



Norfolk County Council

NORWICH WESTERN LINK ROAD

Interim Desmoulin's Whorl Snail Survey Report



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1. INTRODUCTION

1.1. PROJECT BACKGROUND

- 1.1.1. The Norwich Western Link Road (NWL) is a highway scheme linking the A1270 Broadland Northway from its junction with the A1067 Fakenham Road to the A47 trunk road near Honingham.
- 1.1.2. The NWL, hereafter referred to as the Scheme, will comprise:
- Dualling the A1067 Fakenham Road westwards from its existing junction with the A1270 to a new roundabout located approximately 400m to the north west;
 - Construction of a new roundabout; and
 - Constructing a dual carriageway link from the new roundabout to a new junction with the A47 near Honingham.
- 1.1.3. As part of a separate planned scheme, Highways England proposes to realign and dual the A47 from the existing roundabout at Easton to join the existing dual carriageway section at North Tuddenham. If that scheme proceeds, it is expected that Highways England will construct the Honingham junction and the Norwich Western Link will connect to the north-eastern side of that junction.
- 1.1.4. The Scheme will cross the River Wensum and its flood plain by means of a viaduct. The Scheme will include ancillary works such as provision for non-motorised users, necessary realignment of the local road network and the provision of environmental mitigation measures.
- 1.1.5. Following feasibility studies, six route options were presented at public consultations in 2018 and 2019. Route C was selected in July 2019 and the current alignment of Route C and the proposed road corridor is hereafter referred to as the 'Preferred Route'.

1.2. ECOLOGICAL BACKGROUND

- 1.2.1. Desmoulin's whorl snail *Vertigo moulinsiana* (hereafter referred to as *V. moulinsiana*) is a snail typically found in old or semi-natural open calcareous fen and wetlands, usually adjacent or close to rivers, streams, lakes and ponds. In the UK it is chiefly distributed in a broad band of country from central-southern England to East Anglia (Kerney, 1999). Outlying populations also exist in the midland meres, north Wales, and north Cornwall. Across its range the species has experienced significant reductions in its populations, several of which are no longer viable.
- 1.2.2. *V. moulinsiana* is categorised as Rare (category 3) in the UK Red Data Books (Bratton, 1991), and more recently has been classified as vulnerable on the IUCN based UK red list review (Seddon, et al., 2014). The species is listed in Annex II a of the European Community Habitats and Species Directive (92/43/EEC) and is a NERC Section 41 'Species of Principal Importance in England' (replacing the UK BAP priority species in 2006). Since the designation of *V. moulinsiana* as a Priority Species in 1995, many surveys have been undertaken (summary details of some of these appear in Drake (1999)).
- 1.2.3. A Desk Study (WSP UK Ltd., 2018A) and Phase 1 habitat survey (WSP UK Ltd., 2018B) of the Scheme was commissioned in 2018, based on multiple route options. The Desk Study was subsequently updated in March 2020 and Phase 1 habitat survey will also be updated in 2020 in order to present a refined contemporary baseline relevant to the Scheme.

- 1.2.4. The requirement for *V. moulinsiana* survey followed the identification, through the desk study, of the River Wensum Special Area of Conservation (SAC). *V. moulinsiana* is a qualifying feature (S1016) (Code UK0012647) of the River Wensum SAC and as such it is important to understand its distribution with relation to the Scheme.
- 1.2.5. The Scheme will cross the River Wensum SAC, as well as additional adjacent riparian habitat and ditches which may be suitable for supporting this species, hence the requirement for survey. The need for survey was subsequently agreed with Natural England.

1.3. BRIEF AND OBJECTIVES

- 1.3.1. In 2019 WSP UK Ltd was commissioned to undertake a survey for *V. moulinsiana* in order to provide current baseline data regarding the presence and extent of this species within the vicinity of the Scheme. To achieve this the following objectives were set:
- Carry out an assessment of the suitability of habitats for supporting *V. moulinsiana* within a Survey Area detailed in Section 1.4 below and shown on Appendix A; and
 - Carry out sampling in areas of suitable habitat to confirm the presence or likely absence of *V. moulinsiana*.
- 1.3.2. The methods and results of the *V. moulinsiana* survey are provided in this report and the subsequent assessment will be included within the Ecology Chapter of the Scheme Environmental Statement. The planning application submission for the Scheme is anticipated to be made in 2021 and the Ecology Chapter will be finalised at that time.

1.4. STUDY AND SURVEY AREAS

- 1.4.1. A previous desk study was completed and reported in 2018 (WSP UK Ltd., 2018A) using a broad Study Area which covered a large area encompassing multiple route options. This was updated in March 2020 using a more refined Study Area based on the Preferred Route.
- 1.4.2. The 2020 updated Desk Study defined Study Areas for *V. moulinsiana* as follows:
- Records of *V. moulinsiana* within 2km of the Scheme; and
 - A search for statutory sites designated for *V. moulinsiana* within 10km of the Scheme.
- 1.4.3. These Study Areas are presented in Appendix B.
- 1.4.4. The River Wensum SAC, identified through the Desk Study, lists *V. moulinsiana* as a qualifying feature. The Survey Area therefore encompassed a stretch of the River Wensum, from TG 13741 15658 to TG 14141 15368 (British National Grid), and the surrounding grazing marshes, which included the area of the River Wensum SAC and functionally linked habitat which lies within the Scheme boundary.
- 1.4.5. An initial assessment of habitat suitability was undertaken within the Survey Area, which identified 29 sampling locations for detailed survey.
- 1.4.6. The Survey Area and sampling locations are show in Appendix A.

2. RELEVANT LEGISLATION

2.1. LEGAL COMPLIANCE

- 2.1.1. *V. moulinsiana* is listed in Annex II a of the European Community Habitats and Species Directive (92/43/EEC). This means that core areas of their habitat are designated as sites of Community importance (SCIs) and included in the Natura 2000 network. These sites must be managed in accordance with the ecological needs of the species. *V. moulinsiana* is a qualifying species of the River Wensum SAC.
- 2.1.2. The species is also listed as a Species of Principal Importance (SPI) for the Conservation of Biodiversity in England in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Under Section 40 of the NERC Act (2006) public bodies, including local planning authorities have a duty to have regard for SPI when carrying out their functions, including determining planning applications.

3. METHODS

3.1. OVERVIEW

- 3.1.1. A walkover survey was undertaken on 13 November 2019 and areas of habitat suitable for supporting *V. moulinsiana* were identified for detailed survey work. The Survey Area included sections of the River Wensum SAC and surrounding grazing marshes. In total, 29 sampling locations were subject to detailed survey.
- 3.1.2. All *V. moulinsiana* records collected during the 2019 surveys will be submitted to Norfolk Biodiversity Information Service (NBIS).

3.2. DESK STUDY

- 3.2.1. The updated ecological desk study, completed in March 2020, requested records of any notable or legally protected species, including *V. moulinsiana*, from within 2km of the Scheme were requested from the Norfolk Biodiversity Information Service (NBIS).
- 3.2.2. A review of the Multi-Agency Geographic Information for the Countryside (MAGIC) website (www.magic.defra.gov.uk) was completed to identify any statutory sites designated for *V. moulinsiana* within 10km of the Scheme.

3.3. FIELD SURVEY

- 3.3.1. The habitat preferences of *V. moulinsiana* at a broad level are known (Kerney, 1999). For example, in general the snail prefers *Carex* vegetation and 'swampy' conditions. However, the specific and fine-scale habitat preferences and thus the optimal biotic and abiotic conditions for the species are not known. A high degree of surveyor experience was therefore used to assess habitat suitability.
- 3.3.2. At each sampling location two sub-samples of terrestrial molluscs were taken, described as samples A and B. Duplicating sampling in this way minimises the risk that, where present at a given sampling location, *V. moulinsiana* might not be detected.
- 3.3.3. The mollusc community was sampled using a non-destructive method. A white plastic tray (40cm x 60cm) was held near the base of the vegetation and the vegetation was bent over the tray and shaken vigorously. Adult *V. moulinsiana* snails were identified and separated from other molluscs by the presence of a developed lip and apertural teeth in the shell and then they were counted. All other terrestrial molluscs present were noted and quantified. Once this analysis was complete animals were returned to their origin.
- 3.3.4. *V. moulinsiana* can easily be identified in the field and as such no samples needed to be retained.
- 3.3.5. At each sampling location chosen by the surveyor for detailed work, a minimum of five minutes was spent to record all molluscs and vegetation within an area of one metre from a centre point.
- 3.3.6. Several environmental and biotic variables were recorded at the sampling locations:
- Canopy cover (shade) (Table 3-1);
 - Average height of the vegetation;
 - Vegetation composition – DAFOR scale; and

- Moisture content of the soil (Table 3-2).

Table 3-1 – Canopy Cover Classes

Canopy cover	Percentage
1	0-20%
2	21-40%
3	41-60%
4	61-80%
5	81-100%

Table 3-2 – Soil moisture classes

Soil moisture classes	
1 – Dry	No visible moisture on ground surface.
2 – Damp	Ground visibly damp, but water does not rise under pressure.
3 – Wet	Water rises under light pressure.
4 – Very wet	Pools of standing water, generally less than 5cm deep.
5 – Site under water	Entire sampling location in standing or flowing water over 5cm deep.

BOTANICAL ASSESSMENT

- 3.3.7. Quadrats were used to assess the composition of vegetation around each mollusc sampling location.
- 3.3.8. The percentage cover of vegetation was recorded within each quadrat. In addition to this, other biotic and abiotic factors were also recorded including:
- Open water;
 - Litter depth;
 - Field layer;
 - Vegetation height;
 - Slope;
 - Aspect; and
 - NVC community.
- 3.3.9. In this sample-site specific survey, the emphasis was on covering the area immediately around the mollusc sampling locations and detecting as many plant species as possible.

3.3.10. The plant species present were classified into four groups, with Class I the most favoured habitat for *V. moulinsiana* and Class IV considered unsuitable habitat (Table 3-3 below).

Table 3-3 - Vegetation classes

Vegetation classes	
Class I	Tall <i>Carex</i> species, <i>Cladium mariscus</i> <i>Glyceria maxima</i>
Class II	<i>Equisetum fluviatile</i> <i>Phragmites australis</i>
Class III	<i>Juncus subnodulosus</i> <i>Mentha aquatica</i> <i>Angelica sylvestris</i>
Class IV	<i>Urtica dioica</i> <i>Eupatorium cannabinum</i> and all other species

3.3.11. Vegetation cover within each quadrat was assessed as follows:

- D – Dominant (51-100% cover)
- A – Abundant (31-50% cover)
- F – Frequent (16-30% cover)
- O – Occasional (6-15% cover)
- R – Rare (less than 5% cover)

3.4. DATES OF SURVEY AND PERSONNEL

3.4.1. The recommended survey period for *V. moulinsiana* is from mid-late summer to the end of autumn (Killeen, 2000) inclusive, following the main reproductive period, but this species does breed throughout the year with juveniles present in samples across all seasons. The surveys should be carried out before the first frosts of the autumn, before the main vegetation has started to collapse and where the conditions are not too wet. This avoids excessive disturbance to the habitat. However, where suitable habitat is present, *V. moulinsiana* can be detected at any time of year.

3.4.2. A Suffolk-based mollusc surveyor and nationally recognised Vertiginidae specialist, who is also a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM), visited the Survey Area in November 2019 to undertake an assessment of the area.

3.5. NOTES AND LIMITATIONS

3.5.1. Due to access restrictions the sampling was carried out late in the season and followed a period when there had been considerable flooding in the preceding weeks. The survey was therefore undertaken when flooding had receded. Given that *V. moulinsiana* were recorded in two locations within the Survey Area, it is considered unlikely that any large populations were missed. There remains a low risk that small numbers of this species were not detected in some Sampling Locations.

4. RESULTS

4.1. OVERVIEW

- 4.1.1. *V. moulinsiana* was confirmed to be present at four sampling locations within suitable habitat. This indicates the presence of a scattered population within the Survey Area.
- 4.1.2. It should be noted that at each of the sampling location *V. moulinsiana* was only found in one of the two samples taken. This indicates the cryptic distribution of this species and the possibility that it is present at other sites where it was not found during this survey in small numbers (see Section 5).

4.2. DESK STUDY

- 4.2.1. The NBIS returned no records of *V. moulinsiana* within the 2km radius of the Study Area.
- 4.2.2. Two statutory sites designated for *V. moulinsiana* were identified within 10km of the Scheme. These are:
- The River Wensum SAC for which *V. moulinsiana* is a qualifying feature (S1016) (Code UK0012647), which the Scheme crosses; and
 - The Norfolk Valley Fens SAC (Code UK0012892) which is approximately 6.2km north-east of the Scheme, for which *V. moulinsiana* is a primary reason for selection of the site.
- 4.2.3. Given the limited mobility of the species the population present within the Norfolk Valley Fens SAC will not be impacted by the Scheme, however the 10km Study Area allowed a wider view of the distribution of this species in the local area.

4.3. FIELD SURVEY

- 4.3.1. The Survey Area consisted of species-poor grazing marsh either side of the River Wensum, with the majority of suitable habitat for *V. moulinsiana* to the south of the river. In this location there was a larger complex of ditches supporting vegetation in a range of successional stages. In the north, the northern bank of the river and the ditch running at the rear of the grazing marsh noted above were the only waterbodies with potentially suitable vegetation for *V. moulinsiana*.
- 4.3.2. The Survey Area has been divided into three sections for reporting. The northern section (samples 1-5), south-eastern section (samples 6-12 and 27-29), and south-western section (samples 13-26) of the main grazing marshes.
- 4.3.3. Full results of all mollusc species recorded is provided in Appendix C.

NORTHERN SECTION (SAMPLES 1-5)

- 4.3.4. Three of these samples were taken within the sparsely distributed areas of *Carex* sward along the edge of the riverbanks. The water level was high at the time of the survey, though it was possible to sample sufficient amounts of the habitat for *V. moulinsiana*. The mollusc community in samples 3-5 was lacking in diversity. These samples were dominated by the snail *Succinea putris*.
- 4.3.5. The other two samples were taken within the edge of a recently cleared ditch (Sample 2) and an area of wet grassland dominated by *Glyceria maxima* (Sample 1). The *Glyceria maxima* grassland was wet at the time of the survey and as this can occasionally support *V. moulinsiana*, it was searched. The mollusc community here was poor, comprising *Succinea putris* and two slug species, *Deroceras reticulatum* and *D. laeve*. The habitat of Sample 1 (in the edge of a newly created pond

adjacent to the river) comprised small stands of *Glyceria maxima*. The only shelled mollusc present here was *Radix balthica*. The ditch running at the north of this area was not surveyed as it held no suitable habitat and was dominated with *Berula erecta*.

4.3.6. No *V. moulinsiana* were present within this northern section.

SOUTH-EASTERN SECTION (SAMPLES 6-12 AND 27-29)

4.3.7. Samples 6 to 8 were within a ditch colonised densely with *Glyceria maxima*. This species was lying nearly flat to the surface of the water and supported *Succinea putris* and *Anisus vortex*. This vegetation does not have the structural integrity typical of sites supporting *V. moulinsiana*.

4.3.8. Samples 8 and 9 were in a *Carex riparia* dominated sward. Searching found only a very limited mollusc fauna with *Succinea putris* and a *Galba truncatula* only present. These snails are common wetland species.

4.3.9. Samples 10 to 12 were taken within areas of *Glyceria maxima* mosaic with *Carex acutiformis*. Mollusc species collected here were very limited, restricted to *Succinea putris* and *Cepaea hortensis*. The vegetation was standing in water to a depth of 30cm, though it appeared that the ditch was likely much drier for long periods of the year.

4.3.10. Samples 27 to 29 were taken in the ditch vegetation dominated with *Glyceria maxima*, *Carex riparia*, and small stands of *Sparganium erectum*. The vegetation in all these locations was wet with at least 30cm of water. The mollusc communities here lacked diversity with *Succinea putris* the dominant species and very few other species present. Only *Ashfordia granulata* was a wetland species of interest.

4.3.11. No *V. moulinsiana* were present within this eastern section.

SOUTH-WESTERN SECTION (SAMPLES 13-26)

4.3.12. The western portion of the Survey Area covered several ditches, all in a mid to late successional stage. Samples 13 to 16 were within a shallow ditch with *Salix caprea* scattered along the margins. Between these trees were areas of *Glyceria maxima* with smaller stands of *Sparganium erectum* and occasional branches from the willows lying across the vegetation. The *Sparganium* and the willow branches created a framework for the *Glyceria* to grow through creating a more vertical dense sward. The only molluscs in samples 13 and 14 were *Succinea putris* and *Galba truncatula*.

4.3.13. In sub-sample 13a a total of 102 *Vertigo moulinsiana* were found. Two additional sub-samples were taken close to the initial find, but neither of these contained *V. moulinsiana*. A sub-sample taken at point 14 contained 4 juvenile *V. moulinsiana*. This sample was only four meters to the west of the original find. Further samples were taken from adjacent areas and no more specimens were located.

4.3.14. Samples 17 and 18 were taken from a choked ditch containing *Sparganium erectum* and small quantities of *Carex acutiformis*. The mollusc community here was very restricted with only *Succinea putris* and *Cepaea hortensis* present in the vegetation.

4.3.15. Samples 19 and 20 were taken in the vegetation on the edge of the channel within *Glyceria maxima* and *Urtica dioica*. Only *Succinea putris* was found in the samples.

4.3.16. Sample 21 was within a community of *Carex riparia* and again only *Succinea putris* was found.

4.3.17. The final set of samples (samples 22-26) were taken from the western ditch running north-east to south-west. The ditch was in late succession, its vegetation dominated by *Glyceria maxima*, *Carex*

riparia and *Carex acutiformis*. In samples 23 and 24 *Vertigo moulinsiana* was present, with a single juvenile found in each sample. Other mollusc species found were limited to *Succinea putris* and *Cepaea hortensis*.

Table 4-1 – Locations of Positive *Vertigo moulinsiana* Samples

Sample Location	Grid reference	Species	Adult	Juvenile	Total	Sub sample
13	TG 13830 15432	<i>Vertigo moulinsiana</i>	13	89	102	A
14	TG 13825 15440	<i>Vertigo moulinsiana</i>	0	4	4	A
23	TG 13519 15435	<i>Vertigo moulinsiana</i>	0	1	1	A
24	TG 13535 15461	<i>Vertigo moulinsiana</i>	0	1	1	A
Total			13	95	108	

5. RECOMMENDATIONS FOR FURTHER SURVEY

- 5.1.1. Consideration should be given to avoiding or minimising effects on this species during the ongoing design of the Scheme.
- 5.1.2. Further survey work is needed to establish the wider context of the population recorded by this survey, specifically whether this is a single outlier population or part of a larger scattered population within the grazing marshes of the River Wensum corridor. This survey work would inform more specific mitigation measures for this species. Additional survey is therefore recommended over a much larger extent of the Wensum floodplain, covering an area from the A1067 Fakenham Road to the northwest of the Scheme to Ringland Road to the southeast.
- 5.1.3. The last two years have seen unprecedented dry summers. During wetter summers it is likely that the population of *V. moulinsiana* will be present over a wider area than that recorded during this survey.

6. REFERENCES

6.1. PROJECT REFERENCES

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6.2. TECHNICAL REFERENCES

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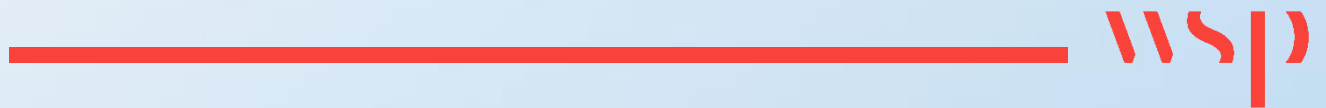
Killeen, I. J. (2000). Monitoring Desmoulin's Whorl Snail. *Monitoring series No. 6*.

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Appendix A

DESMOULIN'S WHORL SNAIL SURVEY RESULTS



Path: \\uk.wspgroup.com\central\data\Projects\700419\04\1922 - Norwich Western Link\02 WIPEC Ecology\06 GIS & Mapping\04 Baseline Surveys\Desmoulin's Snail\Desmoulin's Snail_Survey_Results.gxg



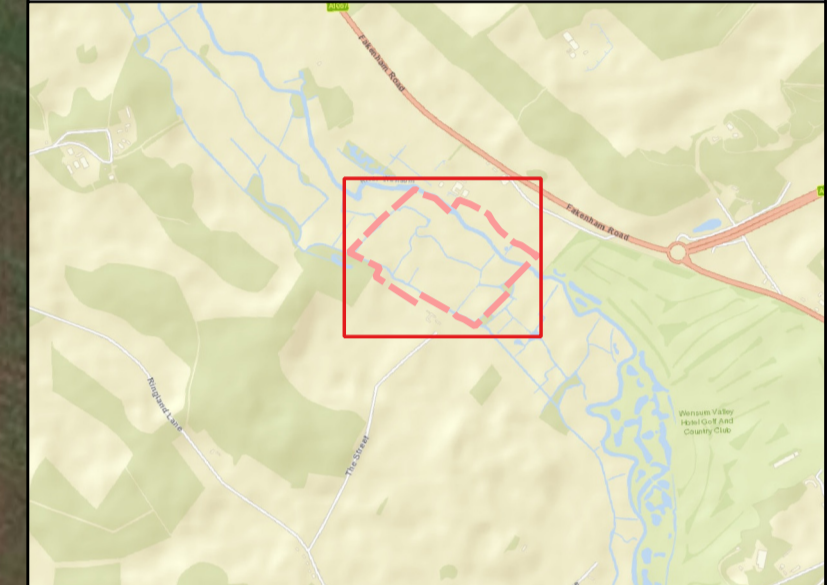
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Legend

- Survey Area
- Snail Sampling Locations

Sampling Location Key

- Juvenile
- Adult
- Total number of snails recorded



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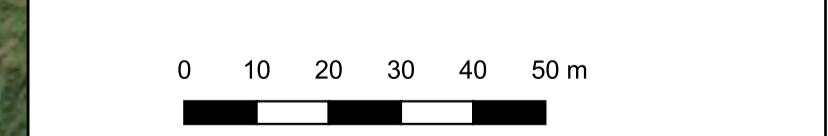
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Drawing Title:
**Appendix A - Desmoulin's Whorl
 Snail Survey Results**

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Drawn UKRKR001			
Stage 1 Check HS	Stage 2 Check AH	Originated KR	Date 22/04/2020

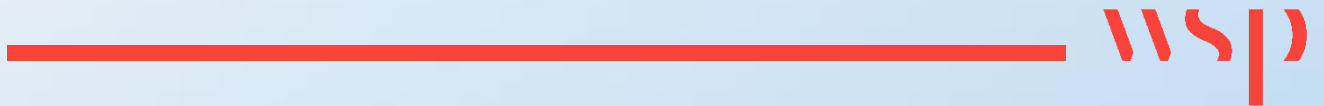


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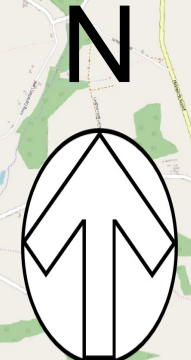
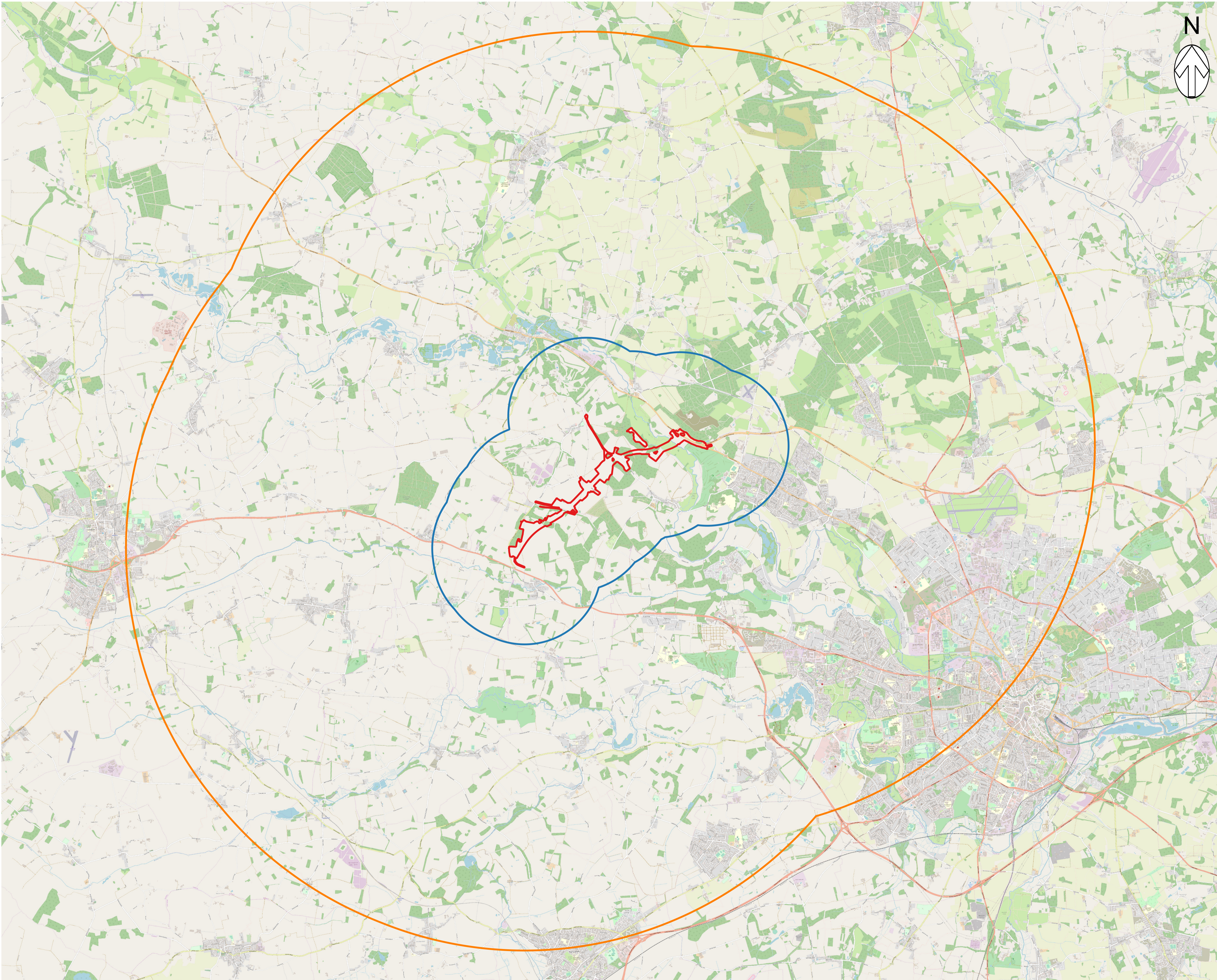
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70061370-09-03-0001

Appendix B

DESMOULIN'S DESK STUDY AREA AND RESULTS



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- Legend
- Scheme Boundary March 2020
 - 10km Study Area
 - 2km Study Area

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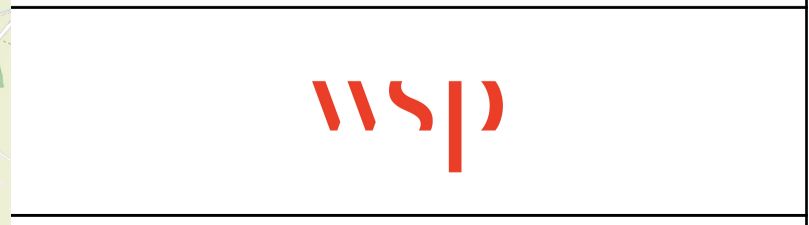
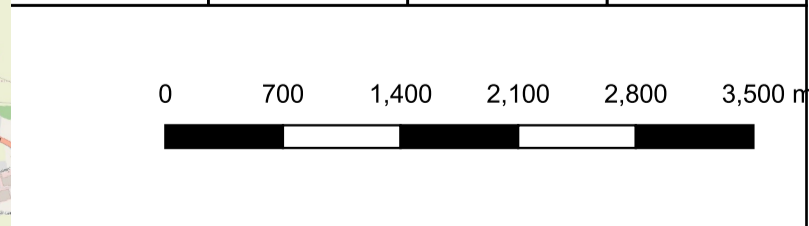
**Norfolk County Council
Norwich Western Link**

Drawing Title

Desmoulin's Whorl Snail Desk Study Area

Scale at A1: **1:45,000**

Drawn	UKRKR001		
Stage 1 Check	HS	Stage 2 Check	AH
		Originated	KR
		Date	22/04/2020



Drawing Number: **70061370-09-03-0002**

Appendix C

FULL RESULTS



Table C-1 – Mollusc species recorded at sampling locations

Mollusc species	Sampling location																												Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28		29
<i>Anisus vortex</i>	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
<i>Arion sp.</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Ashfordia granulata</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5
<i>Bathyomphalus contortus</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Cepaea hortensis</i>	0	0	2	0	0	0	0	0	0	0	0	1	2	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	8
<i>Cochlicopa cf. lubricella</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
<i>Deroceras reticulatum</i>	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	5
<i>Deroceras sp.</i>	3	0	0	0	1	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	7
<i>Galba truncatula</i>	0	0	0	0	1	0	13	0	1	0	0	0	3	3	0	5	0	0	0	0	0	0	0	0	0	0	0	0	2	28
<i>Radix balthica</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Succinea putris</i>	4	0	34	1	1	2	1	2	2	1	2	1	3	1	1	1	2	1	3	2	1	4	7	6	37	6	15	5	6	152
<i>Vertigo moulinsiana</i>	0	0	0	0	0	0	0	0	0	0	0	0	102	4	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	108
<i>Zonitoides nitidus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Grand Total	10	2	42	1	3	3	14	3	3	1	3	2	110	8	1	7	2	2	3	2	1	5	8	9	38	6	17	5	12	323



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