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

Annex C: Phase 2 Botany and NVC Survey Report

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EXECUTIVE SUMMARY

1. This report presents the results of vegetation surveys using the methods of the National Vegetation Classification (NVC). They were undertaken in connection with a proposed development known as Rail Central, at Milton Malsor, Northamptonshire (Ordnance Survey Grid reference: SP 73363 54488).

2. The surveys only targeted examples of vegetation that were the subject of interest and uncertainty. At the main SRFI site they were semi-improved agricultural grasslands and rough grasslands on road verges and an abandoned agricultural field. At the Junction 15a Site they were tall-herb swamps, semi-ruderal in part, in a PWS east of the canal.

3. Standard quadrat-sampling methods were used to gather information about the target vegetation types, and the data were analysed to identify NVC types using experience, computer matching, and the keys and NVC type descriptions set out in *British Plant Communities* – the standard source for NVC descriptions.

4. The semi-improved agricultural grasslands all proved to belong to the NVC type **MG6 *Lolium perenne-Cynosurus cristatus* grassland** and are unexceptional.

5. The rough grassland types on road verges proved to belong to the NVC type **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community** and though containing a few calcicolous plants are unexceptional as grassland. The rough grassland on abandoned agricultural land could not be assigned to an NVC type and has low nature conservation value.

6. The swamp vegetation types proved to belong to the NVC type **OV26c *Epilobium angustifolium* community, *Filipendula ulmaria-Angelica sylvestris* sub-community** or to transitions from OV26c to **OV26a *Epilobium hirsutum* community, *Juncus effusus-Ranunculus repens* sub-community**. Owing to the general scarcity of wetland habitat in Northamptonshire they have value in the county context.

1 INTRODUCTION

Purpose of this Report

This report presents the results of investigations into certain examples of vegetation of potentially above-average interest or nature conservation value (following on from an extended Phase 1 habitat survey carried out on land south of Milton Malsor, Northamptonshire, as well as land off Junction 15a of the M1 just North-west of Milton Malsor). These investigations centred on identifying the National Vegetation Classification (NVC) types to which the target vegetation belongs.

Structure of this Report

The remainder of this report is structured as follows:

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

Appendix A provides the figures

Nomenclature

Plant nomenclature in this report follows Stace (2010) for native and naturalised species of vascular plant. Introduced species and garden varieties were identified using the relevant texts. Plant names in the text are given with English names first, followed by the scientific name in brackets. Where applicable, doubtful identifications are preceded by 'cf.' placed before the specific epithet where the plant is very probably the species indicated, but it is impossible to distinguish it from similar members of the genus with certainty. Nomenclature for any mosses and liverworts follow Hill et al. (2008). Names of National Vegetation Classification (NVC) communities and sub-communities follow *British Plant Communities: volumes 1 to 5* (Rodwell 1991a, 1991b, 1992, 1995, 2000). Though of these five volumes only Rodwell (1992) and Rodwell (2000) cover NVC types identified in this report, computer matching of the sample data may have thrown up NVC codes included in the other volumes.

2 METHODS

Main Site

The methods of the National Vegetation Classification (NVC) were used to describe certain vegetation types of potentially modest nature conservation value where the NVC type was not obvious. On the main SRFI site these were mesotrophic grassland vegetation types including semi-improved agricultural grasslands and rough grasslands on road verges and abandoned agricultural land. Quadrat sampling was carried out to provide a description of the most typical and distinctive vegetation of these candidate grassland areas. The prospect that agricultural grassland in lowland Britain wil conform to one of the described NVC types (Rodwell 1992) is good; but there was no expectation that sul and semi-ruderal rough grassland vegetation would equally conform to any described NVC community type, since it is acknowledged that many semi-ruderal vegetation types are not yet covered by the system (Rodwell *et al.* 2000).

Quadrat data were collected from homogeneous stands of grassland following the standard methods for identifying NVC types (Rodwell 2006). The cover of each species in each quadrat was estimated by eye and recorded on the Domin Scale (10 - over 90% cover, 9 - 76-90%, 8 - 51-75%, 7 - 34-50%, 6 - 26-33%, 5 - 11-25%, 4 - 5-10%, 3 - under 5% yet frequent, 2 - under 5% and occasional, 1 - under 5% and rare). Where possible at least five quadrats were recorded in each sampled vegetation type, so that not only cover but also frequency estimates were available for each species (i.e. percentage occurrence in quadrats – *e.g.* a species recorded in 3 quadrats out of 5 has a frequency of 60%). Because NVC communities are determined primarily in terms of species' frequency, this facilitates the identification of NVC types, and especially improves computer matching to identify NVC types (Rodwell 2006). The two-metre square quadrat size recommended for grassland by Rodwell (2006) was used.

The data are presented as floristic tables in the style of the definitive NVC tables given in *British Plant Communities* (Rodwell 1991a, 1991b, 1992, 1995, 2000). Species are ordered by their relative abundance, first by frequency class (class I – 0-20%, II – 21-40%, III -41-60%, IV – 61-80%, V – 81-100%), and then by maximum cover value on the Domin Scale; any remaining species ties are then ordered alphabetically.

Stands of vegetation were identified from quadrat data with the assistance of the computer-program MATCH (Malloch 1999), which computes similarity-coefficients between quadrat data and the published NVC tables in *British Plant Communities* (because these define the NVC communities and sub-communities). This gives only an initial indication of which NVC types the data are most likely to have been drawn from – the highest coefficient does not necessarily indicate a correct NVC diagnosis. It is always necessary to identify the NVC type through careful consideration of the NVC descriptions in *British Plant Communities* (Rodwell 1991, 1992, 2000). In the floristic tables, matching coefficients in bold represent acceptable NVC diagnoses, and those in

italics represent informative but individually unacceptable diagnoses, *e.g.* cases where a stand of vegetation is transitional to the indicated coefficient.

Junction 15a

At Junction 15a permission for detailed sampling of aquatic and water-margin vegetation in the canal had not been forthcoming in 2017. However questions about the nature and NVC status of swamp vegetation in the PWS east of the canal were addressed by quadrat sampling. The methods used for sampling and analysing the swamp vegetation were the same as those used for grassland vegetation in the main SRFI site, execpt that a larger quadrat size – 5-metres square – was used as recommended in Rodwell (2006)

3 RESULTS

Main SRFI Site

Extensive semi-improved grassland – some of it on ridge-and-furrow In the south-western corner of the main SRFI site – appears to have a wide range of grass species including *Alopecurus pratensis* (Meadow Foxtail) and *Hordeum secalinum* (Meadow Barley) while being distinctly poor in broad-leaved herbs, presumably as a result of low-key agricultural improvement such as fertiliser use or heavy grazing. Some modest and only slightly terraced banks near the canal have a slightly greater incidence of broad-leaved herbs. Quadrat data from these two (subtle) variants of this grassland are presented in *Tables C1 and C2.* They show that the sward is referable to the NVC type **MG6 *Lolium perenne-Cynosurus cristatus* grassland** and on the banks more specifically to **MG6a *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community**.

Table C1. Floristic table for five 2×2m quadrats in semi-improved grassland on banks near the canal in the south-western corner of the main SFRI site.

Trifolium repens	8	8	5	8	9	V	5-9
Agrostis capillaris	8	5	5	4	3	V	3-8
Dactylis glomerata	4	4	4	5	4	V	4-5
Festuca rubra	4	3	5	3	3	V	3-5
Senecio jacobaea	4	4	4	4	3	V	3-4
Poa trivialis	3	1	1	4	1	V	1-4
Prunella vulgaris	2	3	4	4	1	V	1-4
Medicago lupulina	1	2	1	2	2	V	1-2
Ranunculus repens	2	2	1	1	1	V	1-2
Potentilla reptans	-	6	4	3	2	IV	2-6
Lolium perenne	-	5	3	1	5	IV	1-5
Equisetum arvense	3	2	2	4	-	IV	2-4
Heracleum sphondylium	-	2	3	2	2	IV	2-3
Achillea millefolium	-	3	-	4	3	III	3-4
Cynosurus cristatus	1	-	3	3	-	III	1-3
Convolvulus arvensis	-	-	1	2	3	III	1-3
Holcus lanatus	3	-	3	1	-	III	1-3
Plantago major ssp. *major*	-	3	1	1	-	III	1-3
Taraxacum species	-	-	1	-	3	II	1-3

Cirsium arvense	2	1	-	-	-	II	1-2
Cirsium vulgare	1	-	-	2	-	II	1-2
Phleum bertolonii	-	1	-	2	-	II	1-2
Trifolium pratense	1	-	-	-	2	II	1-2
Deschampsia cespitosa	3	-	-	-	-	I	3
Carex hirta	-	-	-	-	2	I	2
Hordeum secalinum	-	-	-	-	2	I	2
Alopecurus pratensis	-	-	1	-	-	I	1
Arrhenatherum elatius	-	-	-	1	-	I	1
Cerastium fontanum	1	-	-	-	-	I	1
Hypochaeris radicata	-	-	-	1	-	I	1
Lathyrus pratensis	1	-	-	-	-	I	1
Odontites vernus ssp. *serotinus*	-	-	1	-	-	I	1
Senecio erucifolius	-	1	-	-	-	I	1

Matching coefficients. **MG6a 57.6**, MG6 undifferentiated 54.9, MG6b 52.5, MG6c 52.3, OV23d 49.1, MG7e 49.0, OV23c 48.9, MG7b 48.6, OV23 undifferentiated 46.7, MG5a 46.6.

Diagnosis. The sward conforms0 to the description of the NVC community indicated by the highest matching coefficient , and can be accepted as fairly typical **MG6a *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community**. It is insufficiently weedy for **OV23 *Lolium perenne-Dactylis glomerata* community** and lacks has grasses such as *Agrostis capillaris* that are not generally abundant in **MG7 *Lolium perenne* leys and related grasslands**.

Table C2. Floristic table for five 2×2m quadrats in semi-improved grassland on ridge-and-furrow in the south-western corner of the main SFRI site.

Agrostis capillaris	8	7	8	8	8	V	7-8
Trifolium repens	5	8	7	7	8	V	5-8
Festuca rubra	4	3	5	5	5	V	3-5
Holcus lanatus	4	5	4	5	2	V	2-5
Alopecurus pratensis	4	3	1	4	3	V	1-4
Hordeum secalinum	3	1	4	1	4	V	1-4
Poa trivialis	4	1	1	1	2	V	1-4
Senecio jacobaea	1	3	4	3	2	V	1-4
Cirsium arvense	1	2	1	1	2	V	1-2
Dactylis glomerata	-	4	4	4	4	IV	4
Cerastium fontanum	1	1	-	-	-	II	1
Prunella vulgaris	-	1	1	-	-	II	1
Anthoxanthum odoratum	3	-	-	-	-	I	3
Trisetum flavescens	-	3	-	-	-	I	3
Ranunculus acris	1	-	-	-	-	I	1
Ranunculus repens	-	-	1	-	-	I	1

Matching coefficients. MG7b 52.1, *MG6 undifferentiated 50.0*, MG6a 49.3, MG7d 49.3, MG7c 48.3, MG6c 47.9, MG6b 47.8, MG9 undifferentiated 47.1, MG9b 45.7, MG9a 45.0

Diagnosis. In the absence of *Lolium perenne* the highest matching coefficient with **MG7b *Lolium perenne* leys and related grasslands, *Lolium perenne-Poa trivialis* leys** does not represent an acceptable diagnosis. The high incidence of such grasses as *Agrostis capillaris*, *Festuca rubra* and *Holcus lanatus* is more suggestive of **MG6 *Lolium perenne-Cynosurus cristatus* grassland** though again the absence of *Lolium perenne* is anomalous. The presence of the grasses *Alopecurus pratensis* and *Hordeum secalinum* – usually found in richer swards - in a sward that is unusually poor in broad-leaved herbs suggests origins in a distinctive variant of **MG6 *Lolium perenne-Cynosurus cristatus* grassland** that has been greatly modified by agricultural improvement.

Quadrat data for an abandoned field beside the A43 are presented in *Table C3*. They show that the tall sward there could not satisfactorily be assigned to any NVC type – a very common finding with successional grassland - though it has loose affinities with **MG9b *Holcus lanatus-Deschampsia cespitosa* grassland, *Arrhenatherum elatius* sub-community**.

Table C3. Floristic table for five 2×2m quadrats in rough grassland colonising an abandoned field adjacent to the A43 in the western part or main SFRI site.

Ranunculus repens	9	5	9	10	4	V	4-10
Alopecurus pratensis	5	6	8	4	9	V	4-9
Cirsium arvense	4	5	-	5	2	IV	2-5
Holcus lanatus	3	3	3	-	1	IV	1-3
Dactylis glomerata	-	4	1	-	1	III	1-4
Cerastium fontanum	2	1	-	-	1	III	1-2
Galium aparine	-	1	-	1	1	III	1
Agrostis capillaris	2	5	-	-	-	II	2-5
Festuca rubra	4	4	-	-	-	II	4
Senecio jacobaea	-	3	-	-	4	II	3-4
Poa trivialis	3	-	3	-	-	II	3
Urtica dioica	-	2	-	1	-	II	1-2
Myosotis arvensis	-	1	1	-	-	II	1
Deschampsia cespitosa	-	-	4	-	-	I	4
Rumex acetosa	-	-	-	3	-	I	3

Matching coefficients. MG9 undifferentiated 49.8, MG7d 49.2, MG9b 48.7, MG7c 48.1, MG9a 45.0, MG6a 44.5, OV10d 44.2, OV27b 43.9, MG7b 43.7, MG1c 43.1

Diagnosis. The mid-succession sward has affinities with rough grasslands referable to the NVC type **MG9b *Holcus lanatus-Deschampsia cespitosa* grassland, *Arrhenatherum elatius* sub-community** with which it agrees in having *Deschampsia cespitosa* and tall semi-ruderal herbs, but in reality it barely conforms to the description of MG9. The abundance of *Alopecurus pratensis* explains the high matching coefficient with **MG7d *Lolium perenne* leys and related grasslands, *Lolium perenne-Alopecurus pratensis* grassland** but this is not a *Lolio-Plantaginion* grassland of any kind, so MG7d is not an appropriate diagnosis. None of the lower matching coefficients are helpful. Like many early-succession swards this is probably best regarded as not conforming to any so-far-described NVC type.

The verges of Towcester Road – away from managed areas near premises and private houses at least – mostly support coarse grassland obviously referable to the NVC types **MG1a *Arrhenatherum elatius* grassland, *Festuca rubra* sub-community**, or where tall semi-ruderal herbs such as *Cirsium arvense* (Creeping Thistle) and *Urtica dioica* (Common Nettle) are prominent to **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community**, as do those of other roads in and around the main SRFI site, *e.g.* those of Barn Lane. However, some swards, mainly on the eastern verge of Towcester Road in its central section, have slightly more species-rich swards in which the presence of such species as *Galium album (Hedge-bedstraw)* and *Hypericum hirsutum* (Hairy St John's-wort) suggests calcicolous tendencies. Quadrat data for these swards are presented in *Table C4* and show that despite such extra species the sward is only really referable to the NVC type **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community** though a degree of transition towards more calcicolous forms of MG1 such as **MG1e *Arrhenatherum elatius* grassland, *Centaurea nigra* sub-community** may be suspected.

To the east of Towcester Road there is one field with a relatively species-rich sward, which nevertheless features a high abundance of various species – especially scrambling legumes such as *Vicia tetrasperma* (Smooth Tare) – that are rather suggestive of a recently sown sward. Quadrat data for this sward are presented in *Table C5* and show that it is referable to the NVC type **MG6 *Lolium perenne-Cynosurus cristatus* grassland** and probably to **MG6b *Lolium perenne-Cynosurus cristatus* grassland, *Anthoxanthum odoratum* sub-community** though it is somewhat atypical.

Table C4. Floristic table for five 2×2m quadrats in species-rich rough grassland on the verges of Towcester Road.

Arrhenatherum elatius	3	3	3	6	7	V	3-7
Heracleum sphondylium	2	4	2	5	2	V	2-5
Schedonorus arundinaceus	7	7	8	5	-	IV	5-8
Galium album	7	5	5	-	4	IV	4-7
Urtica dioica	-	1	1	5	6	IV	1-6
Centaurea debeauxii	6	8	6	-	-	III	6-8
Dactylis glomerata	1	-	-	5	4	III	1-5
Lathyrus pratensis	2	1	4	-	-	III	1-4
Convolvulus arvensis	1	3	1	-	-	III	1-3
Tussilago farfara	-	-	4	5	-	II	4-5
Plantago lanceolata	2	4	-	-	-	II	2-4
Achillea millefolium	2	3	-	-	-	II	2-3
Anthriscus sylvestris	-	-	-	2	2	II	2
Epilobium hirsutum	-	-	-	6	-	I	6
Cirsium arvense	-	-	-	-	5	I	5
Rubus fruticosus agg.	-	-	4	-	-	I	4
Brachypodium sylvaticum	-	2	-	-	-	I	2
Hypericum hirsutum	2	-	-	-	-	I	2
Potentilla reptans	-	-	-	-	2	I	2
Agrimonia eupatoria	-	1	-	-	-	I	1
Alopecurus pratensis	-	-	1	-	-	I	1
Glechoma hederacea	-	1	-	-	-	I	1

Matching coefficients. **MG1b 61.8**, MG1a 50.9,OV24b 50.0, OV26d 48.0, MG1 undifferentiated 47.8, MG1c 47.7, OV24 undifferentiated 47.5, MG1e 39.4, W24 undifferentiated 36.5, OV26 undifferentiated 36.4

Diagnosis. The very high matching coefficient with **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community** suggests that this NVC community must be accepted as the best diagnosis for this sward. It is understandable as the grass *Arrhenatherum elatius* is dominant in association with tall semi-ruderal herbs, especially *Heracleum sphondylium* and *Urtica dioica*. The sward is rather species-rich for MG1b and the presence of such broad-leaved herbs as *Centaurea debeauxii* and *Galium album* suggests a degree of transition towards **MG1e *Arrhenatherum elatius* grassland, *Centaurea nigra* sub-community**.

Table C5. Floristic table for five 2×2m quadrats in mesotrophic grassland in a field east of Towcester Road.

Trifolium dubium	5	8	3	4	4	V	3-8
Holcus lanatus	7	7	6	7	6	V	6-7
Vicia tetrasperma	3	2	4	2	7	V	2-7
Ranunculus acris	1	3	5	6	7	V	1-7
Cynosurus cristatus	3	5	5	6	4	V	4-6
Festuca rubra	2	3	1	4	4	V	1-4
Arrhenatherum elatius	1	2	1	2	3	V	1-3
Alopecurus pratensis	2	1	1	1	1	V	1-2
Prunella vulgaris	2	1	1	2	2	V	1-2
Anthoxanthum odoratum	-	2	5	5	4	IV	2-5
Trifolium repens	1	-	5	-	2	III	1-5
Agrostis capillaris	-	-	4	4	4	III	4
Ranunculus repens	4	2	3	-	-	III	2-4
Trifolium pratense	-	-	3	2	1	III	1-3
Cirsium arvense	1	1	2	-	-	III	1-2
Bromus secalinus	7	1	-	-	-	II	1-7
Dactylis glomerata	-	1	-	2	-	II	1-2
Poa trivialis	2	1	-	-	-	II	1-2
Geranium dissectum	1	1	-	-	-	II	1
Rumex acetosa	-	1	1	-	-	II	1
Lolium perenne	3	-	-	-	-	I	3
Plantago lanceolata	-	-	-	3	-	I	3
Lathyrus pratensis	-	-	-	2	-	I	2
Agrostis stolonifera	-	1	-	-	-	I	1
Heracleum sphondylium	1	-	-	-	-	I	1
Hordeum secalinum	-	1	-	-	-	I	1
Rhinanthus minor	-	-	-	-	1	I	1
Senecio jacobaea	1	-	-	-	-	I	1

Matching coefficients. *MG6a 57.4*, *MG6 undifferentiated 57.2*, **MG6b 56.2**, MG7c 53.1, MG5a 52.7, MG9b 52.1, MG9 undifferentiated 52.0, MG5 undifferentiated 51.5, MG7d 50.2, MG9a 50.1

Diagnosis. Since the three highest matching coefficients all relate to the NVC community **MG6 *Lolium perenne-Cynosurus cristatus* grassland** it seems that some form of MG6 is likely to be the best diagnosis. Though the sward contains a grass component consistent with **MG5 *Cynosurus cristatus-Centaurea nigra* grassland**, it lacks many character species among the broad-leaved herbs as well as the sedge *Carex flacca*. Similarly in lacking *Deschampsia cespitosa* and in lacking

dominance by coarse grasses generally this sward differs clearly from **MG9 *Holcus lanatus-Deschampsia cespitosa* grassland**. The abundant broad-leaved herbs are principally short-lived legumes suggesting a sward of rather recent origin, or perhaps an older sward modified by reseeding with a wild-flower seed-mixture. It is probably best regarded an atypical example of **MG6b *Lolium perenne-Cynosurus cristatus* grassland, *Anthoxanthum odoratum* sub-community**.

Junction 15a

Swamp vegetation in the PWS east of the canal varies considerably from place to place, first because – as in many swamp vegetation types – one or another of the tall species tends to dominate here and there, probably as a simple result of clonal (vegetative) growth; and second because of a ruderal element in the vegetation characterised by such species as *Cirsium arvense* (Creeping Thistle) and *Urtica dioica* (Common Nettle) which is more marked in the slightly drier places. It was therefore sampled extensively to see whether contrasting parts might belong to different NVC communities. However, quadrat data presented in *Tables C6*, C*7* and C*8* show that it is all referable to the NVC type **OV26 *Epilobium hirsutum* community** – unequivocally to **OV26c *Epilobium angustifolium* community, *Filipendula ulmaria-Angelica sylvestris* sub-community** in the wetter places, and to transitions from OV26c to **OV26a *Epilobium hirsutum* community, *Juncus effusus-Ranunculus repens* sub-community** in the drier and more ruderal places. Despite the tall semi-ruderal herbs there is little evidence for **OV26e *Epilobium angustifolium* community, *Urtica dioica-Cirsium arvense* sub-community**.

Table C6. Floristic table for five 2×2m quadrats in tall-herb swamp vegetation in the PWS south of the M1 and west of the canal.

Epilobium hirsutum	8	7	8	8	7	V	7-8
Juncus inflexus	5	6	7	4	8	V	4-8
Filipendula ulmaria	-	6	2	5	4	IV	2-6
Equisetum palustre	3	-	1	1	1	IV	1-3
Impatiens capensis	3	1	2	1	-	IV	1-3
Juncus effusus	-	3	2	1	2	IV	1-3
Typha latifolia	-	-	3	3	3	III	3
Angelica sylvestris	3	1	1	-	-	III	1-3
Rumex sanguineus	3	-	1	-	1	III	1-3
Urtica dioica	3	-	1	-	2	III	1-3
Lathyrus pratensis	4	1	-	-	-	II	1-4
Galium aparine	3	-	-	-	-	I	3
Scrophularia auriculata	2	-	-	-	-	I	2
Cardamine amara	-	1	-	-	-	I	1
Epilobium cf. *obscurum*	1	-	-	-	-	I	1
Holcus lanatus	-	1	-	-	-	I	1
Solanum dulcamara	1	-	-	-	-	I	1
Stachys palustris	-	1	-	-	-	I	1

Matching coefficients. OV26 undifferentiated 53.2, OV26a 48.6, OV26c 45.9, OV26d 43.0, S26d 42.7, OV26b 42.2, S26 undifferentiated 41.7, OV26e 41.6, S7 undifferentiated 40.0, M27b 39.3

Diagnosis. This wet tall-herb vegetation is clearly referable to the NVC type **OV26 *Epilobium hirsutum* community**. In combining weedy and grassy elements such as *Galium aparine*, *Holcus lanatus* and *Urtica dioica* on the one hand with tall wetalnd herbs such as *Angelica sylvestris* and *Filipendula ulmaria* on the other, the vegetation appears to be intermediate in character between **OV26a *Epilobium hirsutum* community, *Juncus effusus-Ranunculus repens* sub-community** and **OV26c *Epilobium angustifolium* community, *Filipendula ulmaria-Angelica sylvestris* sub-community**.

Table C7. Floristic table for five 2×2m quadrats in tall-herb swamp vegetation in the PWS south of the M1 and west of the canal.

Angelica sylvestris	2	1	7	4	5	V	1-7
Filipendula ulmaria	9	7	-	8	4	IV	4-9
Epilobium hirsutum	3	6	1	-	6	IV	1-6
Rumex sanguineus	1	4	4	4	-	IV	1-4
Equisetum palustre	3	5	-	-	6	III	3-6
Typha latifolia	4	2	-	-	4	III	2-4
Galium aparine	-	-	7	4	-	II	4-7
Urtica dioica	-	-	4	5	-	II	4-5
Carex hirta	-	3	4	-	-	II	3-4
Poa trivialis	-	-	4	3	-	II	3-4
Cirsium arvense	-	-	4	-	1	II	1-4
Cardamine amara	-	-	-	-	4	I	4
Juncus inflexus	3	-	-	-	-	I	3
Persicaria amphibia	-	3	-	-	-	I	3
Vicia cracca	-	-	-	3	-	I	3
Arrhenatherum elatius	-	-	-	2	-	I	2
Holcus lanatus	-	-	2	-	-	I	2
Scrophularia auriculata	-	2	-	-	-	I	2
Carex otrubae	1	-	-	-	-	I	1
Cirsium palustre	-	1	-	-	-	I	1
Dipsacus fullonum	-	1	-	-	-	I	1
Glechoma hederacea	-	-	1	-	-	I	1
Myosotis arvensis	-	-	1	-	-	I	1

Matching coefficients. OV26 undifferentiated 59.5, S26 undifferentiated 52.9, M27b 51.3, S26d 49.3, OV26a 49.2, OV26c 46.5, OV26d 44.6, M27 undifferentiated 44.3, OV26b 42.6, S26b 41.2

Diagnosis. In combining weedy and grassy elements such as *Galium aparine*, *Holcus lanatus* and *Urtica dioica* on the one hand with tall wetalnd herbs such as *Angelica sylvestris* and *Filipendula ulmaria* on the other, the vegetation appears to be intermediate in character between **OV26a *Epilobium hirsutum* community, *Juncus effusus-Ranunculus repens* sub-community** and **OV26c *Epilobium angustifolium* community, *Filipendula ulmaria-Angelica sylvestris* sub-community**. This is reflected with the nigh matching coefficient with OV26 undifferentiated. In tha absence of *Phragmites australis* matches with **S26 *Phragmites australis-Urtica dioica* tall-herb fen** and its sub-communities do not represent acceptable diagnoses, while the ruderal element is inconsistent with **M27 *Filipendula ulmaria-Angelica sylvestris* mire**.

Table C8. Floristic table for five 2×2m quadrats in tall-herb swamp vegetation in the PWS south of the M1 and west of the canal.

Epilobium hirsutum	9	5	7	8	7	V	5-9
Filipendula ulmaria	4	8	4	1	1	V	1-8
Angelica sylvestris	5	5	4	2	5	V	2-5
Juncus inflexus	-	4	7	5	3	IV	3-7
Lathyrus pratensis	3	5	3	6	-	IV	3-6
Rumex sanguineus	4	3	3	4	-	IV	3-4
Brachythecium rutabulum	-	4	2	4	3	IV	2-4
Kindbergia praelonga	9	8	-	-	-	II	8-9
Juncus effusus	4	-	-	-	6	II	4-6
Hypericum tetrapterum	-	1	2	2	-	II	1-2
Scrophularia auriculata	2	-	-	1	-	II	1-2
Phalaris arundinacea	-	-	-	-	4	I	4
Carex hirta	-	-	-	3	-	I	3
Stachys palustris	-	-	-	-	2	I	2
Poa trivialis	-	-	-	1	-	I	1

Matching coefficients. OV26c 50.0, OV26 undifferentiated 49.9, OV26a 48.1, M27 undifferentiated 37.3, M27b 36.2, OV26b 36.1, OV26d 35.2, M27c 33.8, M27a 33.6, S26 undifferentiated 33.2

Diagnosis. This vegetation is clearly referable to the NVC type **OV26c *Epilobium angustifolium* community, *Filipendula ulmaria-Angelica sylvestris* sub-community**.

4 EVALUATION AND CONCLUSIONS

Main SRFI Site

Semi-improved grassland in the main SRFI site is referable to the very common NVC type **MG6 *Lolium perenne-Cynosurus cristatus* grassland** rather than any of the NVC types associated with the more valuable unimproved grasslands in lowland Britain such as **MG4 *Alopecurus pratensis-Sanguisorba officinalis* grassland** or **MG5 *Cynosurus cristatus-Centaurea nigra* grassland**. The loss of species-rich mesotrophic grasslands since 1945 has been so extreme across lowland Britain (probably around 98%) that even semi-improved grasslands may have modest nature conservation value, but those in the south-western part of the main SRFI site are highly impoverished in broad-leaved herbs, and are hardly to be regarded as above average for MG6 swards, though the presence of the grass *Hordeum secalinum* (Meadow Barley) – characteristic of MG6 on heavy clays including coastal grazing-marshes – is a minor feature of modest interest.

Other marginally species-rich swards in the vicinity of Towcester Road are again referable to the common NVC types **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community** and **MG6b *Lolium perenne-Cynosurus cristatus* grassland, *Anthoxanthum odoratum* sub-community**. They have an above-average range of broad-leaved herbs than most such swards, but it is not exceptional.

Junction 15a

Tall-herb swamp in the PWS referable to the NVC type **OV26c *Epilobium angustifolium* community, *Filipendula ulmaria-Angelica sylvestris* sub-community** is of note in the Northamptonshire context where extensive wetlands are unusual and most swamp and fen vegetation is confined to the canal corridors. Though OV26 is a relatively common wetland NVC type, it is the semi-ruderal forms such as **OV26e *Epilobium angustifolium* community, *Urtica dioica-Cirsium arvense* sub-community** that are most often encountered, while **OV26c *Epilobium angustifolium* community, *Filipendula ulmaria-Angelica sylvestris* sub-community** is characteristic of relatively natural wetlands that are of higher nature conservation value. That combined with the relative scarcity of such habitat in Northamptonshire is the basis for considering it to have value in the county context – it might not have such high relative value in a lowland county with more extensive and natural wetland vegetation types including true fen types, *e.g.* Norfolk.

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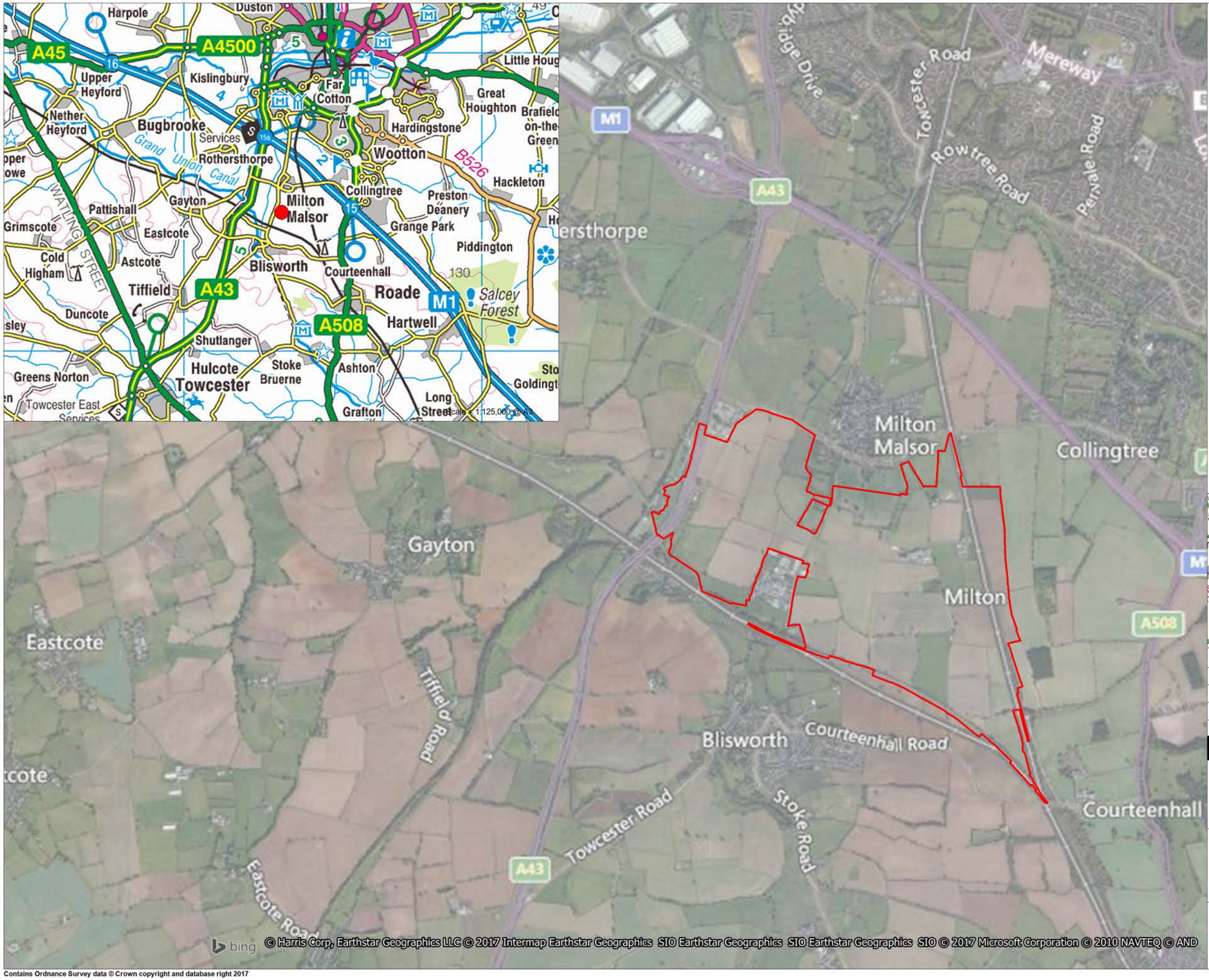
APPENDIX A – FIGURES



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

Rail Central

RSK

Figure C1.1

Main SRFI Site
Site Location Plan

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

REV 00

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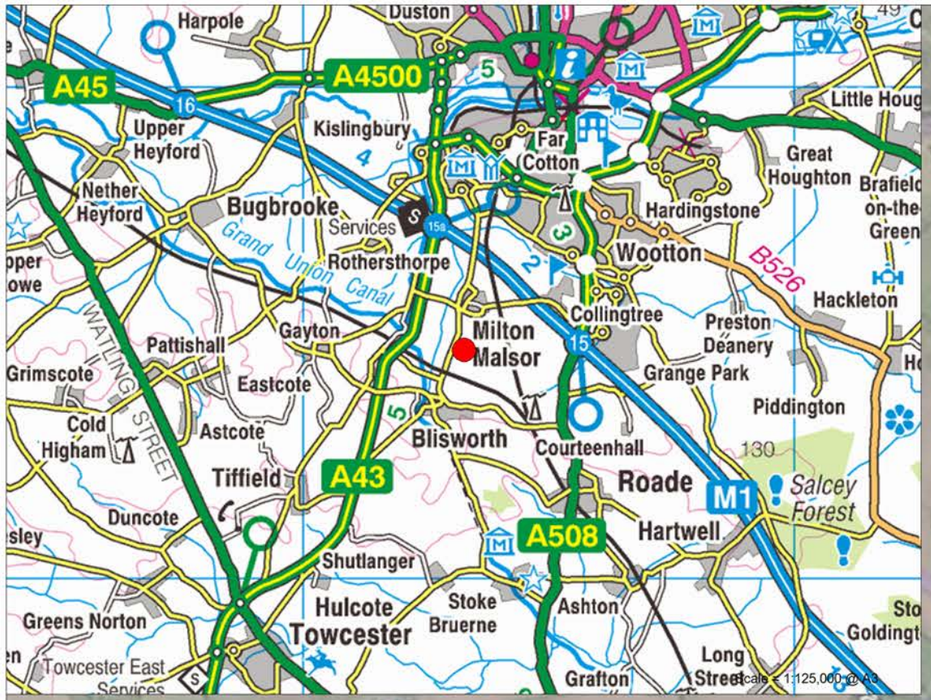

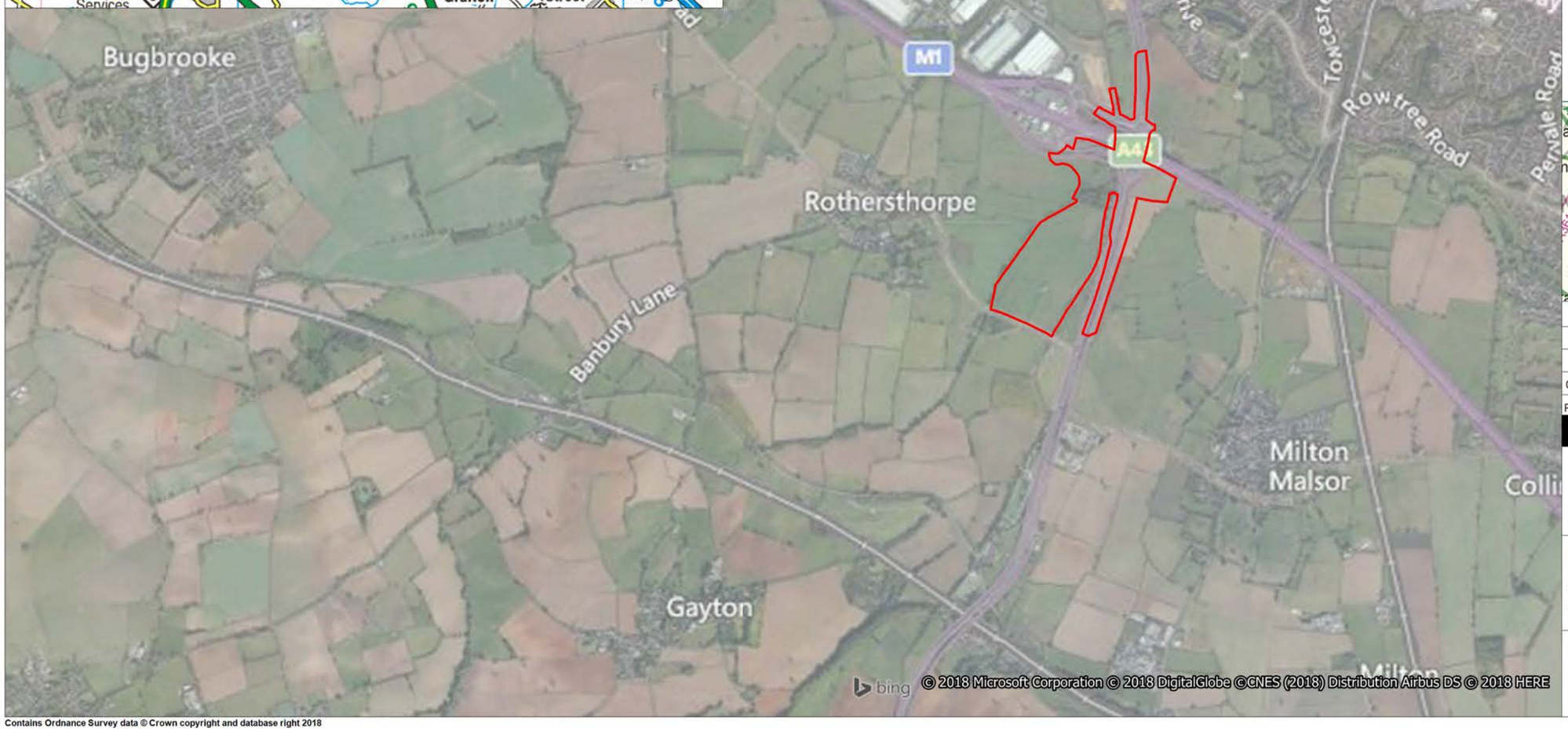

Rev	Date	Description	Drn	Chk	App
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Rail Central

RSK

Figure C1.2

Junction 15a
Site Location Plan

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

N W E S

REV 00

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