>	R
Honeysuckle	<i>Lonicera periclymenum</i>	R
Ox-eye daisy	<i>Leucanthemum vulgare</i>	F
Pyramidal orchid	<i>Anacamptis pyramidalis</i>	R
Red clover	<i>Trifolium pratense</i>	R
Red fescue	<i>Festuca rubra</i> agg.	LO
Ribwort plantain	<i>Plantago planceolata</i>	O
Rough hawksbeard	<i>Crepis biennis</i>	LO
Self-heal	<i>Prunella vulgaris</i>	R
Smooth tare	<i>Ervum tetraspermum</i>	R
Soft brome	<i>Bromus hordeaceus</i>	R
Spear thistle	<i>Cirsium vulgare</i>	R
Wild carrot	<i>Daucus carota</i>	R
Wild mignonette	<i>Reseda lutea</i>	R
Wild parsnip	<i>Pastinaca sativa</i>	R
Woolly thistle	<i>Cirsium eriophorum</i>	R
Yarrow	<i>Achillea millefolium</i>	R
Yellow oat-grass	<i>Trisetum flavescens</i>	F
Yellow rattle	<i>Rhinanthus minor</i>	R
Yorkshire fog	<i>Holcus lanatus</i>	O
Rough hawksbeard	<i>Crepis biennis</i>	LO
Self-heal	<i>Prunella vulgaris</i>	R

Common name	Scientific name	Abundance (DAFOR)
Smooth tare	<i>Ervum tetraspermum</i>	R
Soft brome	<i>Bromus hordeaceus</i>	R
Spear thistle	<i>Cirsium vulgare</i>	R
Wild carrot	<i>Daucus carota</i>	R
Wild mignonette	<i>Reseda lutea</i>	R
Wild parsnip	<i>Pastinaca sativa</i>	R
Woolly thistle	<i>Cirsium eriophorum</i>	R
Yarrow	<i>Achillea millefolium</i>	R
Yellow oat-grass	<i>Trisetum flavescens</i>	F
Yellow rattle	<i>Rhinanthus minor</i>	R
Yorkshire fog	<i>Holcus lanatus</i>	O
Ardley Road Verge Nature Reserve DWS		
Agrimony	<i>Agrimonia eupatoria</i>	R
Ash	<i>Fraxinus excelsior</i>	R
Bittersweet	<i>Solanum dulcamara</i>	R
Black horehound	<i>Ballota nigra</i>	LO
Black medic	<i>Medicago lupulina</i>	LO
Blackthorn	<i>Prunus spinosa</i>	LF
Bloody crane's-bill	<i>Geranium sanguineum</i>	R
Bramble	<i>Rubus fruticosus</i> agg.	LF
Cock's-foot	<i>Dactylis glomerata</i>	R
Common comfrey	<i>Symphytum officinale</i>	R
Common knapweed	<i>Centaurea nigra</i>	R
Common mouse-ear	<i>Cerastium fontanum</i>	R
Common nettle	<i>Urtica dioica</i>	LO
Common ragwort	<i>Jacobae vulgaris</i>	R
Creeping buttercup	<i>Ranunculus repens</i>	R
Creeping cinquefoil	<i>Potentilla reptans</i>	LO
Creeping thistle	<i>Cirsium arvense</i>	R
Dandelion	<i>Taraxacum</i> sp. agg.	R
Dog rose	<i>Rosa canina</i> agg.	R
Dove's-foot cranesbill	<i>Geranium molle</i>	R
Elder	<i>Sambucus nigra</i>	LO
False oat-grass	<i>Arrhenatherum elatius</i>	LF
Fat hen	<i>Chenopodium album</i>	R
Field bindweed	<i>Convolvus arvensis</i>	LO
Field forget-me-not	<i>Myosotis arvensis</i>	R
Field maple	<i>Acer campestre</i>	R
Field scabious	<i>Knautia arvensis</i>	R
Germander speedwell	<i>Veronica chamaedrys</i>	LO

Common name	Scientific name	Abundance (DAFOR)
Greater knapweed	<i>Centaurea scabiosa</i>	LO
Ground-ivy	<i>Glechoma hederacea</i>	LF
Hawthorn	<i>Crataegus monogyna</i>	O
Hedge bindweed	<i>Calystegia sepium</i>	R
Hedgerow crane's-bill	<i>Geranium pyrenaicum</i>	LO
Herb-robert	<i>Geranium robertianum</i>	R
Hogweed	<i>Heracleum sphondylium</i>	R
Honeysuckle	<i>Lonicera periclymenum</i>	R
Mugwort	<i>Artemisia vulgaris</i>	LO
Meadow clary	<i>Salvia pratensis</i>	R
Mullein	<i>Verbascum</i> sp.	R
Night-flowering catchfly	<i>Silene noctiflora</i>	R
Perforate St John's-wort	<i>Hypericum perforatum</i>	LO
Primrose	<i>Primula vulgaris</i>	R
Privet	<i>Ligustrum vulgare</i>	LO
Purging buckthorn	<i>Rhamnus cathartica</i>	R
Red clover	<i>Trifolium pratense</i>	LO
Ribwort plantain	<i>Plantago lanceolata</i>	R
rago willowherb	<i>Chamaenerion angustifolium</i>	LF
Smooth sow-thistle	<i>Sonchus olearaceus</i>	R
Spear thistle	<i>Cirsium vulgare</i>	R
Tor grass	<i>Brachypodium pinnatum</i>	R
Treacle mustard	<i>Erysimum cheiranthoide</i>	R
Violet	<i>Viola</i> sp.	R
Woolly thistle	<i>Cirsium eriophorum</i>	R
Yarrow	<i>Achillea millefolium</i>	LF
Yellow toadflax	<i>Linaria vulgaris</i>	R
TN10		
Agrimony	<i>Agrimonia eupatoria</i>	R
Annual meadow-grass	<i>Poa annua</i>	LO
Black medic	<i>Medicago lupulina</i>	LO
Bladder campion	<i>Silene vulgaris</i>	R
Bramble	<i>Rubus fruticosus</i> agg.	LO
Charlock	<i>Sinapis arvensis</i>	R
Common comfrey	<i>Symphytum officinale</i>	O
Common knapweed	<i>Centaurea nigra</i>	R
Common nettle	<i>Urtica dioica</i>	F
Common vetch	<i>Vicia sativa</i>	R
Cow parsley	<i>Anthriscus sylvestris</i>	LO
Creeping thistle	<i>Cirsium arvense</i>	O

Common name	Scientific name	Abundance (DAFOR)
Dandelion	<i>Taraxacum</i> sp. agg.	R
Field forget-me-not	<i>Myosotis arvensis</i>	R
Garlic mustard	<i>Alliaria petiolata</i>	LF
Green alkanet	<i>Pentaglottis sempervirens</i>	R
Ground-ivy	<i>Glechoma hederacea</i>	ON
Hairy bittercress	<i>Cardamine hirsuta</i>	R
Hare's-foot clover	<i>Trifolium arvense</i>	LF
Hemlock	<i>Conium maculatum</i>	O
Hogweed	<i>Heracleum sphondylium</i>	R
Lady's bedstraw	<i>Galium verum</i>	R
Lesser burdock	<i>Arctium minus</i>	R
Meadow cranesbill	<i>Geranium pratense</i>	R
Mullein	<i>Verbascum</i> sp.	R
Oxeye daisy	<i>Leucanthemum vulgare</i>	R
Ribwort plantain	<i>Plantago lanceolata</i>	R
Spear thistle	<i>Cirsium vulgare</i>	R
Sticky mouse-ear	<i>Cerastium glomeratum</i>	R
Wall speedwell	<i>Veronica arvensis</i>	R
Weld	<i>Reseda luteola</i>	R
Wetted thistle	<i>Carduus crispus</i>	R
Wild teasel	<i>Dipsacus follunum</i>	R
Yarrow	<i>Achillea millefolium</i>	R
Main Site Scrub and Trees		
Ash	<i>Fraxinus excelsior</i>	O
Apple	<i>Malus</i> sp.	R
Beech	<i>Fagus sylvatica</i>	R
Blackthorn	<i>Prunus spinosa</i>	O
Bramble	<i>Rubus fruticosus</i> agg.	D
Butterfly-bush	<i>Buddleia davidii</i>	R
Cherry	<i>Prunus</i> sp.	R
Cleavers	<i>Galium aparine</i>	LO
Common lime	<i>Tilia x europaea</i>	R
Common nettle	<i>Urtica dioica</i>	LF
Dog rose	<i>Rosa canina</i> agg.	O
Dog's mercury	<i>Mercurialis perennis</i>	LO
Dogwood	<i>Cornus sanguinea</i>	R
Elder	<i>Sambucus nigra</i>	O
Elm	<i>Ulmus</i> sp.	R
English oak	<i>Quercus robur</i>	O/F
European larch	<i>Larix decidua</i>	R

Common name	Scientific name	Abundance (DAFOR)
False oat-grass	<i>Arrhenatherum elatius</i>	O
False-brome	<i>Brachypodium sylvaticum</i>	LF
Field maple	<i>Acer campestre</i>	O
Garlic mustard	<i>Alliaria petiolata</i>	LO
Goat willow	<i>Salix caprea</i>	R
Great willowherb	<i>Epilobium hirsutum</i>	R
Ground-ivy	<i>Glechoma hederacea</i>	LF
Hawthorn	<i>Crataegus monogyna</i>	O
Hazel	<i>Corylus avellana</i>	O
Hedge bindweed	<i>Calystegia sepium</i>	R
Hemlock	<i>Conium maculatum</i>	R
Hogweed	<i>Heracleum sphondylium</i>	LO
Horse-chestnut	<i>Aesculus hippocastanum</i>	F
Hybrid crack willow	<i>Salix x fragilis</i>	R
Ivy	<i>Hedera helix</i>	LF
Lesser burdock	<i>Arctium minus</i>	R
Leyland cypress	<i>Cupressocyparis leylandii</i>	R
Lords-and-ladies	<i>Arum maculatum</i>	R
Mint	<i>Mentha</i> sp.	R
Red dead-nettle	<i>Lamium purpureum</i>	R
Rough meadow-grass	<i>Poa trivialis</i>	R
Scots pine	<i>Pinus sylvestris</i>	R
Spear thistle	<i>Cirsium vulgare</i>	R
Wetted thistle	<i>Carduus crispus</i>	R
Wood dock	<i>Rumex sanguineus</i>	R
Yorkshire-fog	<i>Holcus lanatus</i>	LO
Highway Works Scrub		
Ash	<i>Fraxinus excelsior</i>	R/O
Barren brome	<i>Bromus sterilis</i>	R
Blackthorn	<i>Prunus spinosa</i>	R/F
Bramble	<i>Rubus fruticosus</i> agg.	LF
Canadian fleabane	<i>Erigeron canadensis</i>	R
Cleavers	<i>Galium aparine</i>	LO
Cock's-foot	<i>Dactylis glomerata</i>	R
Common centaury	<i>Centaurium erythraea</i>	R
Common lime	<i>Tilia x europaea</i>	R
Common nettle	<i>Urtica dioica</i>	R/O
Common ragwort	<i>Jacobae vulgaris</i>	R
Cotoneaster	<i>Cotoneaster</i> sp.	LF
Crab apple	<i>Malus sylvestris</i>	R

Common name	Scientific name	Abundance (DAFOR)
Creeping thistle	<i>Cirsium arvense</i>	R
Dog rose	<i>Rosa canina</i> agg.	R
Dog's mercury	<i>Mercurialis perennis</i>	R
Dogwood	<i>Cornus sanguinea</i>	O/LF
Elder	<i>Sambucus nigra</i>	O/F
Elm	<i>Ulmus minor</i>	F
False oat-grass	<i>Arrhenatherum elatius</i>	O/LF
False-brome	<i>Brachypodium sylvaticum</i>	R
Field maple	<i>Acer campestre</i>	O/F
Garlic mustard	<i>Alliaria petiolata</i>	LO/LA
Goat willow	<i>Salix caprea</i>	R
Ground-ivy	<i>Glechoma hederacea</i>	LO/F
Gelder rose	<i>Viburnum opulus</i>	R
Hawthorn	<i>Crataegus monogyna</i>	O/LF
Hazel	<i>Corylus avellana</i>	R/O
Hedge woundwort	<i>Stachys sylvatica</i>	R
Hemlock	<i>Conium maculatum</i>	LO
Hornbeam	<i>Carpinus betulus</i>	O
Ivy	<i>Hedera helix</i>	LO
Lesser burdock	<i>Arctium minus</i>	R
Mouse-ear hawkweed	<i>Hieracium pilosella</i>	R
Mugwort	<i>Artemisia vulgaris</i>	LO
Oxeye daisy	<i>Leucanthemum vulgare</i>	LF
Perforate St John's-wort	<i>Hypericum perforatum</i>	R
Privet	<i>Ligustrum vulgare</i>	O
Purging blackthorn	<i>Rhamnus cathartica</i>	R
Red fescue	<i>Festuca rubra</i> agg.	F
Ribwort plantain	<i>Plantago lanceolata</i>	R
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	LO
Rough chervil	<i>Chaerophyllum temulum</i>	R
Rough meadow-grass	<i>Poa trivialis</i>	LF
Silver birch	<i>Betula pendula</i>	R
Spindle	<i>Euonymus europaeus</i>	R
Sycamore	<i>Acer pseudoplatanus</i>	R
Viburnum	<i>Viburnum</i> sp.	R
White bryony	<i>Bryonia alba</i>	R
White campion	<i>Silene latifolia</i>	R
Wild carrot	<i>Daucus carota</i>	F
Wild cherry	<i>Prunus avium</i>	A
Wild parsnip	<i>Pastinaca sativa</i>	R

Common name	Scientific name	Abundance (DAFOR)
Hedgerows		
Ash	<i>Fraxinus excelsior</i>	LO
Barren brome	<i>Bromus sterilis</i>	R
Bittersweet	<i>Solanum dulcamara</i>	R
Black bryony	<i>Dioscorea communis</i>	R
Blackthorn	<i>Prunus spinosa</i>	LF
Bramble	<i>Rubus fruticosus</i> agg.	LO
Cleavers	<i>Galium aparine</i>	LO
Common nettle	<i>Urtica dioica</i>	LF
Common poppy	<i>Papaver rhoeas</i>	R
Cow parsley	<i>Anthriscus sylvestris</i>	LF
Creeping thistle	<i>Cirsium arvense</i>	LO
Dog rose	<i>Rosa canina</i> agg.	R
Dog's mercury	<i>Mercurialis perennis</i>	R
Dogwood	<i>Cornus sanguinea</i>	R
Elder	<i>Sambucus nigra</i>	O
English oak	<i>Quercus robur</i>	R
False oat-grass	<i>Arrhenatherum elatius</i>	LF
Field maple	<i>Acer campestre</i>	O
Fool's water-cress	<i>Helosciadium nodiflorum</i>	R
Garlic mustard	<i>Alliaria petiolata</i>	LO
Germander speedwell	<i>Veronica chamaedrys</i>	R
Goat's-beard	<i>Aruncus diocius</i>	R
Great willowherb	<i>Epilobium hirsutum</i>	R
Ground-ivy	<i>Glechoma hederacea</i>	LO
Hawthorn	<i>Crataegus monogyna</i>	A
Hazel	<i>Corylus avellana</i>	R
Hedge bindweed	<i>Calystegia sepium</i>	R
Hemlock	<i>Conium maculatum</i>	R
Herb-robert	<i>Geranium robertianum</i>	R
Hogweed	<i>Heracleum sphondylium</i>	R
Honeysuckle	<i>Lonicera periclymenum</i>	R
Hornbeam	<i>Carpinus betulus</i>	R
Horse-chestnut	<i>Aesculus hippocastanum</i>	R
Ivy	<i>Hedera helix</i>	LO
Meadow crane's-bill	<i>Geranium pratense</i>	R
Purging buckthorn	<i>Rhamnus cathartica</i>	R
Rose	<i>Rosa</i> sp.	R
Rough chervil	<i>Chaerophyllum temulum</i>	R
Spear thistle	<i>Cirsium vulgare</i>	LO

Common name	Scientific name	Abundance (DAFOR)
Spindle	<i>Euonymus europaeus</i>	R
Sycamore	<i>Acer pseudoplatanus</i>	O
Traveller's-joy	<i>Clematis vitalba</i>	R
Violet	<i>Viola</i> sp.	R
White bryony	<i>Bryonia alba</i>	R
Willow	<i>Salix</i> sp.	R
Main Site Plantation Woodland		
Alder	<i>Alnus glutinosa</i>	R
Ash	<i>Fraxinus excelsior</i>	O/F
Barren brome	<i>Bromus sterilis</i>	LF
Bearded couch	<i>Elymus caninus</i>	R
Beech	<i>Fagus sylvatica</i>	R
Blackthorn	<i>Prunus spinosa</i>	R
Box	<i>Buxus sempervirens</i>	R
Bramble	<i>Rubus fruticosus</i> agg.	O/LA
Cleavers	<i>Galium aparine</i>	LO
Clustered dock	<i>Rumex conglomeratus</i>	R
Common feather-moss	<i>Kindbergia praelonga</i>	R
Common lime	<i>Tilia x europaea</i>	R
Common nettle	<i>Urtica dioica</i>	LF
Cow parsley	<i>Anthriscus sylvestris</i>	R
Crab apple	<i>Malus sylvestris</i>	R
Creeping bent	<i>Agrostis stolonifera</i>	R
Creeping buttercup	<i>Ranunculus repens</i>	R
Dog rose	<i>Rosa canina</i> agg.	R
Dog's mercury	<i>Mercurialis perennis</i>	R/LO
Dogwood	<i>Cornus sanguinea</i>	R/LO
Elder	<i>Sambucus nigra</i>	R/O
Elm	<i>Ulmus</i> sp.	R
Enchanter's-nightshade	<i>Circaea lutetiana</i>	R
English elm	<i>Ulmus procera</i>	R
English oak	<i>Quercus robur</i>	R
European	<i>Larix decidua</i>	R
False oat-grass	<i>Arrhenatherum elatius</i>	R
False-brome	<i>Brachypodium sylvaticum</i>	LO
Field maple	<i>Acer campestre</i>	O
Field maple	<i>Acer campestre</i>	R
Garlic mustard	<i>Alliaria petiolata</i>	LF
Great willowherb	<i>Epilobium hirsutum</i>	R
Grey willow	<i>Salix cinerea</i> subsp. <i>oleifolia</i>	R

Common name	Scientific name	Abundance (DAFOR)
Ground-ivy	<i>Glechoma hederacea</i>	LO
Hard rush	<i>Juncus inflexus</i>	R
Hawthorn	<i>Crataegus monogyna</i>	R/LF
Hazel	<i>Corylus avellana</i>	O
Hedge bindweed	<i>Calystegia sepium</i>	R
Hedge woundwort	<i>Stachys sylvatica</i>	R
Hemlock	<i>Conium maculatum</i>	R
Herb-robert	<i>Geranium robertianum</i>	LO
Hogweed	<i>Heracleum sphondylium</i>	R
Hybrid black poplar	<i>Populus x canadensis</i>	LD
Ivy	<i>Hedera helix</i>	LO
Hybrid crack willow	<i>Salix x fragilis</i>	R
Jointed rush	<i>Juncus articulatus</i>	R
Lesser burdock	<i>Arctium minus</i>	R
Lesser celandine	<i>Ficaria verna</i>	LO
Lime	<i>Tilia cordata x platyphyllos (T. x vulgaris)</i>	R
Lords-and-ladies	<i>Arum maculatum</i>	R/LO
Rough meadow-grass	<i>Poa trivialis</i>	R
Silver birch	<i>Betula pendula</i>	F
Sorbus species	<i>Sorbus sp.</i>	R
Spear thistle	<i>Cirsium vulgare</i>	R
Sycamore	<i>Acer pseudoplatanus</i>	R
Tufted hair-grass	<i>Deschampsia caespitosa</i>	R
Viburnum speceis	<i>Viburnum sp.</i>	R
Water figwort	<i>Scrophularia umbrosa</i>	R
Wetted thistle	<i>Carduus crispus</i>	R
White poplar	<i>Populus alba</i>	R
Wood avens	<i>Geum urbanum</i>	LO
Wood dock	<i>Rumex sanguineus</i>	R
Yorkshire-fog	<i>Holcus lanatus</i>	R
Highway Works Plantation Woodland		
Alder	<i>Alnus glutinosa</i>	R
Ash	<i>Fraxinus excelsior</i>	F/A
Bee orchid	<i>Ophrys apifera</i>	R
Beech	<i>Fagus sylvatica</i>	R
Blackthorn	<i>Prunus spinosa</i>	R/LF
Bramble	<i>Rubus fruticosus</i> agg.	R/LO
Cleavers	<i>Galium aparine</i>	R/LF
Cock's-foot	<i>Dactylis glomerata</i>	R
Common feather moss	<i>Kindbergia praelonga</i>	LF

Common name	Scientific name	Abundance (DAFOR)
Common lime	<i>Tilia x europaea</i>	R/O
Common nettle	<i>Urtica dioica</i>	LO
Common ragwort	<i>Jacobae vulgaris</i>	R
Cotoneaster	<i>Cotoneaster</i> sp.	R
Cow parsley	<i>Anthriscus sylvestris</i>	LO/LA
Crab apple	<i>Malus sylvestris</i>	R/O
Creeping buttercup	<i>Ranunculus repens</i>	LO
Dog rose	<i>Rosa canina</i> agg.	R
Dog's mercury	<i>Mercurialis perennis</i>	LO/LF
Dogwood	<i>Cornus sanguinea</i>	R/LO
Dogwood	<i>Cornus sanguinea</i>	R/O
Elder	<i>Sambucus nigra</i>	R/LO
Elm	<i>Ulmus minor</i>	R
English oak	<i>Quercus robur</i>	R/O
European larch	<i>Larix decidua</i>	R/O
False oat-grass	<i>Arrhenatherum elatius</i>	LO/LF
Semi-Natural Woodland		
Ash	<i>Fraxinus excelsior</i>	O/F
Beech	<i>Fagus sylvatica</i>	R
Blackthorn	<i>Prunus spinosa</i>	LO
bramble	<i>Rubus fruticosus</i>	LO
cleavers	<i>Galium aparine</i>	LO
Cotoneaster	<i>Cotoneaster</i> sp.	R
cow parsley	<i>Anthriscus sylvestris</i>	LF
Dog rose	<i>Rosa canina</i> agg.	R
Dog's mercury	<i>Mercurialis perennis</i>	LF
English oak	<i>Quercus robur</i>	R
Field maple	<i>Acer campestre</i>	F
Hawthorn	<i>Crataegus monogyna</i>	R/LO
Hazel	<i>Corylus avellana</i>	O
Hedge woundwort	<i>Stachys sylvatica</i>	R
herb robert	<i>Geranium roperstanum</i>	R
Holly	<i>Ilex aquifolium</i>	R
horse chestnut	<i>Aesculus hippocastanum</i>	R
Hybrid black poplar	<i>Populus x canadensis</i>	O
Ivy	<i>Hedera helix</i>	LF
Lords-and-ladies	<i>Arum maculatum</i>	R
nipplewort	<i>Lapsana communis</i>	R
Norway spruce	<i>Picea abies</i>	R
Privet	<i>Ligustrum vulgare</i>	R

Common name	Scientific name	Abundance (DAFOR)
Rowan	<i>Sorbus acuparia</i>	R
Silver birch	<i>Betula pendula</i>	F/O
Sycamore	<i>Acer pseudoplatanus</i>	R/O
Viburnum	<i>Viburnum</i> sp.	LO
Wild cherry	<i>Prunus avium</i>	F/A
Wood avens	<i>Geum arbanum</i>	R
Wood dock	<i>Rumex sanguineus</i>	R
Trees and Treelines		
Ash	<i>Fraxinus excelsior</i>	O/LF
Barren brome	<i>Bromus sterilis</i>	R
Black bryony	<i>Disoscorea communis</i>	R
Blackthorn	<i>Prunus spinosa</i>	O/F
Box honeysuckle	<i>Lonicera nitida</i>	R
Bramble	<i>Rubus fruticosus</i> agg.	LO/LF
Cleavers	<i>Galium aparine</i>	LO/LF
Cock's-foot	<i>Dactylis glomerata</i>	R
Common lime	<i>Tilia x europaea</i>	R/LF
Common mallow	<i>Malva sylvestris</i>	R
Common nettle	<i>Urtica dioica</i>	LO/LF
Common sorrel	<i>Rumex acetosa</i>	R
Crab apple	<i>Malus sylvestris</i>	R
Dog rose	<i>Rosa canina</i> agg.	R
Dog's mercury	<i>Mercurialis perennis</i>	R
Dogwood	<i>Cornus sanguinea</i>	O
Dogwood	<i>Cornus sanguinea</i>	R/O
Elder	<i>Sambucus nigra</i>	O/F
Elm	<i>Ulmus minor</i>	R/LF
English oak	<i>Quercus robur</i>	R
False oat-grass	<i>Arrhenatherum elatius</i>	R/O
False-brome	<i>Brachypodium sylvaticum</i>	LO
Field maple	<i>Acer campestre</i>	R/F
Garlic mustard	<i>Alliaria petiolata</i>	LO/LA
Goat willow	<i>Salix caprea</i>	R
Great willowherb	<i>Epilobium hirsutum</i>	R
Ground-ivy	<i>Glechoma hederacea</i>	LO/LF
Hawthorn	<i>Crataegus monogyna</i>	O/F
Hazel	<i>Corylus avellana</i>	R/LO
Hedge bindweed	<i>Calystegia sepium</i>	R
Hedge woundwort	<i>Stachys sylvatica</i>	R
Hemlock	<i>Conium maculatum</i>	LF

Common name	Scientific name	Abundance (DAFOR)
Hogweed	<i>Heracleum sphondylium</i>	R
Holly	<i>Ilex aquifolium</i>	R
Hybrid crack willow	<i>Salix x fragilis</i>	R
Ivy	<i>Hedera helix</i>	LO
Lesser burdock	<i>Arctium minus</i>	R
Lilac	<i>Syringa vulgaris</i>	R
Lords-and-ladies	<i>Arum maculatum</i>	R
Mint	<i>Mentha</i> sp.	LO
Mugwort	<i>Artemisia vulgaris</i>	R/LO
Purging buckthorn	<i>Rhamnus cathartica</i>	R
Red dead-nettle	<i>Lamium purpureum</i>	R
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	LO
Rough meadow-grass	<i>Poa trivialis</i>	O
Rowan	<i>Sorbus acuparia</i>	R
Silver birch	<i>Betula pendula</i>	O
Smooth sow-thistle	<i>Sonchus olearaceus</i>	R
Sorbus	<i>Sorbus</i> sp.	LF
Sycamore	<i>Acer pseudoplatanus</i>	R/LO
Viburnum	<i>Viburnum</i> sp.	R
Wetted thistle	<i>Carduus crispus</i>	R
Wild cherry	<i>Prunus avium</i>	R
Willow	<i>Salix</i> sp.	R
Wood dock	<i>Rumex sanguineus</i>	R
Yew	<i>Taxus baccata</i>	R
Yorkshire-fog	<i>Holcus lanatus</i>	R
Wall		
Bramble	<i>Rubus fruticosus</i> agg.	R
Canadian fleabane	<i>Erigeron canadensis</i>	R
Fern grass	<i>Catapodium rigidum</i>	R
Male fern	<i>Dryopteris filix-mas</i>	O
Rosebay willowherb	<i>Chamaenerion angustifolium</i>	R
Rough hawksbeard	<i>Crepis biennis</i>	R
Soft rush	<i>Juncus effusus</i>	R
Yarrow	<i>Achillea millefolium</i>	R
Amenity Grassland/Planting		
Black medic	<i>Medicago lupulina</i>	R
Broad-leaved dock	<i>Rumex obtusifolius</i>	R
Cock's-foot	<i>Dactylis glomerata</i>	R
Cow parsley	<i>Anthriscus sylvestris</i>	R
Creeping buttercup	<i>Ranunculus repens</i>	LO

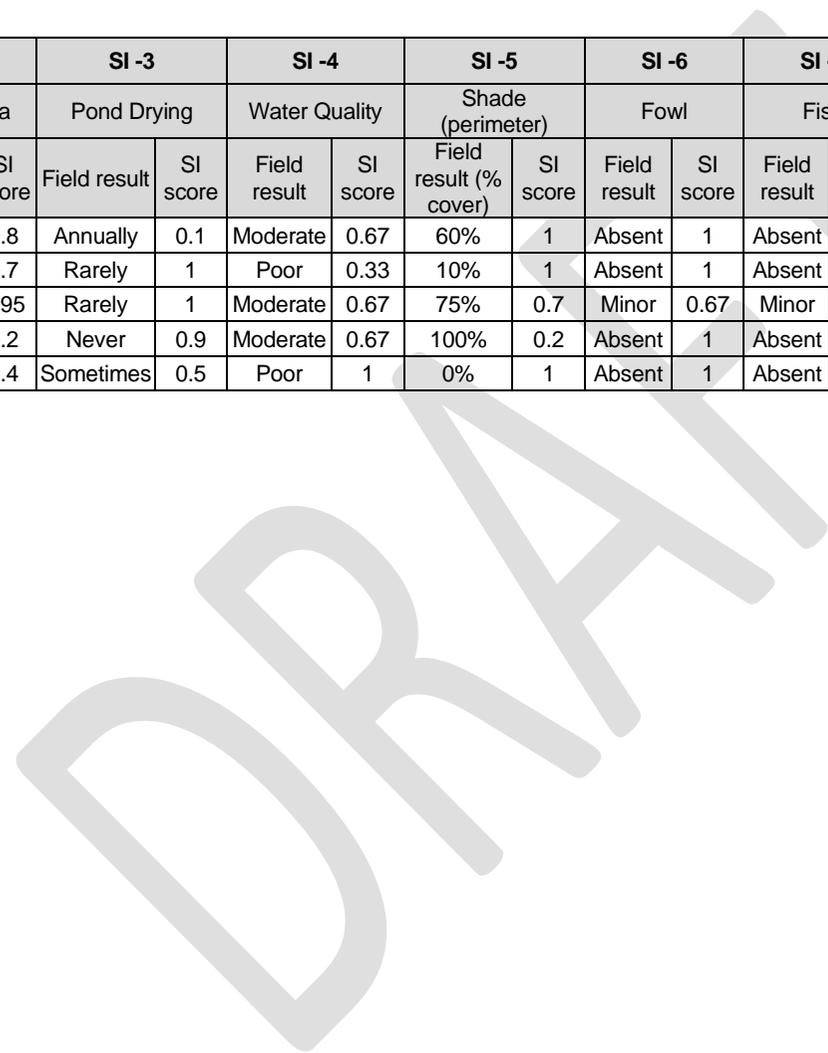
Common name	Scientific name	Abundance (DAFOR)
Daisy	<i>Bellis perennis</i>	R
Dandelion	<i>Taraxacum</i> sp. agg.	LO
Field bindweed	<i>Convolvus arvensis</i>	LO
Germander speedwell	<i>Veronica chamaedrys</i>	R
Perennial rye-grass	<i>Lolium perenne</i>	F
Red fescue	<i>Festuca rubra</i> agg.	LO
Ribwort plantain	<i>Plantago lanceolata</i>	R
Rowan	<i>Sorbus acuparia</i>	R
Small leaved lime	<i>Tilia cordata</i>	R
Smooth hawk's-beard	<i>Crepis capillaris</i>	R
Wild cherry	<i>Prunus avium</i>	R
Yarrow	<i>Achillea millefolium</i>	O
Waterbodies		
Bittersweet	<i>Solanum dulcamara</i>	R
Bulrush	<i>Typhus latifolia</i>	R
Club rush	<i>Schoenoplectus lacustris</i>	LA
Clubrush	<i>Schoenoplectus lacustris</i>	LF
Clustered dock	<i>Rumex conglomeratus</i>	R
Common nettle	<i>Urtica dioica</i>	O/R
Common reed	<i>Phragmites australis</i>	A
Creeping bent	<i>Agrostis stolonifera</i>	O
False oat-grass	<i>Arrhenatherum elatius</i>	R
Fool's water-cress	<i>Helosciadium nodiflorum</i>	LD/F
Goat willow	<i>Salix caprea</i>	R
Great willowherb	<i>Epilobium hirsutum</i>	LF
Hybrid crack willow	<i>Salix x fragilis</i>	R
Lords-and-ladies	<i>Arum maculatum</i>	O
Meadowsweet	<i>Filipendula ulmaria</i>	LO
Mint	<i>Mentha</i> sp.	R
Red fescue	<i>Festuca rubra</i> agg.	LF
Reed canary grass	<i>Phalaris arundinacea</i>	R
Water figwort	<i>Scrophularia umbrosa</i>	R/O
Water star-wort	<i>Callitriche</i> sp.	LO
Willowherb	<i>Epibolium</i> sp.	R
Yellow flag iris	<i>Iris pseudacorus</i>	R/LF
Yorkshire-fog	<i>Holcus lanatus</i>	O
Watercourses		
Bramble	<i>Rubus fruticosus</i> agg.	R
Bulrush	<i>Typhus latifolia</i>	R/O
Clustered dock	<i>Rumex conglomeratus</i>	R

Common name	Scientific name	Abundance (DAFOR)
Common nettle	<i>Urtica dioica</i>	O/R
False oat-grass	<i>Arrhenatherum elatius</i>	R
Fool's water-cress	<i>Helosciadium nodiflorum</i>	LF/LD
Great willowherb	<i>Epilobium hirsutum</i>	LF
Goat willow	<i>Salix caprea</i>	R
Great willowherb	<i>Epilobium hirsutum</i>	F
Hard rush	<i>Juncus inflexus</i>	O
Hybrid crack willow	<i>Salix x fragilis</i>	R
Jointed rush	<i>Juncus articulatus</i>	O
Lords-and-ladies	<i>Arum maculatum</i>	O
Mint	<i>Mentha</i> sp.	O/R
Water figwort	<i>Scrophularia umbrosa</i>	R/O

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APPENDIX B: POND HABITAT SUITABILITY ASSESSMENT RESULTS

Waterbody Number	SI -1		SI - 2		SI -3		SI -4		SI -5		SI -6		SI -7		SI -8		SI -9		SI -10		HSI Scores	
	Geographical Location		Pond Area		Pond Drying		Water Quality		Shade (perimeter)		Fowl		Fish		Ponds		Terrestrial Habitat		Macrophytes		HSI score	Pond suitability
	Field result (A,B,C)	SI score	Field result (m2)	SI score	Field result	SI score	Field result	SI score	Field result (% cover)	SI score	Field result	SI score	Field result	SI score								
1	A	1	400	0.8	Annually	0.1	Moderate	0.67	60%	1	Absent	1	Absent	1	12	1	Poor	0.33	90%	1	0.66	Average
2	A	1	375	0.7	Rarely	1	Poor	0.33	10%	1	Absent	1	Absent	1	16	1	Poor	0.33	20%	0.5	0.72	Good
3	A	1	1000	0.95	Rarely	1	Moderate	0.67	75%	0.7	Minor	0.67	Minor	0.67	16	1	Moderate	0.67	42%	0.7	0.79	Good
4	A	1	100	0.2	Never	0.9	Moderate	0.67	100%	0.2	Absent	1	Absent	1	5	1	Good	1	0%	0.3	0.61	Average
20	A	1	200	0.4	Sometimes	0.5	Poor	1	0%	1	Absent	1	Absent	1	12	1	Moderate	0.67	10%	.04	0.42	Good



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Key

-  Site Boundary
-  1km Buffer
-  2km Buffer
-  Cherwell District Wildlife Site (DWS)
-  Oxfordshire Local Wildlife Site (LWS)
-  Proposed Cherwell District Wildlife Site (pDWS)
-  Conservation Target Area (CTA)
- Site of Special Scientific Interest (SSSI)**
-  Biological and Geological Designation
-  Geological Designation

- 1 - Ardley Trackways SSSI
- 2 - Ardley Cutting and Quarry SSSI
- 3 - Upper Heyford Airfield LWS
- 4 - Ardley Fields Quarry LWS
- 5 - Ardley Fields Ponds East LWS
- 6 - Ardley Fields Ponds West LWS
- 7 - The Heath pDWS
- 8 - Trackway adjacent to The Gorse pDWS
- 9 - Kennel Copse pDWS
- 10 - Ardley Road Verge Nature Reserve DWS
- 11 - Ardley and Upper Heyford CTA
- 12 - Trow Pool LWS
- 13 - Stoke Wood LWS
- 14 - Tusmore and Shellswell Park CTA





Oxfordshire Railfreight Limited

Proposed Oxfordshire Strategic Rail Freight Interchange

Site Location and Consultation Results Plan - Designated Sites

Scale 1:40000 Date: LG / HET Date: 23/4/2022

Figure 1a

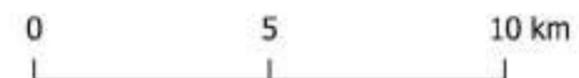
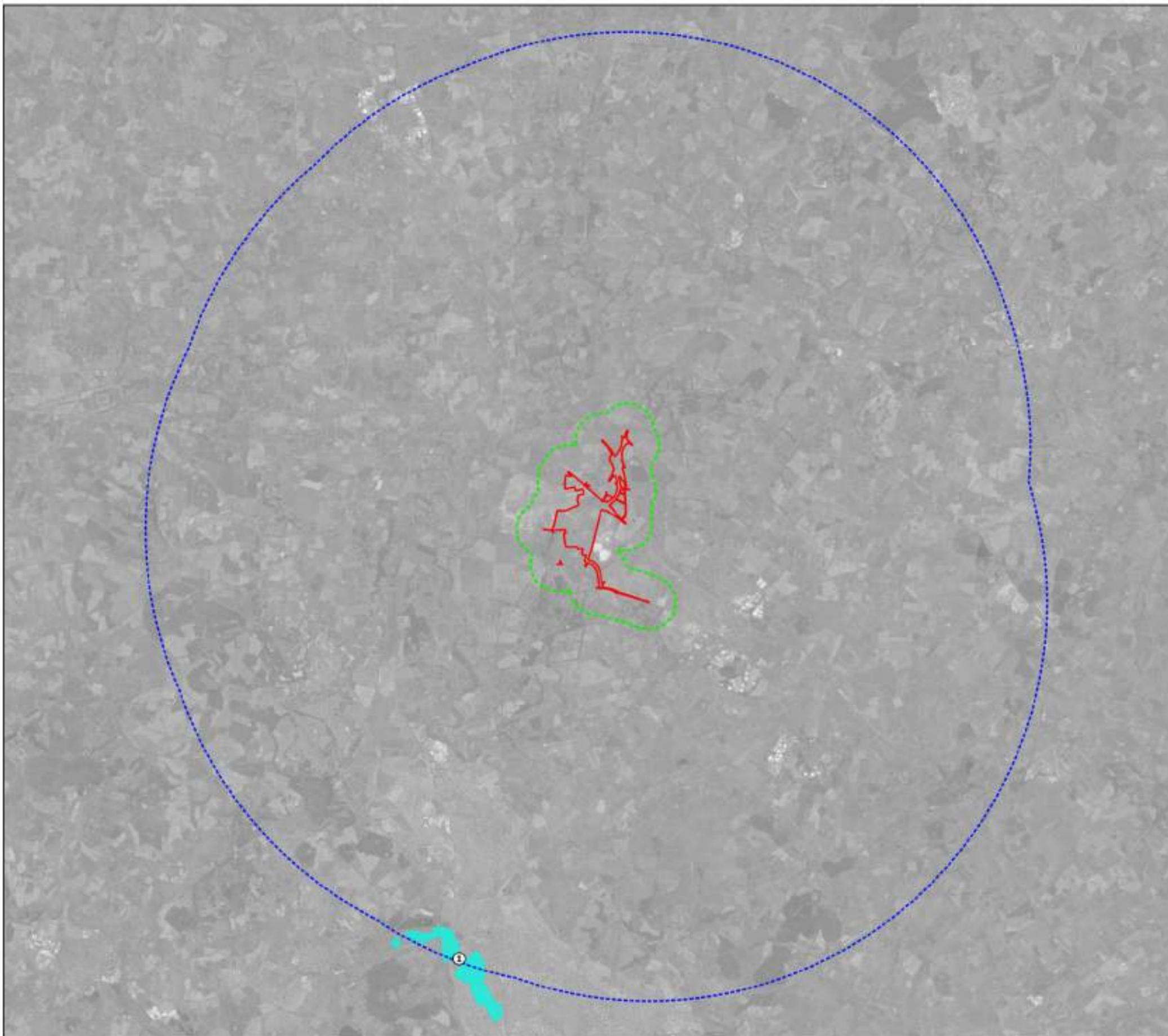
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Key

-  Site Boundary
-  1km Buffer
-  15km Buffer
-  Species Area of Conservation (SAC)

1 - Oxford Meadows



Oxfordshire Railfreight Limited
Proposed Oxfordshire Strategic Rail
Freight Interchange
Site Location and Consultation Results Plan -
Internationally Designated Sites

Scale 1:150000
Author LG/HET
Date 21/4/2022

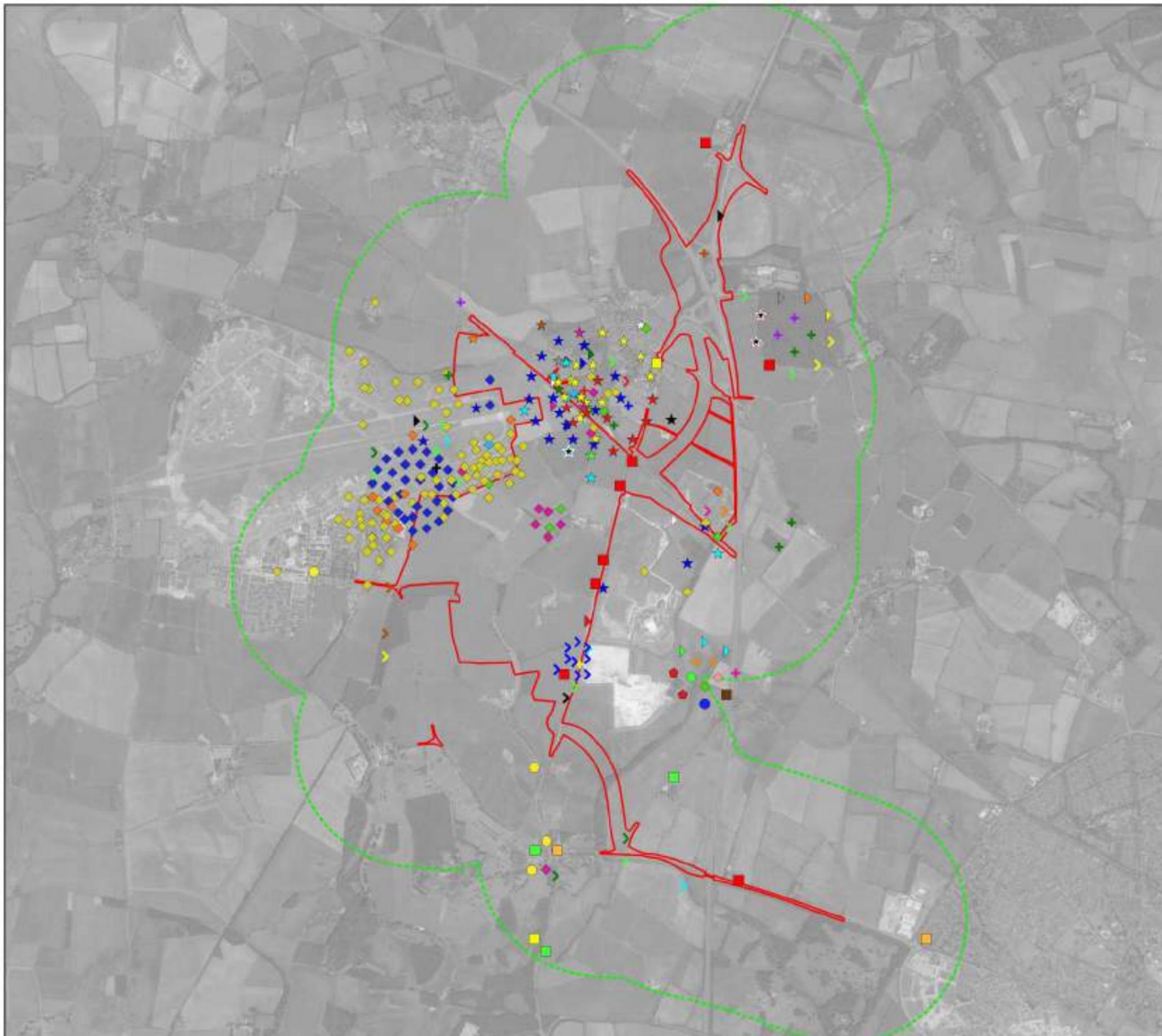
Figure 1b

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Key

- | | |
|---|---------------------------|
| Site Boundary | 1km Buffer |
| Bats | |
| Brown Long-eared | Daubenton's |
| Common Pipistrelle | Unidentified bat sp. |
| Herpetofauna | |
| Common Frog | Great Crested Newt |
| Common Lizard | Palmate Newt |
| Common Toad | Smooth Newt |
| Grass Snake | |
| Invasive and Non-Native Species (INNS) | |
| Butterfly-bush | Nuttall's Waterweed |
| Canadian Waterweed | Signal Crayfish |
| New Zealand Pigmyweed | |
| Mammals | |
| Badger | Otter |
| Brown Hare | Polecat |
| Hedgehog | |
| Notable Invertebrates | |
| Cinnabar | Shaded Broad-bar |
| Dingy Skipper | Sharp-collared Fallow Bee |
| Flax Flea Beetle | Small Blue |
| Grizzled Skipper | Small Heath |
| Lobe-spurred Fallow Bee | Small Square-spot |
| Pear Weevil | Wall |
| Rosy Rustic | White Admiral |
| Notable Plants | |
| Annual Beard-grass | Lesser Spearwort |
| Autumn Gentian | Many-leaved Sedge |
| Basil Thyme | Marsh Pennywort |
| Bloody Crane's-bill | Meadow Clary |
| Bluebell | Narrow-fruited Cornsalad |
| Bottle Sedge | Night-flowering Catchfly |
| Common Rock-rose | Pale Sedge |
| Common Valerian | Pale St John's-wort |
| Corn Mint | Plymouth Pear |
| Dwarf Spurge | Quaking-grass |
| Eyebright | Sainfoin |
| Field Scabious | Sanicle |
| Heath Speedwell | Tubular Water-dropwort |
| Hoary Plantain | Wild Strawberry |



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Oxfordshire Railfreight Limited
 Proposed Oxfordshire Strategic Rail Freight Interchange
 Site Location and Consultation Results Plan - Species Records
 Scale 1:12500
 Date 23/4/2022
Figure 2a

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Key

- | | |
|--|--|
|  Site Boundary |  1km Buffer |
| Birds | |
|  Black-headed Gull |  Meadow Pipit |
|  Bullfinch |  Mistle Thrush |
|  Common Gull |  Mute Swan |
|  Corn Bunting |  Peregrine |
|  Cuckoo |  Quail |
|  Curlew |  Red Kite |
|  Duncock |  Reed Bunting |
|  Fieldfare |  Ring Ouzel |
|  Grasshopper Warbler |  Skyhawk |
|  Grey Partridge |  Song Thrush |
|  Grey Wagtail |  Spotted Flycatcher |
|  House Martin |  Starling |
|  House Sparrow |  Stock Dove |
|  Kestrel |  Swift |
|  Kingfisher |  Tawny Owl |
|  Lapwing |  Tree Sparrow |
|  Lesser Black-backed Gull |  Whimbrel |
|  Linnet |  Willow Warbler |
|  Mallard |  Yellow Wagtail |
|  Marsh Tit |  Yellowhammer |



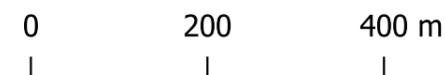
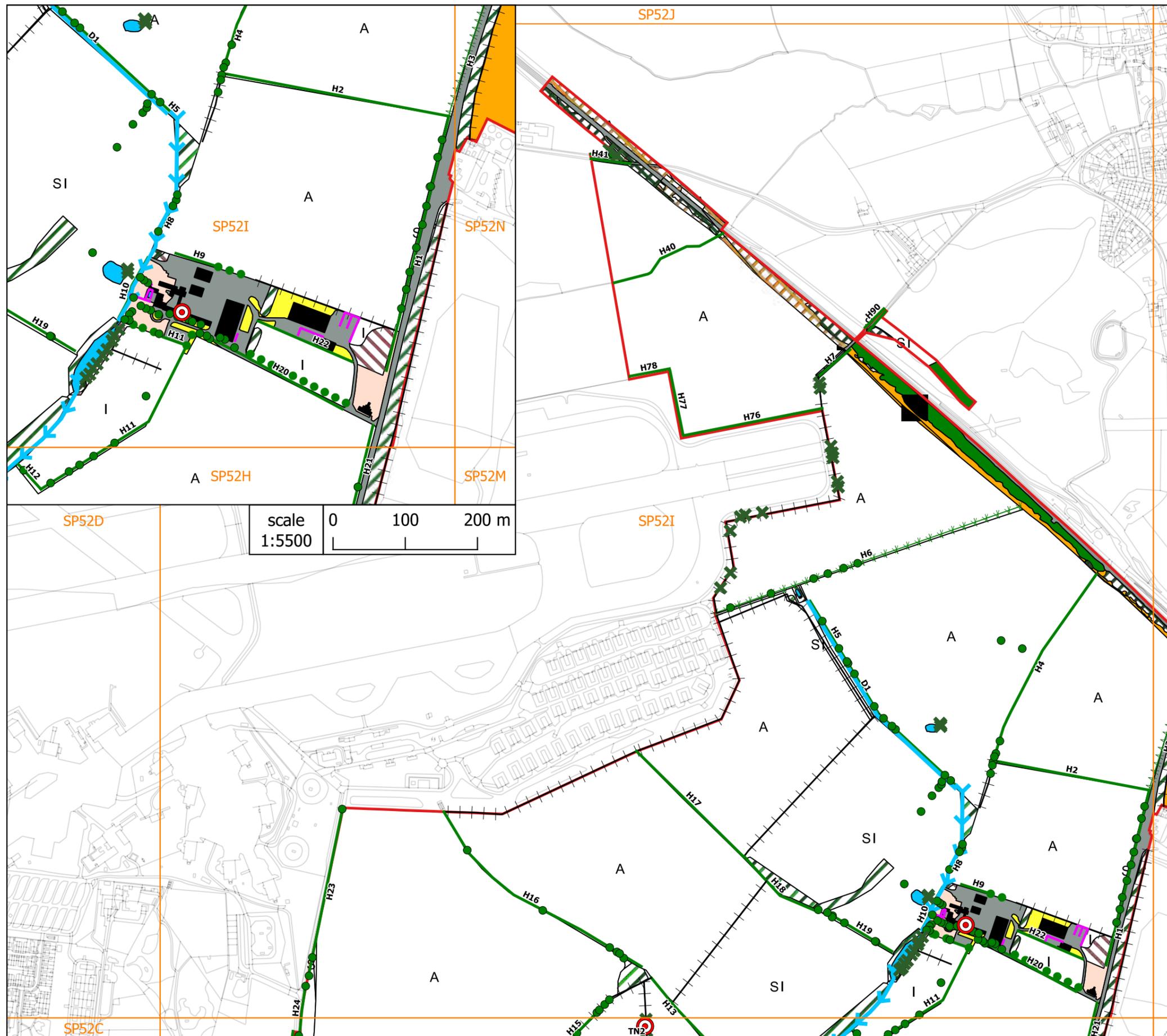
Key

- Site Boundary
- OSGR 2km Grid Squares
- Phase 1 Habitats**
- Broadleaved woodland - plantation
- Broadleaved woodland - semi-natural
- Built Environment: Buildings/hardstanding
- A Cultivated/disturbed land - arable
- Cultivated/disturbed land - ephemeral/short perennial
- SI Neutral grassland - semi-improved
- Other tall herb and fern - ruderal
- SI Poor semi-improved grassland
- Scrub - dense/continuous
- Standing water
- Phase 1 Lines**
- Broadleaved trees
- Standing water
- Running water
- Intact hedge - species-poor
- Intact hedge - native species-rich
- + Fence
- Dry ditch
- ×× Scrub - scattered line
- Phase 1 Points**
- × Scrub - scattered
- ⊙ Target note



Key

- Site Boundary
- OSGR 2km Grid Squares
- Phase 1 Habitats**
- Broadleaved woodland - plantation
- Broadleaved woodland - semi-natural
- Buildings
- Built Environment: Buildings/hardstanding
- Built Environment: Gardens (lawn and planting)
- Calcareous grassland - unimproved
- Coniferous woodland - plantation
- Cultivated/disturbed land - amenity grassland
- A Cultivated/disturbed land - arable
- I Improved grassland
- Mixed woodland - plantation
- Neutral grassland - semi-improved
- Neutral grassland - unimproved
- Other tall herb and fern - ruderal
- SI Poor semi-improved grassland
- Scrub - dense/continuous
- Scrub - scattered
- Standing water
- Phase 1 Lines**
- Broadleaved trees
- Standing water
- Wall
- Running water
- Intact hedge - species-poor
- Intact hedge - native species-rich
- Hedge with trees - native species-rich
- Fence
- Phase 1 Points**
- ✕ Scrub - scattered
- ⊙ Target note
- Coniferous tree
- Broadleaved tree



client
Oxfordshire Railfreight Limited

project
Proposed Oxfordshire Strategic Rail Freight Interchange

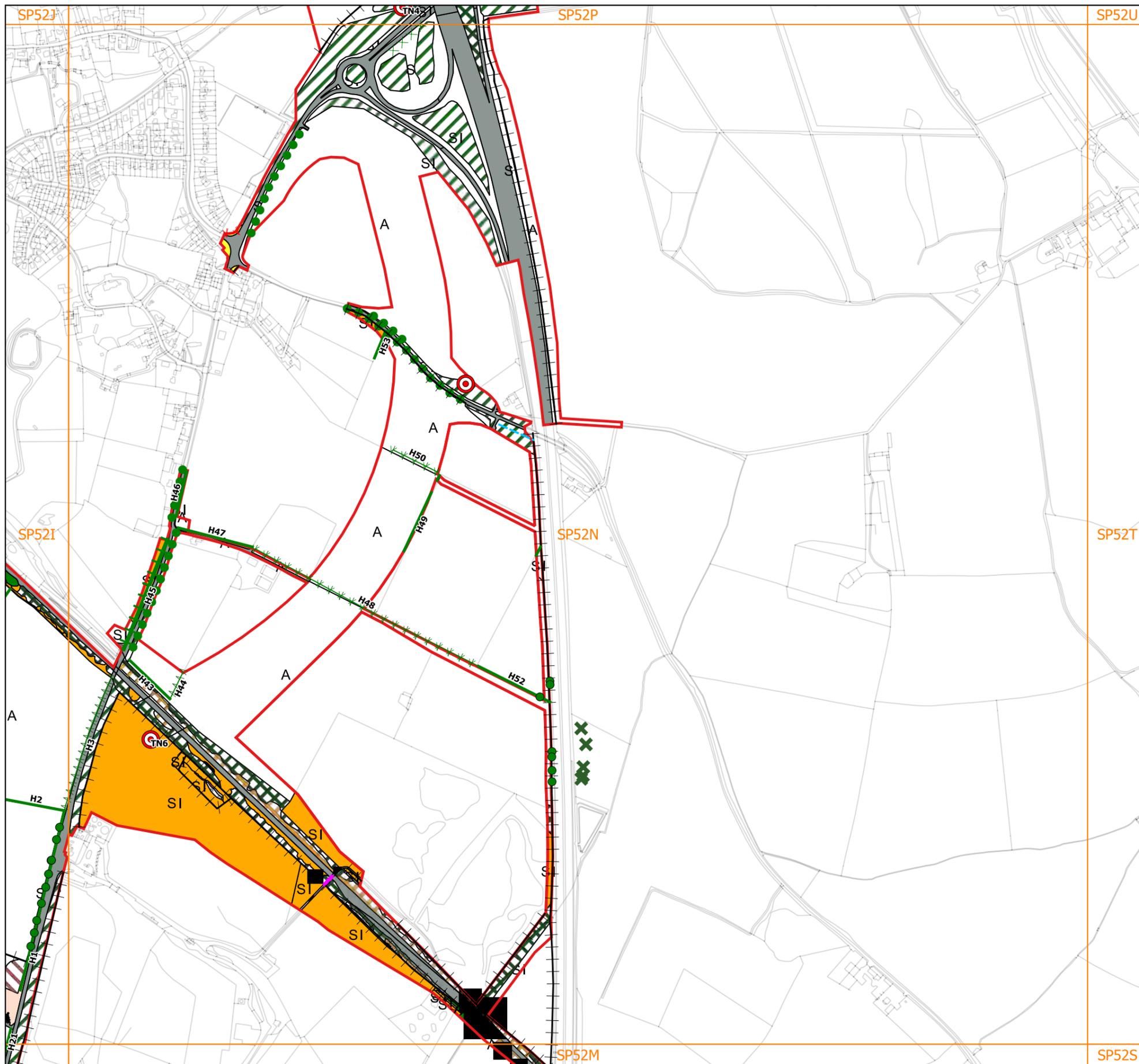
drawing title
Phase 1 Habitat Plan - Grid Ref. SP52I

scale
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drawn
HET

issue
21/4/2022

Figure 3c

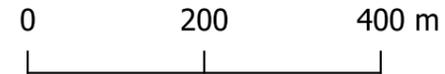


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Key

- | | | |
|---|--|--|
| Site Boundary | Broadleaved trees | |
| OSGR 2km Grid Squares | Wall | |
| Phase 1 Habitats | | |
| Bare ground | Hedges: Introduced shrub | |
| Broadleaved woodland - plantation | Intact hedge - species-poor | |
| Broadleaved woodland - semi-natural | Intact hedge - native species-rich | |
| Buildings | Hedge with trees - species-poor | |
| Built Environment: Buildings/hardstanding | Hedge with trees - native species-rich | |
| Built Environment: Gardens (lawn and planting) | Fence | |
| Calcareous grassland - semi-improved | Dry ditch | |
| Calcareous grassland - unimproved | Scrub - scattered line | |
| Cultivated/disturbed land - amenity grassland | Phase 1 Points | |
| Cultivated/disturbed land - arable | Scrub - scattered | |
| Improved grassland | Target note | |
| Marginal and inundation - inundation vegetation | Coniferous tree | |
| Neutral grassland - semi-improved | Broadleaved tree | |
| Neutral grassland - unimproved | | |
| Other tall herb and fern - ruderal | | |
| Poor semi-improved grassland | | |
| Quarry | | |
| Scrub - dense/continuous | | |
| Scrub - scattered | | |
| Standing water | | |



client
Oxfordshire Railfreight Limited

project
Proposed Oxfordshire Strategic Rail Freight Interchange

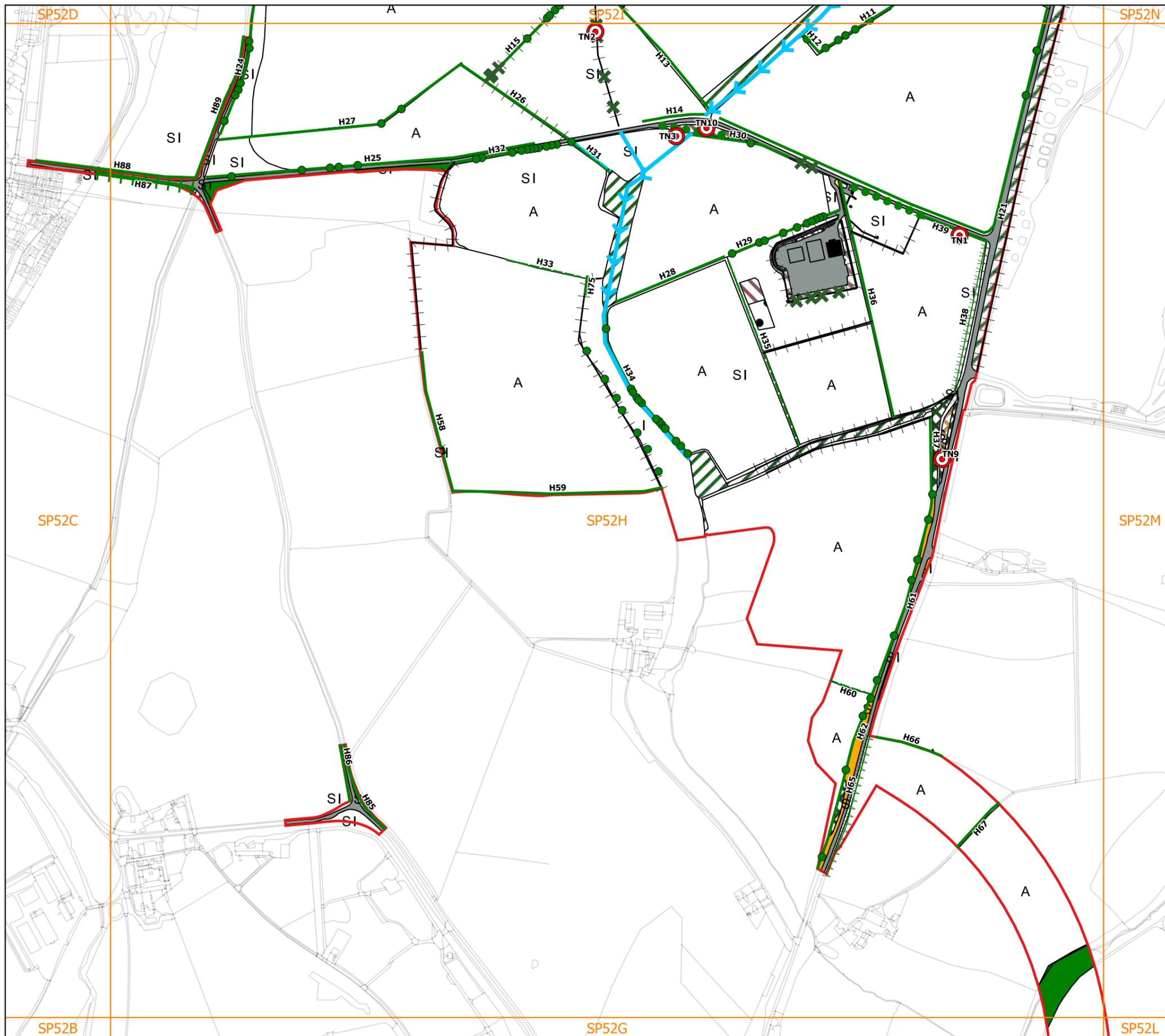
drawing title
Phase 1 Habitat Plan - Grid Ref. SP52N

scale
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drawn
HET

issue
21/4/2022

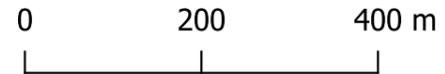
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Figure 3d



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- ### Key
- Site Boundary
 - OSGR 2km Grid Squares
 - Phase 1 Habitats**
 - Bare ground
 - Broadleaved woodland - plantation
 - Broadleaved woodland - semi-natural
 - Buildings
 - Built Environment: Buildings/hardstanding
 - Built Environment: Gardens (lawn and planting)
 - Calcareous grassland - semi-improved
 - Cultivated/disturbed land - amenity grassland
 - Cultivated/disturbed land - arable
 - Cultivated/disturbed land - ephemeral/short perennial
 - Improved grassland
 - Neutral grassland - semi-improved
 - Other tall herb and fern - ruderal
 - Poor semi-improved grassland
 - Scrub - dense/continuous
 - Phase 1 Lines**
 - Broadleaved trees
 - Standing water
 - Running water
 - Intact hedge - species-poor
 - Intact hedge - native species-rich
 - Hedge with trees - species-poor
 - Fence
 - Dry ditch
 - Defunct hedge - species-poor
 - Phase 1 Points**
 - Scrub - scattered
 - Target note
 - Broadleaved tree



client
Oxfordshire Railfreight Limited

project
Proposed Oxfordshire Strategic Rail
Freight Interchange

drawing title
Phase 1 Habitat Plan - Grid Ref. SP52H

scale
1:8000

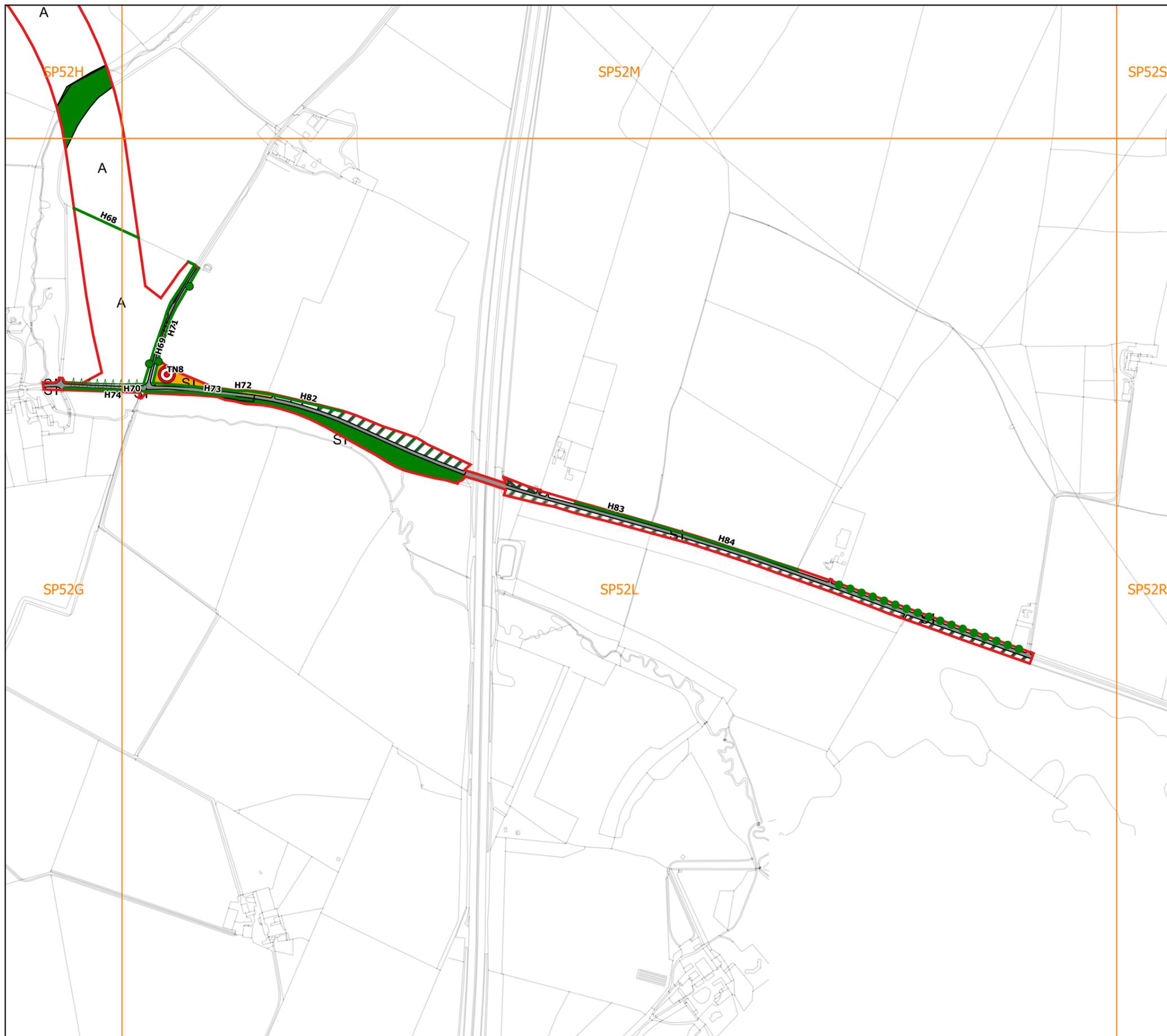
drawn
HET

issue
21/4/2022

drawing / figure number
Figure 3e

Key

- Site Boundary
- OSGR 2km Grid Squares
- Phase 1 Habitats**
- Broadleaved woodland - plantation
- Broadleaved woodland - semi-natural
- Built Environment: Buildings/hardstanding
- A Cultivated/disturbed land - arable
- SI Neutral grassland - semi-improved
- SI Poor semi-improved grassland
- Scrub - dense/continuous
- Phase 1 Lines**
- Broadleaved trees
- Intact hedge - species-poor
- Intact hedge - native species-rich
- Phase 1 Points**
- Target note
- Broadleaved tree



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Key

● Reptile Refugia Location

Slow Worms

● 06/09/21

Common Lizards

■ 21/07/21

■ 27/08/21

■ 03/09/21

■ 06/09/21

■ 20/09/21

■ 23/09/21

■ 28/09/21

■ 29/09/21

Grass Snakes

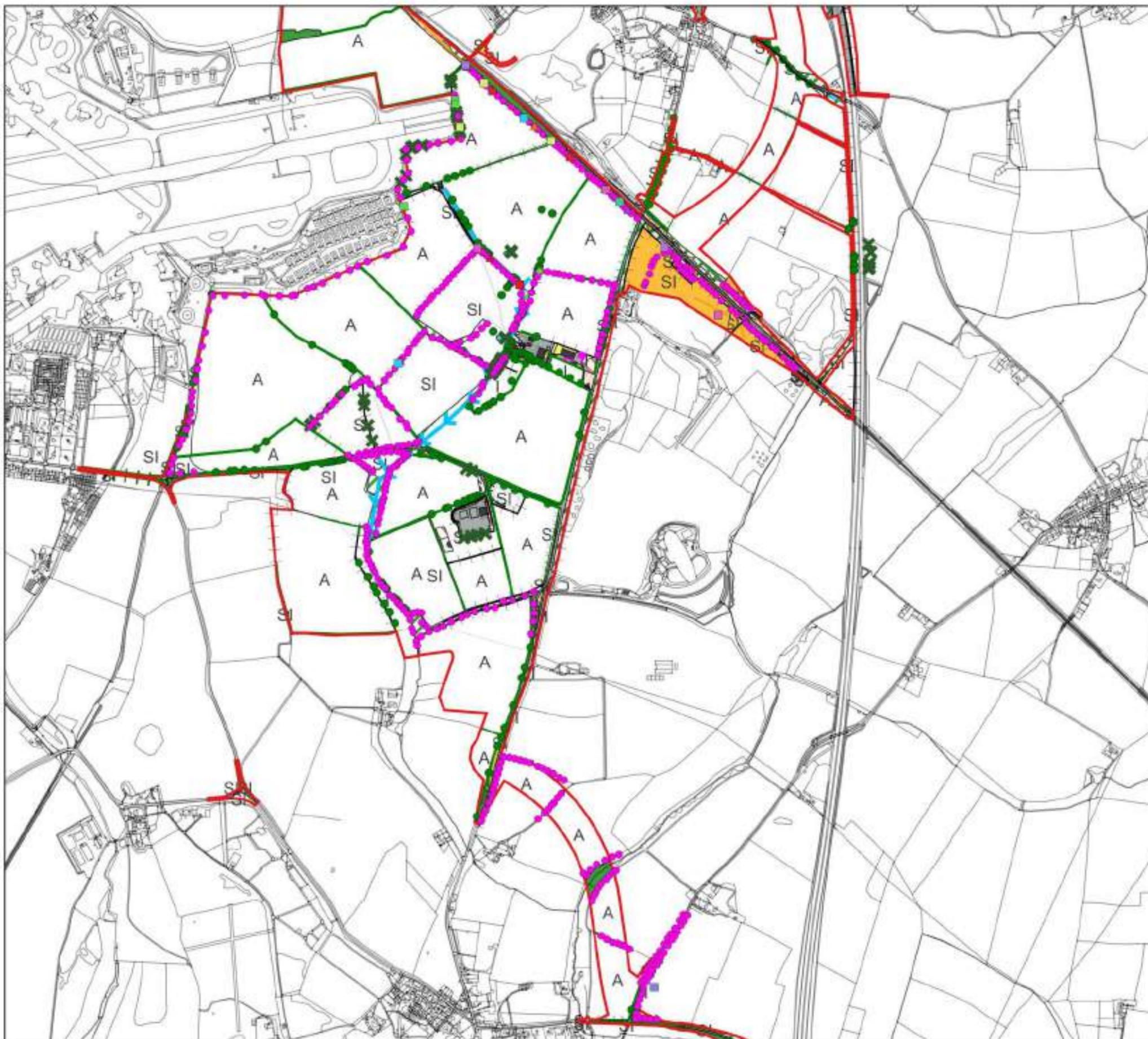
▲ 27/08/21

▲ 03/09/21

▲ 20/09/21

▲ 28/09/21

▲ 29/09/21



Client: Oxfordshire Railfreight Limited
Project: Oxfordshire Strategic Rail Freight Interchange
Drawing No: Reptile Survey Results Plan

Scale: 1:16000
Drawn: NG / HET
Date: 4/5/2022

Figure 4

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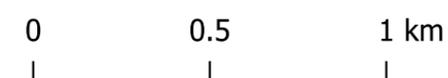
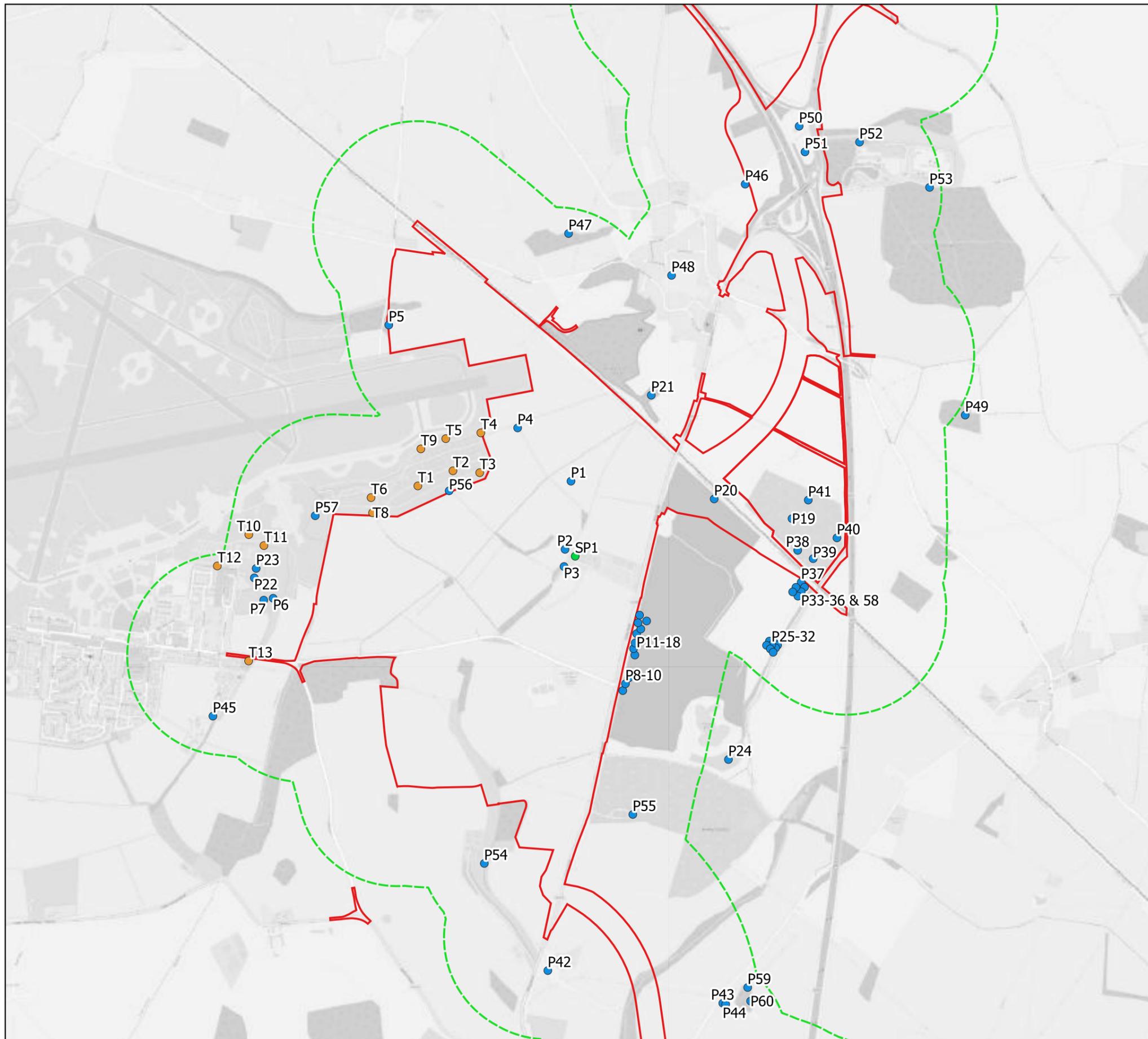
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Key

- Site Boundary
- 500m Pond Buffer

Waterbodies with ref. number

- Pond
- Swimming Pool
- Tank



client
Oxfordshire Railfreight Limited

project
Proposed Oxfordshire Strategic Rail Freight Interchange

drawing title
Waterbody Location Plan

scale
1:20000

drawn
NG / LFR

issue
4/5/2022

drawing / figure number
Figure 5

rev
-