

A46 Newark Bypass

TR010065/APP/6.3

6.3 Environmental Statement

Appendix 8.2 National Vegetation Classification Technical Report

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and
Procedure) Regulations 2009

Volume 6

April 2024

Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed Forms
and Procedure) Regulations 2009**

A46 Newark Bypass

Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT

**APPENDIX 8.2 NATIONAL VEGETATION CLASSIFICATION TECHNICAL
REPORT**

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010065
Application Document Reference	TR010065/APP/6.3
Author:	A46 Newark Bypass Project Team, National Highways

Version	Date	Status of Version
Rev 1	April 2024	DCO Application

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1 Introduction

1.1 Background and scope of work

- 1.1.1 As part of the A46 Newark Bypass Scheme (the Scheme), a National Vegetation Classification (NVC) survey was undertaken to inform the biodiversity assessment reported in Chapter 8 (Biodiversity) of the Environmental Statement (ES) **(TR010065/APP/6.1)**.
- 1.1.2 Chapter 2 of the ES provides the background and a description of the Scheme. The information described in this appendix provides a baseline of the habitats and plants recorded within the survey area, which will be used to inform both the Environmental Impact Assessment (EIA) and the Biodiversity Net Gain (BNG) assessment for the Scheme.
- 1.1.3 This appendix reports the NVC surveys undertaken in 2022 and 2023. Suitable habitats for NVC survey were identified through an extended Phase 1 habitat survey undertaken for the Scheme in 2022 (see Appendix 8.1 (Extended Phase 1 Habitat Report) of the ES Appendices **(TR010065/APP/6.3)**). All habitats scoped in as suitable were surveyed in accordance with the methods given in Section 3 of this appendix, except those for which land access permission was not available.
- 1.1.4 This appendix includes:
- Relevant legislation
 - Methodology for desk and field-based assessments
 - Competencies of the ecologists involved in undertaking the surveys
 - Limitations to the surveys undertaken and any assumptions made because of incomplete data
 - Survey results
 - A summary of findings and future recommendations

2 Legislation, policy and licences

2.1 Legislation

- 2.1.1 The Wildlife and Countryside Act 1981¹ (as amended) 'the 1981 Act' and the Conservation of Habitats and Species Regulations 2017² (as amended) 'The Habitats Regulations' form the cornerstone for species and habitat protection in England and Wales. Schedule 8 of the 1981 Act³ lists plant species legally protected from acts such as intentional picking, uprooting or destruction. A Conservation Licence approved by Natural England is required to undertake work affecting these plants that would otherwise be unlawful. European protected species of plants are listed in Schedule 5 of the Conservation of Habitats and Species Regulations 2017.
- 2.1.2 Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006)⁴ (as amended by the Environment Act 2021) lists Species of Principal Importance (SPI) and Habitats of Principal Importance (HPI) for conserving biodiversity in England. This supersedes the UK Biodiversity Action Plan (BAP) lists. Section 40 of the NERC Act (2006)⁵ requires public bodies, including local authorities 'to have regard to the conservation and enhancement of biodiversity in England' when carrying out their normal functions. Section 41, the list of species and habitats of 'principal importance for the conservation of biodiversity in England' guides public bodies in implementing their duty.

2.2 Great Britain Red List for Vascular Plants

- 2.2.1 The Great Britain (GB) Red List for Vascular Plants⁸ uses the International Union for Conservation of Nature criteria to assess the status of vascular plants based on population trends in GB (for example, a species can be assessed as

¹ Wildlife and Countryside Act 1981. Available URL for download: [Wildlife and Countryside Act 1981 \(legislation.gov.uk\)](#) Last accessed 17/01/2023.

² The Conservation of Habitats and Species Regulations 2017. Available URL for download: [The Conservation of Habitats and Species Regulations 2017 \(legislation.gov.uk\)](#) Last accessed 17/01/2023.

³ Schedule 8 Wildlife and Countryside Act 1981. Available URL for download: [Wildlife and Countryside Act 1981 \(legislation.gov.uk\)](#) Last accessed 17/01/2023.

⁴ Section 41 Natural Environment and Rural Communities Act 2006. Available URL for download: [Natural Environment and Rural Communities Act 2006 \(legislation.gov.uk\)](#) Last Accessed 17/01/2023.

⁵ Section 40 Natural Environment and Rural Communities Act 2006. Available URL for download: [Natural Environment and Rural Communities Act 2006 \(legislation.gov.uk\)](#) Last Accessed 17/01/2023.

endangered if it has decreased by 50% in population size since 1930). A species can also be assessed as endangered if its geographic range has contracted or if it is located in fewer than five locations. This means that a species that is 'Endangered' is considered to be at a very high risk of national extinction in the wild in the near future, and one that is 'Vulnerable' is considered to be facing a high risk of national extinction in the wild in the medium-term future.

Policy framework

2.2.2 National policies relevant to biodiversity are not provided here. These are outlined in Chapter 8 (Biodiversity) of the ES (**TR010065/APP/6.1**).

2.2.3 Nottinghamshire has a Local Biodiversity Action Plan (LBAP) based upon the UK Biodiversity Action Plan (BAP). This is split into Species Action Plans (SAP) and Habitat Action Plans (HAP).

2.2.4 The following plants species have an SAP within Nottinghamshire:⁶

- Black poplar *Populus nigra*
- Deptford pink *Dianthus armeria*
- Autumn crocus *Crocus nudiflorus*
- Spring crocus *Crocus vernus*

2.2.5 Within Nottinghamshire various habitats have a HAP. These habitats are selected by either featuring within the LBAP, meaning they are nationally in need of protection, or have been identified as locally endangered by county experts. Habitats that have a HAP are as follows:⁷

- Ancient and/or species rich hedgerows
- Arable fields
- Canals
- Cereal field margins
- Ditches
- Eutrophic standing waters
- Fen
- Improved grassland
- Lowland calcareous grassland
- Lowland dry acid grassland

⁶ Nottinghamshire Biodiversity Action Group (NBAG) (2020). Species Action Plans. Available URL for download: [REDACTED] Last Accessed: 30/01/2023.

⁷ Nottinghamshire Biodiversity Action Group (NBAG) (2020) Appendix B - List of Habitats of Conservation Concern. Available URL for download: [REDACTED]. Last accessed: 17/01/2023.

- Lowland heathland
- Lowland wet grassland (Included in UK key habitat “coastal and floodplain grazing marsh”)
- Lowland wood pasture and parkland
- Marsh
- Mesotrophic lakes
- Mixed ash dominated woodland
- Oak-birch woodland
- Planted coniferous woodland
- Post-industrial land
- Reedbed
- Rivers and streams
- Saline lagoons
- Unimproved neutral grassland (Equivalent to UK key habitat “lowland hay meadow”)
- Urban land
- Wet broadleaved woodland

3 Methodology

3.1 Desk study

- 3.1.1 The desk study collated and reviewed existing ecological information from the Scheme and its surroundings to inform the ecological survey requirements for the National Vegetation Classification (NVC) survey. This ecological data was gathered during the Phase 1 habitat survey conducted on site (see Appendix 8.1 (Extended Phase 1 Habitat Report) of the ES Appendices (**TR010065/APP/6.3**)) which informed the requirement for a NVC survey based on the variety of habitat types recorded.
- 3.1.2 A Nottinghamshire Biological and Geological Records Centre (NBGRC) biological records search was undertaken to obtain records of protected or notable species within a 5 kilometre radius of the Order Limits. Protected and notable species included species in the following Botanical Society of Britain and Ireland (BSBI) (2021),⁸ Stroh *et al.* 2014⁹ and Wood & Woods (2021)¹⁰ lists respectively.

3.2 National Vegetation Classification surveys

- 3.2.1 NVC surveys were undertaken between June – August 2022 and May – June 2023 and followed the standard methodology based on Rodwell (2006)¹¹ as follows:
- NVC surveys were completed by ecologists (of whom at least one was an experienced botanist, with 3 years' worth of experience leading NVC survey). Surveys were conducted in accordance with the methodology laid out by Rodwell (2006), where homogenous stands of vegetation were identified and sampled with a quadrat. Areas that were scoped in for survey included habitats that were identified as potentially being areas of Priority Habitat based on the results of habitats identified during the extended Phase 1 habitat surveys undertaken for the Scheme (see Appendix 8.1 (Extended Phase 1 Habitat Report) of the ES Appendices (**TR010065/APP/6.3**)) and from

⁸ Botanical Society of Britain and Ireland (BSBI) (2021). GB Red list for Vascular Plants. Available URL for download: <https://bsbi.org/taxon-lists> Last accessed 26/05/2022.

⁹ Stroh, P., Leach, S., August, T. and Taylor, I. (2014). A Vascular Plant Red List for England. Botanical Society of Britain and Ireland; Bristol.

¹⁰ Wood, D. and Wood M. (2021). Nottinghamshire Vice County 56 Rare Plant Register 3rd Edition. Available URL for download: [REDACTED] Last accessed: 17/01/2023.

¹¹ Rodwell, J. S., & Joint Nature Conservation Committee (GB). (2006). National Vegetation Classification: Users' Handbook. Peterborough: JNCC.

the use of MAGICs¹² Priority Habitat layer. Surveyors also utilised an internal 'land parcel' referencing system to identify areas of land that belong to different landowners throughout the Scheme (which followed the following naming conventions; 'NTXXXXXX' or 'UXXXXXX'). Following this, a species inventory was formed using the 'Domin' scale and frequency classes assigned to each species (see Table 3-1).

- The 'DAFOR' (D=dominant, A=abundant, F=frequent, O=occasional, R=rare) scale (see Table 3.2), was used to assign qualitative abundance for any species encountered during the NVC survey. Following Rodwell (2006), DAFOR scores were not used to assign vegetational communities, but only to qualitatively assess species abundance within a stand of vegetation.
- The nomenclature for the vascular plants in this chapter follows Stace (2019)¹³ for both scientific and English names. The bryophyte nomenclature follows Atherton et al. (2010)¹⁴ for scientific and English names.

3.2.2 Table 3-1 and Table 3-2 below illustrate the assessment criteria for assigning species abundance and percentage cover when conducting NVC surveys.

Table 3-1: Assessment of percentage cover using Domin scale

Domin Scale	Percentage Cover
10	91-100%
9	76-90%
8	51-75%
7	34-50%
6	26-33%
5	11-25%
4	4-10%
3	<4% frequent
2	<4% occasional
1	<4% rare

Source: NVC Users Handbook: Rodwell, J.S. (2006) NVC Users' Handbook, JNCC, Peterborough

Table 3-2: Assessment of species abundance using the DAFOR scale

DAFOR Score	Meaning
D	Dominant
A	Abundant
F	Frequent
O	Occasional
R	Rare

Source: NVC Users Handbook: Rodwell, J.S. (2006) NVC Users' Handbook, JNCC, Peterborough

¹² MAGIC Maps Service, available at: <https://magic.defra.gov.uk/>

¹³ Stace, C.S. (2019). New Flora of the British Isles. 4th Edition. Cambridge University Press, Cambridge.

¹⁴ Atherton, I., Bosanquet, S. and Llawley, M. (Eds.) (2010). Mosses and Liverworts of Britain and Ireland: A Field Guide. British Bryological Society.

3.3 Limitations

- 3.3.1 Some areas of habitat that required NVC surveys could not be completed within the 2022 or 2023 survey period. Notably this included the Kelham and Averham Floodplain Compensation Area (FCA), which was added to the Scheme after the NVC surveys on the main alignment were completed and was subject to access issues during 2023. In the absence of field data, a reasonable worst-case scenario has been assumed, using MAGIC Interactive Map in combination with open source aerial photography to define the boundary of each HPI potentially present. Using a precautionary approach, these 'potentially present' HPIs are assumed to be present. The location of HPIs recorded from field surveys and MAGIC Interactive Map (where access was not granted for ground truthing surveys and a precautionary approach applied instead) are shown within Appendix D (Habitats of Principal Importance) of this report.
- 3.3.2 The assessment of specific habitat receptors in the ES was guided and informed by the data gathered throughout the survey area as well as the desk study data. In the absence of data, assessments are based on a reasonable 'worst-case' scenario.

4 Results

4.1 Desk study

- 4.1.1 The desk study returned 444 vascular plant records of 116 protected/notable plant species from within 5 kilometres of the Order Limits.
- 4.1.2 Most of these records are from Local Wildlife Sites (LWS) south and east of Newark such as Farndon Gravel Pit and Marina, Wyke Lane Grassland and Ponds and Beacon Hill Gypsum Workings.
- 4.1.3 Within the Order Limits 19 species of notable plant were recorded, as shown in Table 4-1. Conservation statuses and designations originate from the Botanical Society of Britain and Ireland (BSBI) (2021),¹⁵ Stroh *et al.* 2014¹⁶ and Wood & Woods (2021)¹⁷ respectively.

Table 4-1: Summary of notable plant species biological record information

Species	Most recent record	Number of records	Conservation status/designations
Columbine <i>Aquilegia vulgaris</i>	2010	1	Nottinghamshire Rare Plant Register (RPR) Uncommon
Quaking grass <i>Briza media</i>	2017	3	England Near Threatened, Nottinghamshire RPR Uncommon
Intermediate water-starwort <i>Callitriche brutia ssp. hamulata</i>	2002	1	Nottinghamshire RPR Uncommon
Cornflower, <i>Centaurea cyanus</i>	2010	1	Nottinghamshire RPR Uncommon
Chicory, <i>Cichorium intybus</i>	2017	2	England Vulnerable
Common cudweed, <i>Filago germanica</i>	2019	6	GB Near Threatened
Water violet, <i>Hottonia palustris</i>	1996	3	England Vulnerable, Nottinghamshire RPR Local
Field scabious, <i>Knautia arvensis</i>	2017	1	England Near Threatened
Small cudweed, <i>Logfia minima</i>	1997	1	England Near Threatened

¹⁵ Botanical Society of Britain and Ireland (BSBI) (2021). GB Red list for Vascular Plants. Available URL for download: <https://bsbi.org/taxon-lists> Last accessed 26/05/2022.

¹⁶ Stroh, P., Leach, S., August, T. and Taylor, I. (2014). A Vascular Plant Red List for England. Botanical Society of Britain and Ireland; Bristol.

¹⁷ Wood, D. and Wood M. (2021). Nottinghamshire Vice County 56 Rare Plant Register 3rd Edition. Available URL for download: [Nottinghamshire \(bsbi.org\)](https://www.nottinghamshire.gov.uk/bsbi.org) Last accessed: 17/01/2023.

Species	Most recent record	Number of records	Conservation status/designations
Tubular water-dropwort, <i>Oenanthe fistulosa</i>	2010	1	England Vulnerable, Nottinghamshire RPR Uncommon
Lesser spearwort, <i>Ranunculus flammula</i>	2003	2	England Vulnerable
Prickly poppy, <i>Roemeria argemone</i>	2010	3	GB Vulnerable, England Endangered, Nationally Scarce
Ragged-robin, <i>Silene flos-cuculi</i>	2017	3	England Near Threatened
Field scabious <i>Knautia arvensis</i>	2018	18	England Near Threatened
Greater water-parsnip, <i>Sium latifolium</i>	1807	1	England Endangered, Nottinghamshire RPR Extinct
Large-leaved lime, <i>Tilia platyphyllos</i>	1999	2	Nationally Scarce, Nottinghamshire RPR Uncommon
Wild pansy, <i>Viola tricolor ssp. tricolor</i>	2010	1	GB Near Threatened, England Near Threatened, Nottinghamshire RPR Uncommon

4.2 National vegetation classification survey

- 4.2.1 The findings of the NVC surveys undertaken between June – August 2022 and May – June 2023 are presented below. In summary, the surveyed habitats consisted of seven NVC community types: four mesotrophic (neutral) grassland communities (MG1, MG4, MG5 and MG6), one open vegetation community OV26, and two woodland communities W8 and W10.
- 4.2.2 A map of the NVC communities present in the surveyed area is displayed in Appendix A (NVC Communities Map) of this report. Floristic tables for each vegetation community/subcommunity are provided in Appendix B (Floristic Tables) of this report.
- 4.2.3 Two of the stands surveyed as part of the NVC survey were not assigned a community due to the presence of planted canopies over sparse ground floras, therefore the assigning of specific NVC community was not possible. These areas are shown as unclassified within the Appendix A (NVC Communities Map) of this report.

NVC Community: MG1 *Arrhenatherum elatius* grassland

- 4.2.4 MG1 grassland was found to be present in six of the land parcels surveyed NT361486, NT425645, NT539426,

NT526231, NT477349 and NT526230. For exact locations within the Scheme please view Appendix A (NVC Communities Map) of this report.

- 4.2.5 MG1 grassland within NT361486 was present in the center of the land parcel, with the rabbit grazed sward being adjacent to the existing A46 northbound carriageway. Red fescue, imperforate St John's-wort *Hypericum maculatum*, dove's foot cranesbill *Geranium molle* and ribwort plantain *Plantago lanceolata* were constant. False oat-grass *Arrhenatherum elatius*, creeping bent *Agrostis stolonifera*, cocksfoot *Dactylis glomerata* and birds-foot trefoil *Lotus corniculatus* were all frequent associates. No plant species found in the surveyed grassland was rare, protected, or red-listed as defined under Section 3.1 of this report.
- 4.2.6 The MG1 grassland at NT425645 was situated directly north of the A46 and was approximately 2.1 hectares in size. The grassland was first surveyed in August 2022 and re-surveyed on 30 May 2023 in order to clarify the NVC community type. The grassland appeared to be irregularly mown and comprised of one homogenous stand throughout. False oat-grass, meadow foxtail *Alopecurus pratensis*, red fescue *Festuca rubra*, bird's foot trefoil *Lotus corniculatus* and meadow buttercup *Ranunculus acris* were all constant with Yorkshire fog *Holcus lanatus* a frequent associate. Two plant species that are rare, protected, or red-listed as defined under Section 3.1 of this report, were recorded within the grassland. These were quaking grass *Briza media* and ragged-robin *Silene flos-cuculi* both being rare within the sward and too thinly distributed to be present within the quadrats.
- 4.2.7 MG1 within NT539426 was located adjacent to both Mather Road and the River Trent footbridge. The grassland appeared to be irregularly managed and approximately 0.8 hectares in size. False oat-grass and red fescue were both constants and lady's bedstraw *Galium verum* and dove's foot cranesbill were both frequent associates. Two plant species that are rare, protected, or red-listed as defined under Section 3.1 of this report, were recorded within the grassland. These were quaking grass and field scabious *Knautia arvensis*, with the plants being rare and occasional to locally frequent in the sward respectively.
- 4.2.8 The MG1 grassland at NT526231 was found adjacent to the south side of Kelham Road. The grassland was found to have been grazed in parts by horses and was approximately 0.8 hectares in area. Yorkshire fog *Holcus lanatus* and rough meadow-grass *Poa trivialis* were both constants and smooth meadow-grass *Poa pratensis*, ribwort plantain *Plantago*

lanceolata, creeping thistle *Cirsium arvense*, cut-leaved crane's-bill *Geranium dissectum* and meadow buttercup *Ranunculus acris* were all frequent associates. No plant species found in the surveyed grassland was rare, protected, or red-listed as defined under Section 3.1 of this report.

- 4.2.9 MG1 within NT477349 was located adjacent to the south-east side of Kelham Road. The grassland was found to be relatively homogenous throughout and approximately 0.7 hectares in area. Yorkshire-fog *Holcus lanatus*, perennial rye-grass *Lolium perenne* and Rough meadow-grass *Poa trivialis* were all constants with smooth meadow-grass *Poa pratensis* and false oat-grass *Arrhenatherum elatius* both frequent associates. No plant species found in the surveyed grassland was rare, protected, or red-listed as defined under Section 3.1 of this report.
- 4.2.10 The MG1 grassland at NT526230 was situated on land to the South-East side of Kelham Road. The grassland was uncut and approximately 0.5 hectares in area. Meadow foxtail *Alopecurus pratensis*, cock's-foot *Dactylis glomerata* and Yorkshire fog *Holcus lanatus* were all constants in the sward with false oat grass *Arrhenatherum elatius* and musk thistle *Carduus nutans* both frequent associates. No plant species found in the surveyed grassland was rare, protected, or red-listed as defined under Section 3.1 of this report.
- 4.2.11 MG1 grasslands are very common and widespread communities at both the county and country level, frequently occurring in areas of grassland where management is infrequent (Rodwell, 1992).¹⁸
- 4.2.12 Photos of the MG1 grasslands are shown in Appendix C.1-C.4 (Photos) of this report.

NVC Community: MG4 *Alopecurus pratensis* – *Sanguisorba officinalis* grassland / MG6 *Lolium perenne* – *Cynosurus cristatus* grassland

- 4.2.13 The MG4/6 grassland within NT428717, was present in a field south of a scrapyard and directly north of the A46. The grassland appeared to be horse grazed throughout and is approximately 2.6 hectares in size. Black knapweed *Centaurea nigra* was constant, with Yorkshire fog, perennial rye-grass and lady's bedstraw all frequent associates. One plant species that was rare, protected, or red-listed as defined under Section 3.1 of this report, was recorded within

¹⁸ Rodwell, J. S. (Ed.). (1992). British Plant Communities: Volume 3, Grassland and Montane Communities. Cambridge University Press.

the grassland, quaking grass, which was rare within the sward.

- 4.2.14 The grassland contained a closed sward and care was taken to sample the entire area so that specific vegetative stands were not missing within the sampling effort. In total, 10 quadrats were undertaken. The differing vegetational communities exist as a mosaic of MG4/6 and as such have not been mapped separately in Appendix A – NVC communities map. It should be noted that the MG6 community recorded was very close in character to the MG5 *Cynosurus cristatus* – *Centaurea nigra* grassland community, a Habitat of Principal Importance – Lowland Meadows. These communities are closely related and can grade into each other depending upon agricultural treatments.
- 4.2.15 MG4/6 grassland present within the mosaic is defined as a Nottinghamshire Local Biodiversity Action Plan (LBAP) Unimproved Neutral Grassland and a Habitat of Principal Importance – Lowland Meadows with the MG4 grassland being precautionarily classed as Annex 1 Habitat - H6510 Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*).
- 4.2.16 MG4 grasslands have a local distribution, with species rich stands being sparsely scattered over southern England and the Midlands (Rodwell, 1992).¹⁹ In contrast, MG6 grasslands are very common and widespread communities at both the county and country level, frequently occurring in amenity settings. It should be noted that the MG6 community surveyed is very close to MG5, a community occurring throughout lowland Britain, however, drastically reduced by agricultural improvement.
- 4.2.17 This habitat, which falls outside of the Order Limits, may satisfy the criteria for a designated site and thus could be of regional importance. As per guidance from Jefferson et al. 2019²⁰, if an area of 0.5 hectares or greater of MG4 is present, then the area of grassland is likely to be of the standard for Site of Special Scientific Interest (SSSI) selection.
- 4.2.18 A photo of the MG4/6 grassland is shown in Appendix C.5 (Photos) of this report.

¹⁹ Rodwell, J. S. (Ed.). (1992). British Plant Communities: Volume 3, Grassland and Montane Communities. Cambridge University Press.

²⁰ Jefferson, R.G., Smith, S.L.N. & MacKintosh, E.J. 2019. Guidelines for the Selection of Biological SSSIs. Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 3 Lowland Grasslands. Joint Nature Conservation Committee, Peterborough.

NVC Community: MG5 *Cynosurus cristatus*-*Centaurea nigra* grassland

- 4.2.19 MG5 Lowland Meadow, a type of species-rich neutral grassland, was found within one land parcel at NT414035 to the west of Great North Road. A strip of horse grazed sward was found adjacent to the road with an ephemeral waterbody containing a large population of common water-crowfoot *Ranunculus aquatilis* present to the north of the meadow. Herbaceous plants comprised a substantial proportion of the sward. Red fescue *Festuca rubra*, smooth meadow-grass *Poa pratensis*, common knapweed *Centaurea nigra*, common mouse-ear *Cerastium fontanum* and common ragwort *Jacobaea vulgaris* were all constant with rough meadow-grass *Poa trivialis*, pignut *Conopodium majus*, lady's bedstraw *Galium verum*, meadow buttercup *Ranunculus acris*, bulbous buttercup *Ranunculus bulbosus* and common sorrel *Rumex acetosa* being frequent associates.
- 4.2.20 MG5 is one of four communities associated with well-drained permanent pastures and meadows. It has sustained large losses due to drainage, ploughing and re-seeding and from the use of high rates of fertilisers. There is now less than 6,000 hectares remaining in England. As such it is classed as a Habitat of Principal Importance.
- 4.2.21 MG5 has an associated habitat action plan under the Nottinghamshire LBAP (Unimproved Neutral Grassland) and is a Habitat of Principal Importance – Lowland Meadows.

NVC Community: OV26 *Epilobium hirsutum* community

- 4.2.22 The OV26 community within NT361486 was situated adjacent to the MG1 grassland within the land parcel and comprised tall vegetation surrounding a pond. Creeping thistle *Cirsium arvense* was constant with great willowherb *Epilobium hirsutum* being a frequent associate. No plant species found in the surveyed community were rare, protected, or red-listed as defined under Section 3.1 of this report.
- 4.2.23 The OV26 community is found throughout lowland Britain. It occurs on moist, but not waterlogged soils, and is one of the transitional vegetation types around open water and

alongside lowland streams. It is often found on damp verges and in ditches alongside roads and tracks (Rodwell, 2000)²¹.

- 4.2.24 Photos of OV26 grassland are shown in Appendix C.6 (Photos) of this report.

NVC Community: W8 Fraxinus excelsior - Acer campestre - Mercurialis perennis woodland

- 4.2.25 W8 woodlands were recorded in three land parcels NT402387 (including NT298171) and NT411049. For precise locations within the Scheme see Appendix A (NVC Communities Map) of this report.
- 4.2.26 The areas of W8 woodland within land parcels NT402387 and NT298171 were a continuous stand and as such are mapped as one area (labeled as NT402387 in the Appendix A figure). The canopy comprised constant horse-chestnut *Aesculus hippocastanum*, ash *Fraxinus excelsior*, wild cherry *Prunus avium*, sessile oak *Quercus petraea* and pedunculate oak *Quercus robur*. Within the ground layer cleavers *Galium aparine* was constant and common nettle *Urtica dioica* a frequent associate.
- 4.2.27 W8 woodland within NT411049 was a small area (approximately 0.4 hectares) of woodland habitat, located in the southerly portion of the land parcel. This woodland had a canopy consisting of sycamore *Acer pseudoplatanus*, silver birch *Betula pendula*, ash and elder *Sambucus nigra*. The ground layer contained constant garlic mustard *Alliaria petiolata*, cleavers *Galium aparine*, red campion *Silene dioica* and common nettle *Urtica dioica* with no frequent associates.
- 4.2.28 The W8 woodlands most closely corresponded to the W8e *Geranium robertianum* subcommunity due to their eutrophic, species-poor composition, with cleavers and common nettle being frequent. No plant species found in the surveyed woodlands were rare, protected, or red-listed as defined under Section 3.1 of this report.
- 4.2.29 The W8e woodlands are defined as both a Nottinghamshire LBAP Mixed Ash Dominated Woodland and Habitats of Principal Importance - Lowland Oak and Mixed Deciduous Woodland. The woodlands do not conform to the Annex 1 Habitat - 9180 Tilio-Acerion forests of slopes, scree and ravines, as both woodlands are missing plant species

²¹ Rodwell, J. S. (Ed.). (2000). British Plant Communities: Volume 5, Maritime Communities and Vegetation of Open Habitats. Cambridge University Press.

required for the community such as small-leaved lime *Tilia cordata* and large-leaved lime *Tilia platyphyllos*.

- 4.2.30 W8 woodlands are widespread over lowland Britain being more frequently encountered over more base rich soils (Rodwell, 1991).²²
- 4.2.31 Photos of the W8 woodlands are shown in Appendix C.7 and C.8 (Photos) of this report.

NVC Community: W10 *Quercus robur* – *Pteridium aquilinum* – *Rubus fruticosus* woodland

- 4.2.32 W10 woodland was recorded in two land parcels at NT411049 and NT285583.
- 4.2.33 The W10 woodland at NT411049 comprised a small area (approximately 0.6 hectares) of woodland habitat in the southerly portion of the land parcel. The canopy contained constant pedunculate oak *Quercus robur*, with a varied sub-canopy of constant dogwood *Cornus sanguinea*, hawthorn *Crataegus monogyna*, hazel *Corylus avellana*, privet *Ligustrum vulgare* and elder *Sambucus nigra*. The ground layer contained constant wood avens *Geum urbanum* and the frequent associate bramble *Rubus fruticosus* agg.
- 4.2.34 W10 woodland at NT285583 was located on land lying to the northeast of the Great North Road. The woodland appeared to have been planted in parts with discernible rows of trees within the stand, however it had a predominantly semi-natural structure. Pedunculate oak *Quercus robur* was constant in the canopy with hazel *Corylus avellana* and ash *Fraxinus excelsior* being frequent associates. There were no constants within the ground layer with the majority consisting of decaying leaf litter. Associates included wood avens *Geum urbanum*, hawthorn *Crataegus monogyna*, male-fern *Dryopteris filix-mas* and lesser celandine *Ficaria verna*.
- 4.2.35 Both areas of W10 woodland correspond most closely to W10a due to the dominance of pedunculate oak in the canopy layer and presence of frequent bramble within the field layer, with the absence of other ground layer species that distinguish the other W10 sub-communities.
- 4.2.36 The W10a woodland is defined as a Nottinghamshire LBAP Oak-Birch Woodland and a Habitat of Principal Importance - Lowland Oak and Mixed Deciduous Woodland. All except the areas of planted woodland within land parcel NT285583 conform to the HPI specification of Lowland Mixed

²² Rodwell, J. S. (Ed.). (1991). British Plant Communities: Volume 1, Woodland and Scrub. Cambridge University Press.

Deciduous Woodland. The woodland does not conform to the Annex 1 Habitat - 9160 Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli*, due to the absence of hornbeam *Carpinus betulus*. No plant species found in the surveyed woodland were rare, protected, or red-listed as defined under Section 3.1 of this report.

- 4.2.37 W10 woodland is widely distributed and frequent across the lowlands of England and Wales.
- 4.2.38 Photos of the W10 woodland are shown in Appendix C.9 (Photos) of this report.

4.3 Rare and red-listed plant species

4.3.1 The populations of three rare or red-listed plant were noted during the National Vegetation Classification (NVC) surveys and a summary of population size and conservation importance for each of the species' populations is provided in Table 4-2 below.

Table 4-2: Summary of rare and red-listed plant species

Plant Species	Conservation Designation(s)	Population Size/Extent	Level of Geographic Importance	Reason for Assigned Level of Geographic Importance
Quaking grass <i>Briza media</i>	GB Vulnerable, England Endangered, Nottinghamshire RPR Uncommon	Thinly scattered in several grassland swards present in both MG1 and MG4 communities.	Local	Red-listed but widespread at the county level. The populations do not comprise a significant proportion of the plants in the county.
Field scabious <i>Knautia arvensis</i>	England Near-threatened, Nottinghamshire RPR Occasional	Occasional to locally frequent in the MG1 grassland of NT539426, not recorded elsewhere.	Local	Red-listed but widespread at the county level. The population does not comprise a significant proportion of the plants in the county.
Ragged-robin <i>Silene flos-cuculi</i>	England Near-threatened, Nottinghamshire RPR Scattered	Thinly scattered in NT425645 within MG1 grassland.	Local	Red-listed but relatively widespread at the county level. The population does not comprise a significant proportion of the plants in the county.

5 Summary and conclusion

5.1 Summary

- 5.1.1 The surveyed habitats consisted of seven National Vegetation Classification (NVC) community types: four mesotrophic (neutral) grassland communities (MG1, MG4 and MG6), one open vegetation community OV26 and two woodland communities W8 and W10. The two woodland communities can be further categorised into the W8e and W10a subcommunities. The woodland communities (W8e and W10a) are both classed as a Habitat of Principal Importance - Lowland Oak and Mixed Deciduous Woodland. MG4 *Alopecurus pratensis* – *Sanguisorba officinalis* grassland / MG6 *Lolium perenne* – *Cynosurus cristatus* grassland is categorised as a Habitat of Principal Importance – Lowland Meadows with the MG4 grassland also being precautionarily listed as Annex 1 Habitat - H6510 Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*). The MG5 grassland is also classed as a Habitat of Principal Importance – Lowland Meadow.
- 5.1.2 Three red listed plant species were recorded during the NVC surveys. Quaking grass was thinly scattered in several grassland swards present in both MG1 and MG4 communities throughout the Scheme. Field scabious was found to be occasional to locally frequent within the MG1 grassland of land parcel NT539426. Ragged-robin was present in a thinly scattered population in NT425645 within the MG1 grassland.

6 References

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- ² The Conservation of Habitats and Species Regulations 2017. Available URL for download: [The Conservation of Habitats and Species Regulations 2017 \(legislation.gov.uk\)](#) Last accessed November 2023.
- ³ Schedule 8 Wildlife and Countryside Act 1981. Available URL for download: [Wildlife and Countryside Act 1981 \(legislation.gov.uk\)](#) Last accessed November 2023.
- ⁴ Section 41 Natural Environment and Rural Communities Act 2006. Available URL for download: [Natural Environment and Rural Communities Act 2006 \(legislation.gov.uk\)](#) Last Accessed November 2023.
- ⁵ Section 40 Natural Environment and Rural Communities Act 2006. Available URL for download: [Natural Environment and Rural Communities Act 2006 \(legislation.gov.uk\)](#) Last Accessed November 2023.
- ⁶ Nottinghamshire Biodiversity Action Group (NBAG) (2020). Species Action Plans. Available URL for download: [REDACTED] Last Accessed: November 2023.
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- ⁹ Stroh, P., Leach, S., August, T. and Taylor, I. (2014). A Vascular Plant Red List for England. Botanical Society of Britain and Ireland; Bristol.
- ¹⁰ Wood, D. and Wood M. (2021). Nottinghamshire Vice County 56 Rare Plant Register 3rd Edition. Available URL for download: [REDACTED] Last accessed: November 2023.
- ¹¹ Rodwell, J. S., & Joint Nature Conservation Committee (GB). (2006). National Vegetation Classification: Users' Handbook. Peterborough: JNCC.

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¹⁴ Atherton, I., Bosanquet, S. and Llawley, M. (Eds.) (2010). *Mosses and Liverworts of Britain and Ireland: A Field Guide*. British Bryological Society.

¹⁵ Botanical Society of Britain and Ireland (BSBI) (2021). *GB Red list for Vascular Plants*. Available URL for download: [REDACTED] Last accessed November 2023.

¹⁶ Stroh, P., Leach, S., August, T. and Taylor, I. (2014). *A Vascular Plant Red List for England*. Botanical Society of Britain and Ireland; Bristol.

¹⁷ Wood, D. and Wood M. (2021). *Nottinghamshire Vice County 56 Rare Plant Register 3rd Edition*. Available URL for download: [REDACTED] Last accessed: November 2023.

¹⁸ Rodwell, J. S. (Ed.). (1992). *British Plant Communities: Volume 3, Grassland and Montane Communities*. Cambridge University Press.

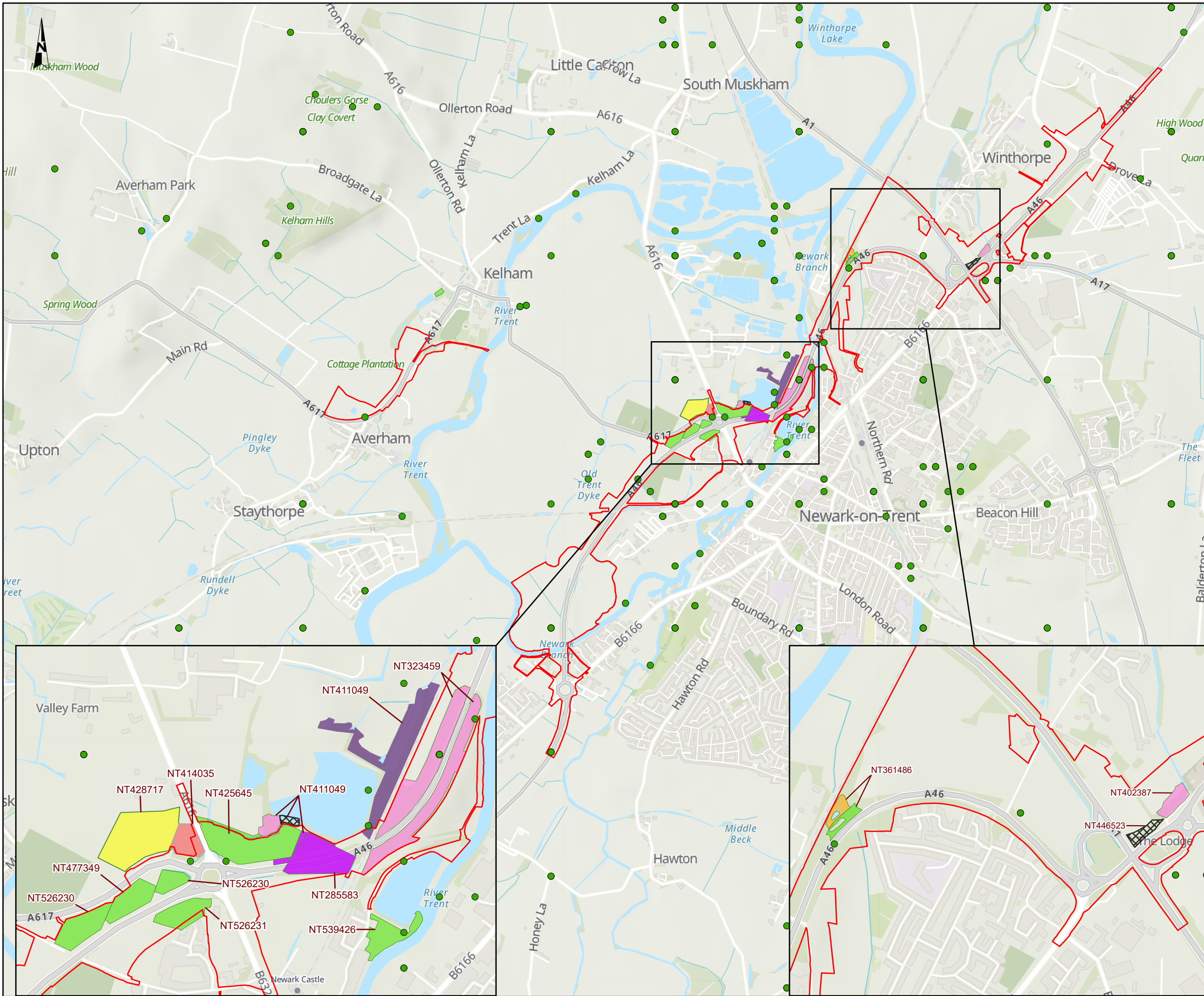
¹⁹ Rodwell, J. S. (Ed.). (1992). *British Plant Communities: Volume 3, Grassland and Montane Communities*. Cambridge University Press.

²⁰ Jefferson, R.G., Smith, S.L.N. & MacKintosh, E.J. 2019. *Guidelines for the Selection of Biological SSSIs. Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 3 Lowland Grasslands*. Joint Nature Conservation Committee, Peterborough.

²¹ Rodwell, J. S. (Ed.). (2000). *British Plant Communities: Volume 5, Maritime Communities and Vegetation of Open Habitats*. Cambridge University Press

²² Rodwell, J. S. (Ed.). (1991). *British Plant Communities: Volume 1, Woodland and Scrub*. Cambridge University Press.

A. Appendix: NVC communities map



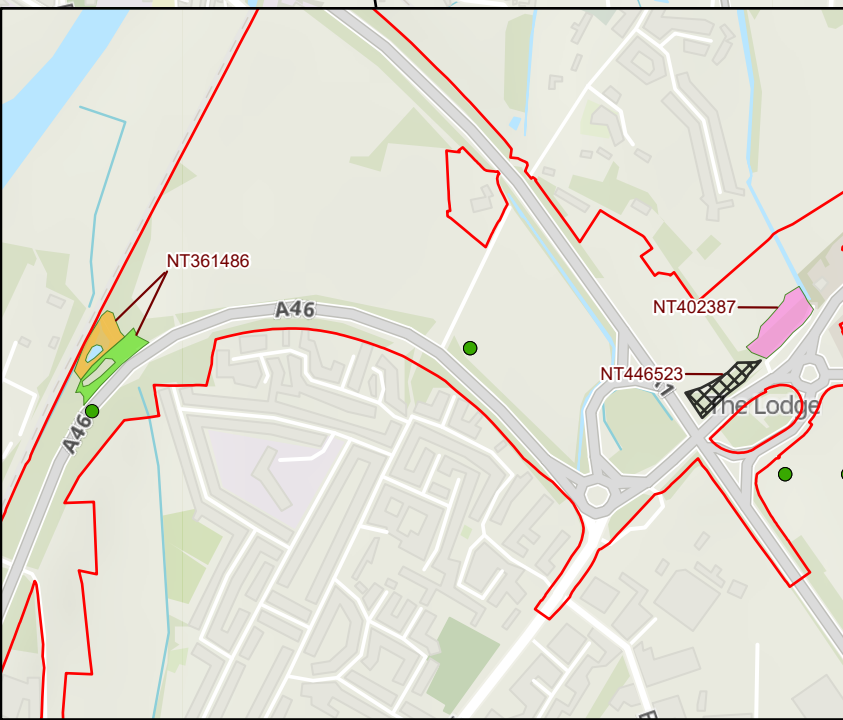
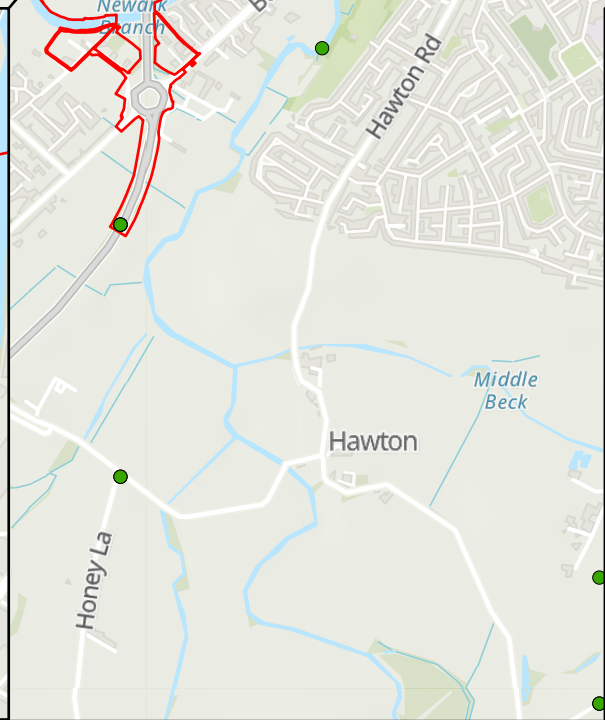
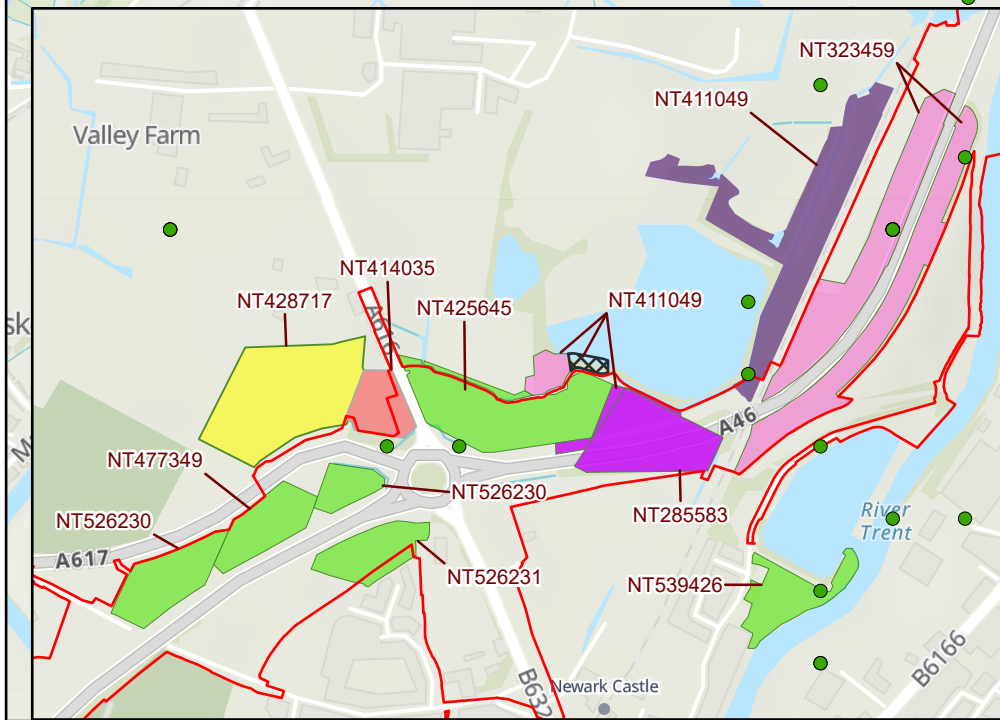
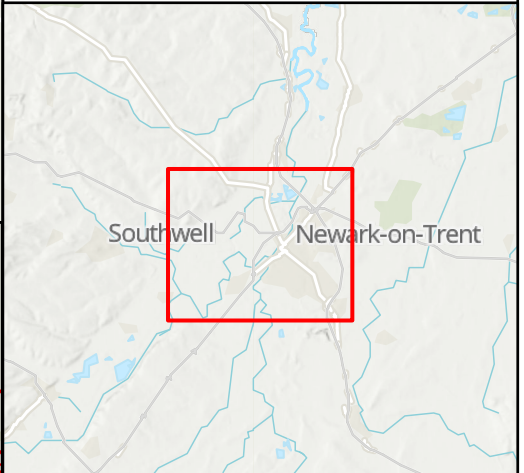
NOTES
 Source
 Ecology data collected by Mott MacDonald, 2022-2023.
 Records: Biological Records Centre, 2022-2023.
 Service Layer Credits
 Contains OS data © Crown Copyright and database right 2023
 Contains data from OS Zoomstack

KEY TO SYMBOLS

- Order Limits
- Rare plant record

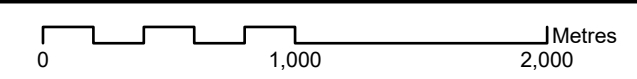
NVC Community

- MG1
- MG4/MG6
- MG5
- OV26
- W8e
- W10a
- W8/W10
- Not classified



C01	08/12/23	DCO APPLICATION	JB	BC	HF
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD	APPD
CLIENT					
PURPOSE OF ISSUE					
DCO APPLICATION					
DEVELOPMENT CONSENT ORDER NUMBER					
TR010065					
PROJECT TITLE					
A46 NEWARK BYPASS					
DRAWING TITLE					
Appendix A NVC Communities					
ORIGINAL SIZE		SCALE			
A3		1:30,000			
DRAWING NUMBER		ORIGINATOR	VOLUME	PROJECT REF NO.	
HE551478		SKAG	EBD	HE551478	
CONWI_CONW		DR	LE	00066	REVISION
				NUMBER	C01

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B. Appendix: NVC floristic tables

Plant Species	Quadrat Number/ Domin Values
Canopy & Shrub	1
<i>Alnus incana</i>	2
<i>Acer campestre</i>	1
<i>Corylus avellana</i>	4
<i>Crataegus monogyna</i>	2
<i>Fraxinus excelsior</i>	4
<i>Ilex aquifolium</i>	1
<i>Ligustrum vulgare</i>	3
<i>Prunus avium</i>	1
<i>Quercus robur</i>	5
Ground Layer	
<i>Crataegus monogyna</i>	1
<i>Dryopteris filix-mas</i>	2
<i>Ficaria verna</i>	1
<i>Geum urbanum</i>	2
Bryophytes	

Source: Mott MacDonald 2023

Plant Species	Quadrat Number / Domin Values				
	1	2	3	4	5
Grasses, Sedges & Rushes					
<i>Arrhenatherum elatius</i>	4	7	3	7	6
<i>Dactylis glomerata</i>	2	3		4	5
<i>Festuca rubra</i>	8	5	2		2
<i>Holcus lanatus</i>		3	6	6	5
<i>Anthoxanthum odoratum</i>	4	1	2		
<i>Agrostis capillaris</i>		2		2	
<i>Phleum pratense</i>		1	3		
<i>Cynosurus cristatus</i>			1		
Forbs					
<i>Centaurea nigra</i>		6	6	2	6
<i>Leucanthemum vulgare</i>	5	2	4	3	
<i>Vicia cracca</i>		4	6	4	5
<i>Trifolium pratense</i>	2	1	1		
<i>Cirsium arvense</i>				2	4
<i>Plantago lanceolata</i>	4		4		
<i>Rhinanthus minor</i>	3		5		
<i>Taraxacum officinale</i> agg.	3	3			
<i>Cerastium fontanum</i>	3				
<i>Fraxinus excelsior</i>			3		
<i>Primula veris</i>		4			
<i>Ranunculus acris</i>				1	
Bryophytes & Lichens					

Source: Mott MacDonald 2023

Frequency Percentage	Frequency Class	Range
100	V	3-7
80	IV	0-5
80	IV	2-8
80	IV	0-6
60	III	0-4
40	II	0-2
40	II	0-3
20	I	0-1
80	IV	0-6
80	IV	0-5
80	IV	0-6
60	III	0-2
40	II	0-4
40	II	0-4
40	II	0-5
40	II	0-3
20	I	0-3
20	I	0-3
20	I	0-4
20	I	0-1

Plant Species	Quadrat Number / Domin Values				
	1	2	3	4	5
Grasses, Sedges & Rushes					
<i>Festuca rubra</i>	4	5	4	4	4
<i>Arrhenatherum elatius</i>	5	2	1		1
<i>Agrostis stolonifera</i>		2	5	3	5
<i>Dactylis glomerata</i>	2	3	2	4	
<i>Holcus lanatus</i>	3	5			4
<i>Poa annua</i>	1	1		1	
<i>Bromus hordeaceus</i>		2			
<i>Poa pratensis</i>		2			
<i>Poa trivialis</i>	2				
Forbs					
<i>Hypericum maculatum</i>	4	4	4	3	3
<i>Geranium molle</i>	1	2	1	1	2
<i>Plantago lanceolata</i>	1	2	3	5	6
<i>Lotus corniculatus</i>	7	7	7	5	
<i>Cerastium fontanum</i>	1	3			1
<i>Achillea millefolium</i>			3	3	
<i>Veronica persica</i>		2	1		
<i>Anthriscus sylvestris</i>		2			
<i>Bellis perennis</i>				2	
<i>Crepis capillaris</i>				1	
<i>Ervum tetraspermum</i>					2
<i>Jacobaea vulgaris</i>				1	
<i>Leucanthemum vulgare</i>				1	
<i>Medicago lupulina</i>				2	
<i>Myosotis arvensis</i>	4				
<i>Prunus spinosa</i>				4	
<i>Ranunculus acris</i>	1				
<i>Ranunculus repens</i>					1
<i>Scorzoneroidea autumnalis</i>				1	
<i>Trifolium dubium</i>					1
<i>Trifolium repens</i>			3		
<i>Tussilago farfara</i>					2
<i>Veronica chamaedrys</i>					3
Bryophytes & Lichens					

Frequency Percentage	Frequency Class	Range
100	V	4-5
80	IV	0-5
80	IV	0-5
80	IV	0-4
60	III	0-5
60	III	0-1
20	I	0-2
20	I	0-2
20	I	0-2
100	V	3-4
100	V	1-2
100	V	1-6
80	IV	0-7
60	III	0-3
40	II	0-3
40	II	0-2
20	I	0-2
20	I	0-2
20	I	0-1
20	I	0-2
20	I	0-1
20	I	0-1
20	I	0-2
20	I	0-4
20	I	0-4
20	I	0-1
20	I	0-1
20	I	0-1
20	I	0-3
20	I	0-2
20	I	0-3

Source: Mott MacDonald 2023

Plant Species	Quadrat Number / Domin Values				
	1	2	3	4	5
Grasses, Sedges & Rushes					
<i>Poa trivialis</i>				3	4
<i>Alopecurus pratensis</i>		2			
<i>Dactylis glomerata</i>		2			
<i>Poa pratensis</i>	1				
Forbs					
<i>Cirsium arvense</i>	4	4	2	1	1
<i>Epilobium hirsutum</i>	8	8	3	2	
<i>Filipendula ulmaria</i>			10	9	9
<i>Rumex sanguineus</i>	2		3		2
<i>Conium maculatum</i>	4	4			
<i>Bistorta officinalis</i>				4	5
<i>Urtica dioica</i>	2	3			
<i>Helminthotheca echioides</i>	3		2		
<i>Achillea millefolium</i>	1				
<i>Anthriscus sylvestris</i>		3			
<i>Ranunculus repens</i>			1		
<i>Rubus fruticosus agg.</i>		1			
<i>Sonchus asper</i>		1			
Bryophytes & Lichens					

Frequency Percentage	Frequency Class	Range
40	II	0-4
20	I	0-2
20	I	0-2
20	I	0-1
100	V	1-4
80	IV	0-8
60	III	0-10
60	III	0-3
40	II	0-4
40	II	0-5
40	II	0-3
40	II	0-3
20	I	0-1
20	I	0-3
20	I	0-1
20	I	0-1
20	I	0-1

Source: Mott MacDonald 2023

Plant Species	Quadrat Number / Domin Values				
	1	2	3	4	5
Canopy & Shrub					
<i>Aesculus hippocastanum</i>	2				
<i>Corylus avellana</i>	1				
<i>Crataegus monogyna</i>	3				
<i>Fraxinus excelsior</i>	8				
<i>Prunus avium</i>	1				
<i>Quercus petraea</i>	2				
<i>Quercus robur</i>	1				
Ground Layer					
<i>Galium aparine</i>	9	8	8		
<i>Urtica dioica</i>	4	4			
<i>Conopodium majus</i>			1		
<i>Geum urbanum</i>			3		
<i>Glechoma hederacea</i>		4			
<i>Hedera helix</i>			5		
<i>Taraxacum officinale agg.</i>			1		
Bryophytes					
<i>Kinbergia praelonga</i>			3		

Source: Mott MacDonald 2023

Frequency Percentage	Frequency Class	Range
100	V	2-2
100	V	1-1
100	V	3-3
100	V	8-8
100	V	1-1
100	V	2-2
100	V	1-1
100	V	8-9
66.7	IV	0-4
33.3	II	0-1
33.3	II	0-3
33.3	II	0-4
33.3	II	0-5
33.3	II	0-1
33.3	II	0-3

Plant Species	Quadrat Number / Domin Values				
	1	2	3	4	5
Canopy and Shrub					
<i>Acer pseudoplatanus</i>	5				
<i>Betula pendula</i>	2				
<i>Crataegus monogyna</i>	1				
<i>Fraxinus excelsior</i>	5				
<i>Sambucus nigra</i>	1				
Ground Layer					
<i>Alliaria petiolata</i>	6	3	2	5	3
<i>Galium aparine</i>	5	6	7	3	9
<i>Silene dioica</i>	2	7	4	5	3
<i>Urtica dioica</i>	5	4	7	2	4
<i>Cirsium arvense</i>	1			2	3
<i>Rubus fruticosus agg.</i>		2		4	1
<i>Rumex obtusifolius</i>		2		2	2
<i>Geum urbanum</i>		4	1		
<i>Oenanthe crocata</i>	1			5	
<i>Poa pratensis</i>	1			5	
<i>Anthriscus sylvestris</i>					1
<i>Crataegus monogyna</i>	1				
<i>Heracleum sphondylium</i>				3	
<i>Plantago lanceolata</i>				1	
<i>Sambucus nigra</i>		1			
Bryophytes					
<i>Kindbergia praelonga</i>			6		

Source: Mott MacDonald 2023

Frequency Percentage	Frequency Class	Range
100	V	5-5
100	V	2-2
100	V	1-1
100	V	5-5
100	V	1-1
100	V	2-6
100	V	3-9
100	V	2-7
100	V	2-7
60	III	0-3
60	III	0-4
60	III	2-2
40	II	0-4
40	II	0-5
40	II	0-5
20	I	0-1
20	I	0-1
20	I	0-3
20	I	0-1
20	I	0-1
20	I	0-6

Plant Species	Quadrat Number / Domin Values				
	1	2	3	4	5
Canopy & Shrub					
<i>Acer campestre</i>	4				
<i>Alnus glutinosa</i>	1				
<i>Crataegus monogyna</i>	3				
<i>Cornus sanguinea</i>	1				
<i>Corylus avellana</i>	4				
<i>Ligustrum vulgare</i>	1				
<i>Sambucus nigra</i>	2				
<i>Quercus robur</i>	7				
Ground Layer					
<i>Geum urbanum</i>	3	4	4	5	1
<i>Rubus fruticosus agg.</i>	1	2	3		5
<i>Fraxinus excelsior</i>			2	1	1
<i>Cornus sanguinea</i>		1		2	
<i>Ligustrum vulgare</i>	3	1			
<i>Urtica dioica</i>				1	3
<i>Arctium lappa</i>	2				
<i>Corylus avellana</i>	1				
<i>Rumex obtusifolius</i>	1				
Bryophytes					

Source: Mott MacDonald 2023

Frequency Percentage	Frequency Class	Range
100	V	4-4
100	V	1-1
100	V	3-3
100	V	1-1
100	V	4-4
100	V	1-1
100	V	2-2
100	V	7-7
100	V	1-5
80	IV	0-5
60	III	0-2
40	II	0-2
40	II	0-3
40	II	0-3
20	I	0-2
20	I	0-1
20	I	0-1

Plant Species	Quadrat Number/ Domin Values				
	1	2	3	4	5
Grasses, Sedges and Rushes					
<i>Festuca rubra</i>	6	3	6	7	6
<i>Poa pratensis</i>	5	3	3	3	3
<i>Poa trivialis</i>	3	3		3	3
<i>Alopecurus pratensis</i>			1	1	3
<i>Cynosurus cristatus</i>	4	3	4		
<i>Dactylis glomerata</i>			1	1	2
<i>Luzula campestris</i>		1	2		
<i>Anthoxanthum odoratum</i>		2			
<i>Carex flacca</i>		4			
<i>Holcus lanatus</i>				1	
Forbs					
<i>Centaurea nigra</i>	4	7	6	3	6
<i>Cerastium fontanum</i>	3	4	3	5	5
<i>Jacobaea vulgaris</i>	1	2	2	2	2
<i>Conopodium majus</i>		3	3	5	5
<i>Galium verum</i>		3	4	4	4
<i>Ranunculus acris</i>		5	5	2	5
<i>Ranunculus bulbosus</i>		3	3	4	2
<i>Rumex acetosa</i>		4	4	4	4
<i>Achillea millefolium</i>	1	3	3		
<i>Geranium dissectum</i>	3			3	3
<i>Hypericum perforatum</i>		2	2		2
<i>Plantago lanceolata</i>	3	3	4		
<i>Poterium sanguisorba ssp. sanguisorba</i>	1	5	2		
<i>Taraxacum sect. hamata</i>		2	2		2
<i>Trifolium pratense</i>		2	4	2	
<i>Lotus corniculatus</i>	7		5		
<i>Potentilla reptans</i>	3		2		
<i>Ranunculus repens</i>	4	2			
<i>Sonchus asper</i>	1	1			
<i>Stellaria graminea</i>				3	3
<i>Equisetum arvense</i>		3			
<i>Leucanthemum vulgare</i>	1				
<i>Potentilla anserina</i>		2			
<i>Prunella vulgaris</i>		1			
<i>Veronica chamaedrys</i>					3
<i>Veronica serpyllifolia</i>		2			
Bryophytes and Lichens					
<i>Kindbergia praelonga</i>		1	2	1	1
<i>Oxyrrhynchium hians</i>		2	2	2	4
<i>Calliargonella cuspidata</i>	3	3			

Source: Mott MacDonald 2023

Frequency Percentage	Frequency Class	Range
100	V	3-7
100	V	3-5
80	IV	0-3
60	III	0-3
60	III	0-4
60	III	0-2
40	II	0-2
20	I	0-2
20	I	0-4
20	I	0-1
100	V	3-7
100	V	3-5
100	V	1-2
80	IV	0-5
80	IV	0-4
80	IV	0-5
80	IV	0-4
80	IV	0-4
60	III	0-3
60	III	0-3
60	III	0-2
60	III	0-4
60	III	0-5
60	III	0-2
60	III	0-4
40	II	0-7
40	II	0-3
40	II	0-4
40	II	0-1
40	II	0-3
20	I	0-3
20	I	0-1
20	I	0-2
20	I	0-1
20	I	0-3
20	I	0-2
80	IV	1-2
80	IV	0-4
40	II	0-3

Plant Species	Quadrat Number / Domin Values				
	1	2	3	4	5
Grasses, Sedges & Rushes					
<i>Arrhenatherum elatius</i>	7	6	8	8	5
<i>Alopecurus pratensis</i>	2	1	3	4	5
<i>Festuca rubra</i>	7	5	5	4	5
<i>Holcus lanatus</i>	3	4	5	4	
<i>Anthoxanthum odoratum</i>	2		2		2
<i>Cynosurus cristatus</i>	2	1	1		
<i>Agrostis stolonifera</i>				2	3
<i>Dactylis glomerata</i>		5			2
<i>Poa pratensis</i>	3				2
Forbs					
<i>Ervum tetraspermum</i>	4	2	4	3	3
<i>Ranunculus acris</i>	4	5	2	2	4
<i>Centurea nigra</i>	2	4			6
<i>Galium verum</i>		4		2	3
<i>Vicia sativa ssp. segetalis</i>		2	4	3	
<i>Cirsium arvense</i>		2			4
<i>Lotus corniculatus</i>	4				1
<i>Plantago lanceolata</i>			1		1
<i>Hypochaeris radicata</i>	1				
<i>Leucanthemum vulgare</i>		3			
<i>Primula veris</i>	5				
<i>Rhinanthus minor</i>		1			
<i>Rubus fruticosus agg.</i>		1			
<i>Rumex sanguineus</i>		1			
<i>Trifolium campestre</i>	4				
Bryophytes & Lichens					

Source: Mott MacDonald 2023

Frequency Percentage	Frequency Class	Range
100	V	5-8
100	V	1-5
100	V	4-7
80	IV	0-5
60	III	0-2
60	III	0-2
40	II	0-3
40	II	0-5
40	II	0-3
100	V	2-4
100	V	2-5
60	III	0-6
60	III	0-4
60	III	0-4
40	II	0-4
40	II	0-4
40	II	0-1
20	I	0-1
20	I	0-3
20	I	0-5
20	I	0-1
20	I	0-1
20	I	0-4

Plant Species	Quadrat Number/ Domin Values				
Grasses, Sedges & Rushes	1	2	3	4	5
<i>Alopecurus pratensis</i>	1	3	5	5	4
<i>Festuca rubra</i>	6	3	4	4	4
<i>Poa pratensis</i>			3		3
<i>Holcus lanatus</i>	3	3		1	3
<i>Poa trivialis</i>	4		1	3	
<i>Cynosurus cristatus</i>		1			3
<i>Anthoxanthum odoratum</i>	4		1	1	4
<i>Schedonorus pratensis</i>		5		3	
<i>Arrhenatherum elatius</i>	2	2	2		3
<i>bromus hordeaceus</i>	1			2	1
<i>Briza media</i>	1				1
<i>Dactylis glomerata</i>	2	4	2	2	3
Forbs					
<i>Ranunculus acris</i>	5	4	4	4	6
<i>Rumex acetosa</i>	1				1
<i>Vicia sativa</i>	4	3	4	5	5
<i>Cirsium arvense</i>			2		
<i>Primula veris</i>		5	3	3	3
<i>Centaurea nigra</i>				6	4
<i>Galium verum</i>		2	4	2	
<i>Geranium dissectum</i>					3
<i>Rhinanthus minor</i>	3				4
<i>Silene flos-cuculi</i>		2	1		
<i>Trifolium dubium</i>	4				2
<i>Leucanthemum vulgare</i>	2	1			
<i>Cerastium fontanum</i>	2	2			2
<i>Helminthotheca echioides</i>	1				
<i>Taraxacum sect. hamata</i>	1				
<i>Bellis perennis</i>	1				
<i>Jacobae vulgans</i>	1		1		
<i>Lotus corniculatus</i>	1	2	4	3	6
<i>Ervum sp.</i>		2	3		3
<i>Plantago lanceolata</i>					3
<i>Rose sp.</i>				1	
<i>Betonica officinalis</i>				1	
Bryophytes & Lichens					
<i>Conopodium majus</i>					1
<i>Brachythecium rutabulum</i>	3	3	7	4	7

Source: Mott MacDonald 2023

Frequency Percentage	Frequency Class	Range
100	V	1-5
100	V	3-6
40	II	0-3
80	IV	1-3
60	III	1-4
40	II	1-3
80	IV	0-4
40	II	0-5
80	IV	0-3
60	III	0-2
40	II	0-1
100	V	2-4
100	V	4-6
40	II	0-1
100	V	3-5
20	I	0-2
80	IV	0-5
40	II	0-6
60	III	0-4
20	I	0-3
40	II	0-4
40	II	0-2
40	II	0-4
40	II	0-2
60	III	0-2
20	I	0-1
20	I	0-1
20	I	0-1
40	II	0-1
100	V	1-6
60	III	0-3
20	I	0-3
20	I	0-1
20	I	0-1
20	I	0-1
100	V	3-7

Plant Species	Quadrat Number / Domin Values									
	1	2	3	4	5	6	7	8	9	10
Grasses, Sedges & Rushes										
<i>Holcus lanatus</i>		3		1	3	1		4	3	2
<i>Lolium perenne</i>	2	7	5	3		5			1	1
<i>Alopecurus pratensis</i>	3		2		5		5	5	1	
<i>Cynosurus cristatus</i>	3	3	4	7		5				2
<i>Festuca rubra</i>	4			3	1	4			5	4
<i>Dactylis glomerata</i>	1		1			1		2	1	1
<i>Poa pratensis</i>	1	1	3		3		2	2		
<i>Arrhenatherum elatius</i>					2		5	5	5	1
<i>Agrostis stolonifera</i>	1	3	4		2					
<i>Anthoxanthum odoratum</i>				1						2
<i>Briza media</i>										2
Forbs										
<i>Centurea nigra</i>	4	4	5	5		6	5	7	6	3
<i>Galium verum</i>	7		2	4	2	2	2	4	4	
<i>Lotus corniculatus</i>	4		1		1	3			1	4
<i>Plantago lanceolata</i>	4	5	3			3		1		
<i>Ranunculus acris</i>	3	2	2			3				3
<i>Leontodon hispidus</i>			1	1		1				6
<i>Rumex acetosa</i>	1				4			4		1
<i>Sanguisorba officinalis</i>			4		7		4			4
<i>Trifolium repens</i>	2	5	4			3				
<i>Achillea millefolium</i>		4	3			3				
<i>Cerastium fontanum</i>		1	2							2
<i>Heracleum sphondylium</i>					4		2	2		
<i>Trifolium pratense</i>	1	1								5
<i>Prunella vulgaris</i>		2								2
<i>Ranunculus repens</i>	3		2							
<i>Taraxacum officinale</i> agg.	1		1							
<i>Cirsium arvense</i>							6			
<i>Jacobaea vulgaris</i>		1								
<i>Lathyrus pratensis</i>									2	
<i>Rumex obtusifolius</i>							1			
<i>Sanguisorba minor</i>				4						
Bryophytes & Lichens										

Frequency Percentage	Frequency Class	Range
70	IV	0-4
70	IV	0-7
60	III	0-5
60	III	0-7
60	III	0-5
60	III	0-2
60	III	0-3
50	III	0-5
40	II	0-4
20	I	0-2
10	I	0-2
90	V	0-7
80	IV	0-7
60	III	0-4
50	III	0-5
50	III	0-3
40	II	0-6
40	II	0-4
40	II	0-7
40	II	0-5
30	II	0-4
30	II	0-2
30	II	0-4
30	II	0-5
20	I	0-2
20	I	0-3
20	I	0-1
10	I	0-6
10	I	0-1
10	I	0-2
10	I	0-1
10	I	0-4

Source: Mott MacDonald 2023

Plant Species	Quadrat Number/ Domin Values					
	1	2	3	4	5	6
Grasses, Sedges & Rushes						
<i>Holcus lanatus</i>	5	4	5	3	3	
<i>Lolium perenne</i>	6	6	5	4	5	
<i>Poa trivialis</i>	3	3	3	3	3	
<i>Poa pratensis</i>	3	2	2		2	
<i>Arrhenatherum elatius</i>		1	2	6	4	
<i>Bromus hordeaceus</i>	1	4		1		
<i>Phleum pratense</i>			1	1		
<i>Agrostis capillaris</i>			3			
<i>Dactylis glomerata</i>					2	
<i>Festuca rubra</i>					2	
<i>Hordeum secalinum</i>					1	
<i>Phleum bertolonii</i>		1				
Forbs						
<i>Geranium dissectum</i>	1		3	1	2	
<i>Rumex obtusifolius</i>	1		2	2		
<i>Geranium molle</i>			1			
<i>Taraxacum sect. taraxacum</i>					1	
Bryophytes & Lichens						
<i>Oxyrrhynchium hians</i>		1	2	1	2	1

Source: Mott MacDonald 2023

Frequency Percentage	Frequency Class	Range
100	V	3-5
100	V	4-6
100	V	3-3
80	IV	0-3
80	IV	0-6
60	III	0-4
40	II	0-1
20	I	0-3
20	I	0-2
20	I	0-2
20	I	0-1
20	I	0-1
60	III	0-3
60	III	0-2
20	I	0-1
20	I	0-1
80	IV	1-2

Plant Species	Quadrat Number/ Domin Values				
	1	2	3	4	5
Grasses, Sedges & Rushes					
<i>Alopecurus pratensis</i>		5		3	8
<i>Arrhenatherum elatius</i>		7		2	3
<i>Dactylis glomerata</i>		5	3	4	3
<i>agrostis capillaris</i>				5	
<i>Poa trivialis</i>			4	4	3
<i>Poa pratensis</i>			2	4	
<i>Festuca rubra</i>			7		
<i>Cynosurus cristatus</i>			3	1	
<i>Holcus lanatus</i>			3	3	2
Forbs					
<i>Cirsium arvernse</i>		2			1
<i>carduus nutans</i>		3	2	3	1
<i>Galium aparine</i>		1			
<i>Jacobae vulgans</i>			1	2	
<i>Geranium dissectum</i>			3		
<i>Prunella vulgaris</i>			2		
<i>Taraxacum secc. Humata</i>			1	2	
<i>Potentilla reptans</i>					
<i>Ranunculus bulbosus</i>				2	
<i>Glechoma hederacea</i>					
Bryophytes & Lichens					
<i>Brachythecium rutabulum</i>			3	5	

Source: Mott MacDonald 2023

Frequency Percentage	Frequency Class	Range
80	IV	0-8
60	III	0-7
80	IV	0-5
20	I	0-5
80	IV	0-4
60	IV	0-4
40	II	0-7
60	III	0-3
80	IV	0-5
40	II	0-2
80	IV	0-3
20	I	
60	III	0-3
20	I	0-3
20	I	0-2
60	III	0-3
20	I	0-1
20	I	0-2
20	I	0-1
40	II	0-5

Plant Species	Quadrat Number/ Domin Values					
	1	2	3	4	5	6
Grasses, Sedges and Rushes						
<i>Holcus lanatus</i>	7	2	5	4	2	
<i>Poa trivialis</i>	4	5	3	4	3	
<i>Poa pratensis</i>	3	2	2		2	
<i>Dactylis glomerata</i>	3		3		3	
<i>Alopecurus pratensis</i>		3	6			
<i>Arrhenatherum elatius</i>	2				4	
<i>Cynosurus cristatus</i>	1				3	
<i>Festuca rubra</i>			4		4	
<i>Lolium perenne</i>	1				2	
<i>Bromus hordeaceus</i>	1					
<i>Elymus repens</i>				4		
Forbs						
<i>Plantago lanceolata</i>	2	2	2		3	
<i>Cirsium arvense</i>	2	3	3	2		
<i>Geranium dissectum</i>	3	2		3	2	
<i>Ranunculus acris</i>	5	5	5		1	
<i>Ranunculus repens</i>		6	1	7		
<i>Achillea millefolium</i>	3				2	
<i>Carduus nutans</i>			1	1		
<i>Vicia sativa ssp. segetalis</i>	1				1	
<i>Cirsium vulgare</i>			1			
<i>Conopodium majus</i>			3			
<i>Equisetum arvense</i>	4					
<i>Ervum tetraspermum</i>					2	
<i>Hypochaeris radicata</i>	2					
<i>Rumex acetosa</i>	1					
<i>Rumex obtusifolius</i>			2			
<i>Taraxacum sect. taraxacum</i>	2					
Bryophytes and Lichens						
<i>Kindbergia praelonga</i>		1	2	1	2	1
<i>Oxyrrhynchium hians</i>		2	2	2	2	4

Source: Mott MacDonald 2023

Frequency Percentage	Frequency Class	Range
100	V	2-7
100	V	3-5
80	IV	0-3
60	III	0-3
40	II	0-6
40	II	0-4
40	II	0-3
40	II	0-4
40	II	0-4
40	II	0-2
20	I	0-1
20	I	0-4
80	IV	0-3
80	IV	0-3
80	IV	0-3
80	IV	0-5
60	III	0-7
40	II	0-3
40	II	0-1
40	II	0-1
20	I	0-1
20	I	0-3
20	I	0-4
20	I	0-2
20	I	0-2
20	I	0-1
20	I	0-2
20	I	0-2
80	IV	1-2
80	IV	0-4

Plant Species	Quadrat Number / Domin Values				
	1	2	3	4	5
Grasses, Sedges & Rushes					
<i>Arrhenatherum elatius</i>	4	1	2	8	5
<i>Festuca rubra</i>	8	8	4	4	6
<i>Dactylis glomerata</i>	3			2	4
<i>Holcus lanatus</i>		4		3	6
<i>Anthoxanthum odoratum</i>		1	1		
<i>Poa pratensis</i>		2	1		
<i>Elymus repens</i>			6	4	
<i>Briza media</i>		2			
Forbs					
<i>Galium verum</i>	6	5	8	7	
<i>Geranium molle</i>	1	1	1	1	
<i>Galium aparine</i>				3	1
<i>Lotus corniculatus</i>		5	2		
<i>Plantago lanceolata</i>	1	1			
<i>Potentilla reptans</i>	2			3	
<i>Centaurea nigra</i>	3				
<i>Sanguisorba officinalis</i>	3				
<i>Persicaria maculosa</i>			4		
<i>Achillea millefolium</i>			1		
Bryophytes & Lichens					

Source: Mott MacDonald 2023

Frequency Percentage	Frequency Class	Range
100	V	1-8
100	V	4-8
60	III	0-4
60	III	0-6
40	II	0-1
40	II	0-2
40	II	0-6
20	I	0-2
80	IV	0-8
80	IV	0-1
40	II	0-3
40	II	0-5
40	II	0-1
40	II	0-3
20	I	0-3
20	I	0-3
20	I	0-4
20	I	0-1

C. Appendix: Photos

Appendix Photo C-1: NT361486 MG1 Grassland



Appendix Photo C-2: NT425645 MG1 Grassland



Appendix Photo C-3: NT539426 MG1 Grassland



Appendix Photo C-4: NT428717 MG4/6 Grassland



Appendix Photo C-5: NT36486 OV26 Open Vegetation



Appendix Photo C-6: NT298171 and NT402387 W8e Woodland



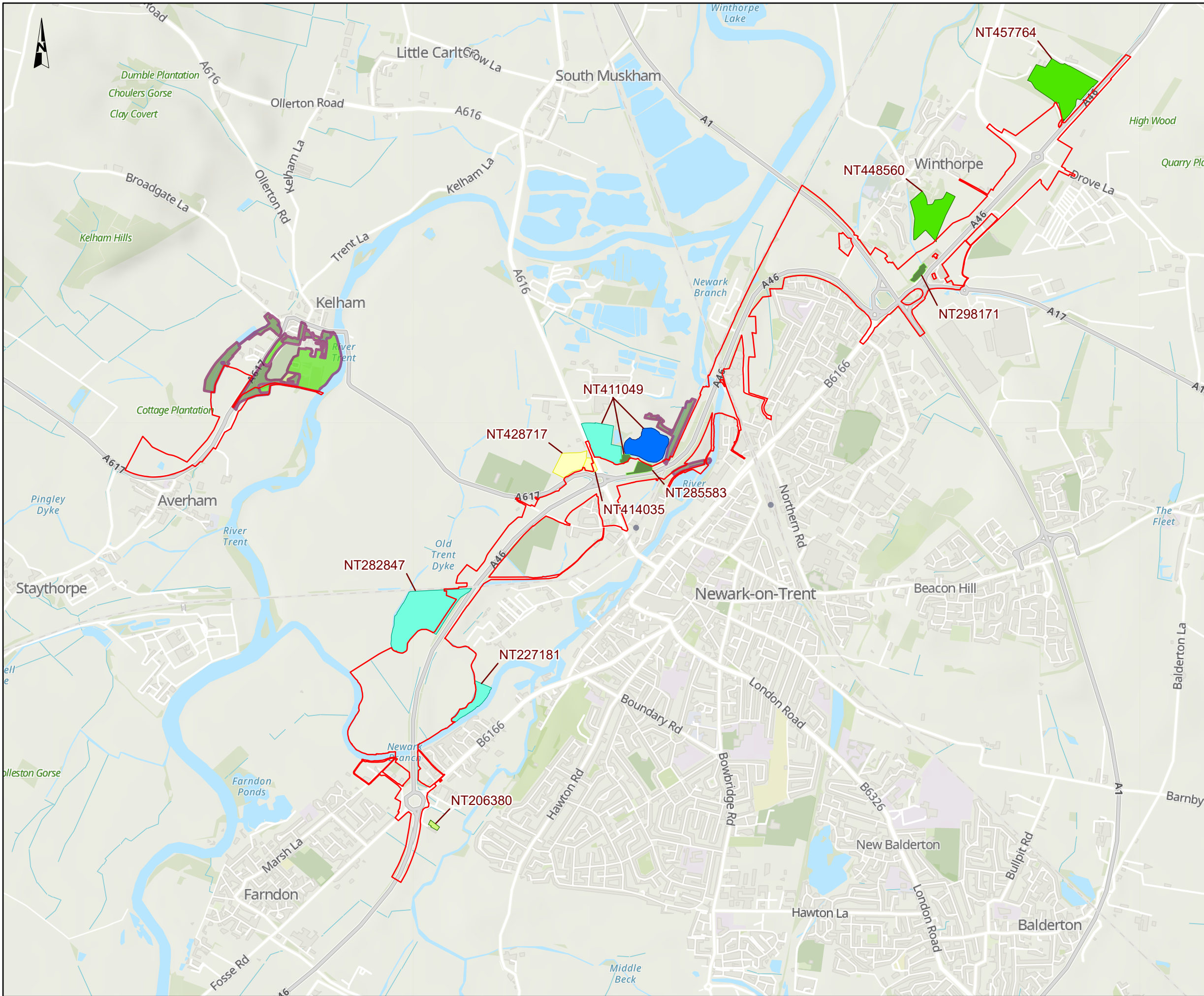
Appendix Photo C-7: NT411049 W8e Woodland



Appendix Photo C-8: NT411049 W10a Woodland

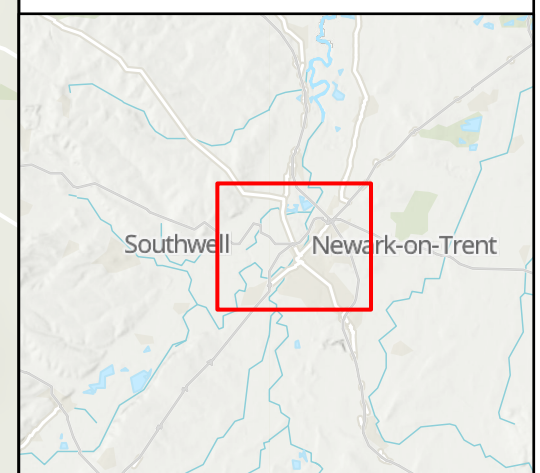


D. Appendix: Habitats of Principal Importance



NOTES
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 Contains data from OS Zoomstack

- KEY TO SYMBOLS**
- Order Limits
 - Habitat of principal importance (HPI) - surveyed**
 - Coastal and Floodplain Grazing Marsh
 - Eutrophic Standing Water
 - Lowland Meadow
 - Lowland Mixed Deciduous Woodland
 - Traditional Orchard
 - Wood Pasture
 - Habitat of principal importance (HPI) - desk study data**
 - Lowland Mixed Deciduous Woodland
 - Traditional Orchard
 - Wood Pasture



C01	08/12/23	DCO APPLICATION	JB	BC	HF
REV.	DATE	AMENDMENT DETAILS	ORIG	CHKD	APPD
CLIENT					
PURPOSE OF ISSUE					
DCO APPLICATION					
DEVELOPMENT CONSENT ORDER NUMBER					
TR010065					
PROJECT TITLE					
A46 NEWARK BYPASS					
DRAWING TITLE					
Appendix D Habitats of Principal Importance (HPI)					
ORIGINAL SIZE		SCALE			
A3		1:25,000			
DRAWING NUMBER			ORIGINATOR		PROJECT REF NO.
HE551478			SKAG		HE551478
			EBD		
CONWI_CONW			DR LE		00170
LOCATION			TYPE		REVISION
					C01

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