Welsh Government

M4 Corridor around Newport

Environmental Statement Volume 3: Appendix 10.9 Dormouse Survey 2014

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Welsh Government

M4 Corridor Around Newport

Dormouse Survey Report

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1 Introduction

Ove Arup & Partners Ltd has been commissioned by Welsh Government to undertake baseline ecological surveys to inform proposals for the M4 Corridor around Newport. Should the Welsh Government adopt its draft Plan, this report provides information to inform the development of the scheme, including a Design Manual for Road and Bridges (DMRB) Stage 3 environmental assessment (HA, 1993).

This report identifies the presence of important habitat areas for dormice *Muscardinus avellanarius*.

Where appropriate, recommendations are made for further surveys to inform the development of the scheme.

1.1 Background to the Project

The M4 in South Wales forms part of the Trans-European Transport Network (TEN-T), which provides connections throughout Europe by road, rail, sea and air. The M4 plays a key strategic role in connecting South Wales with the rest of Europe, providing links to Ireland via the ports in South West Wales and England and mainland Europe to the east. It is a key east-west route being the main gateway into South Wales and also one of the most heavily used roads in Wales.

Providing a facility for transporting goods, linking people to jobs and employment sites as well as serving the Welsh tourism industry, the M4 is critical to the Welsh economy. Cardiff, Newport and Swansea have ambitious regeneration strategies and Monmouthshire County Council is developing areas around Junction 23A of the M4. Rhondda Cynon Taff has important gateways onto the motorway at Junctions 32 and 34. Bridgend is served by M4 Junctions 35 and 36. Neath Port Talbot straddles the motorway and gets important access from Junctions 38 to 43. Congestion on the M4 causing unreliable journey times and reduced service levels will therefore hinder economic development in South Wales.

The M4 between Junctions 28 and 24 was originally designed as the 'Newport Bypass' with further design amendments in the 1960s to include the first motorway tunnels to be built in the UK.

The M4 Motorway between Magor and Castleton does not meet modern motorway design standards. This section of the M4 has many lane drops and lane gains, resulting in some two-lane sections, an intermittent hard shoulder and frequent junctions.

It is often congested, especially during weekday peak periods resulting in slow and unreliable journey times and stop-start conditions with incidents frequently causing delays.

This is why problems with congestion and unreliable journey times have been a fact of life on the M4 around Newport for many years. The motorway and surrounding highway network does not cope with sudden changes in demand or operation, for example as a result of accidents or extreme weather events. These issues are worse at times of peak travel (rush hour) and have worsened as the number of users on the network has increased.

Since 1991, much assessment and consultation has been undertaken to develop a preferred solution to the problems on the motorway around Newport. A detailed history is documented in the M4 Corridor around Newport WelTAG (WG, 2008) Stage 1 (Strategy Level) Appraisal Report (Ove Arup & Partners Ltd, 2013). This included the adoption of a revised TR111 route[1] in April 2006, which remains protected for planning purposes. The alignment of this proposed new section of motorway has been developed following extensive consultation, investigation and analysis. The aim was to minimise the impact on the environment, whilst fully meeting motorway design and safety standards. The main element of the Plan (the Black Route) largely follows this TR111 alignment.

The survey design is informed by the Route Options defined in the Stage 2 DRMB Environmental Report (Ove Arup & Partners Ltd, 2014).

1.2 Survey Objectives

The objectives of the study were:

- To identify the presence of dormice within the study area;
- To identify areas where mitigation or compensation may need to be considered depending on the nature of any scheme;
- To identify further studies that may be required to ensure that dormice are fully considered within the scheme.

1.3 Study Area

The study area for the purpose of this survey was based on a 500m buffer around the physical extents of the previous scheme studied in 2007/8 including both the route alignment, potential junctions and water treatment areas. The Preferred Route announced by Welsh Government in July 2014 is located within the centre of this corridor as shown on Figure 1.

[1] Once a preferred route is announced, Welsh Government serves a statutory notice (TR111) on the local planning authorities requiring the line to be protected from development. This is enacted under Article 19 of The Town & Country Planning (Development Management Procedure) (Wales) Order 2012.

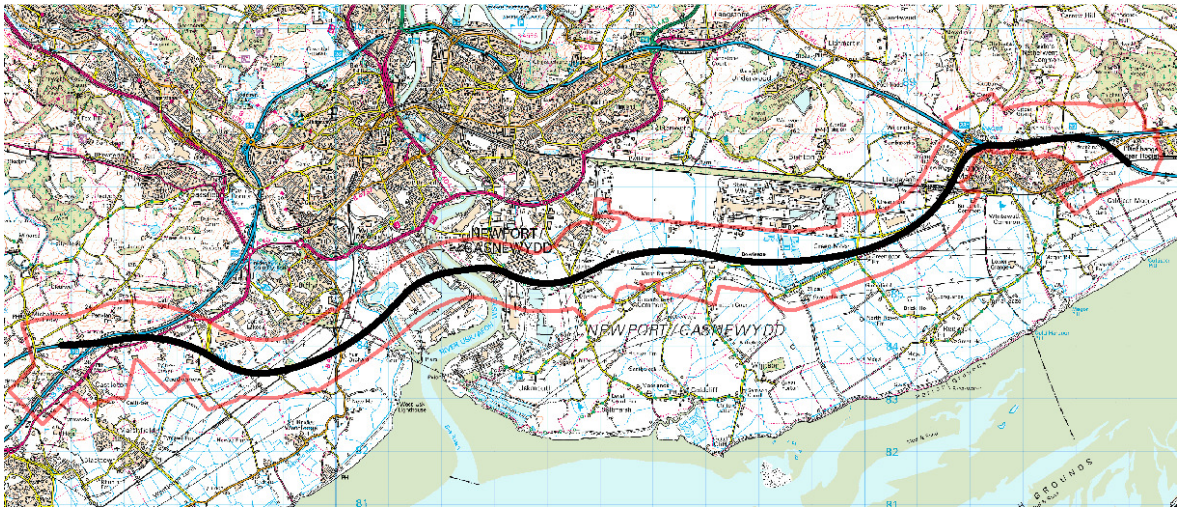

Figure 2 The 2014 Preferred Route within the study area shown in red.

1.4 Legislation

Dormice are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2010 (as amended) (known as the Habitats Regulations) as European Protected Species.

These pieces of legislation together make it an offence to deliberately capture, injure or kill a dormouse, to deliberately disturb a dormouse in such a way as to significantly affect its ability to breed or its local distribution or to damage or destroy a breeding or resting place used by a dormouse; and to intentionally or recklessly disturb a dormouse while it is in place used for shelter or protection or to obstruct access to such a place.

2 Methodology

The survey work involved the use of nest tube surveys in discrete areas to record dormouse presence. Tubes were erected in five areas and checked between four and seven times during 2014. The areas surveyed were selected taking into account the habitat preferences of the species and records of where dormouse have previously been encountered.

Desk study data for dormice is included within the Extended Phase 1 Habitat Survey and Desk Study report for the project.

2.1 Identification of Survey Locations

2.1.1 Previous Dormouse Records

Evidence of previous dormouse presence within the vicinity of the proposed route has been identified from a desk study of records centre information (SEWBReC) and results of previously undertaken studies in the area (including the surveys undertaken by Jacobs for the M4 Widening between Junctions 29 and 32 in 2005/2006 and the Arup studies undertaken to support the proposed New M4 Project in 2007/8).

The previous records are all to the west of the study area, including Nant Mwlan Wood, Bogod's Field and Michaelstone-y-Fedw. Information provided by Jacobs revealed that dormice were present within 9 of the 11 woodlands surveyed adjacent to M4 Widening between Junctions 29 – 32. The majority of dormouse activity is concentrated between central and eastern areas of the M4 Widening Project, and mostly occurs to the north of the existing M4 corridor. However dormice have also been recorded to the south of the M4 Corridor in eastern Cardiff such as at the Pentwyn Park and Ride Site.

The New M4 surveys revealed that dormice were also present further east within the hedgerows around Penylan Farm and Gwaunhonsbrown Farm in Castleton. No records of dormice exist at the eastern end of the study area and there are no records of dormice on the Gwent Levels.

The nearest known population to the eastern end of the study area is approximately 6km north within Wentwood Site of Special Scientific Interest (SSSI) in woodland north of Penhow (NBN Gateway[2]).

Dormouse Habitat Requirements

Dormice are known to favour woodland habitat with a diverse scrub understorey (Bright, Morris, & Mitchell-Jones, 2006) and readily colonise scrub and hedgerow habitats. Other habitats may be used by dormice where connected to these favoured habitats (Annex C of Nature Conservation Management in Relation to Dormice (Highways Agency, 2001)). Annex A of Nature Conservation Management in Relation to Dormice (Highways Agency, 2001) indicates that dormouse habitat fragmentation can occur where gaps of 100m occur between areas of suitable habitat, and Bright (1998) found that dormice would not cross a

[2] https://data.nbn.org.uk/ accessed 7th November 2014.

hedgerow gap greater than 6m. Woodlands should be at least 20ha to support a viable population of dormice unless they are linked to other areas of suitable habitat (Bright, Morris, & Mitchell-Jones, The Dormouse Conservation Handbook, 2006).

During the Phase 1 Habitat Survey undertaken in 2013, habitats within the wider area were identified as having potential to support dormice, including hedgerows to the east of Michaelston-y-Fedw, the verges of the A48(M) and M4, the woodland along the derelict road south of Church Lane and a small woodland to the east of Castleton. It is considered highly likely that dormice could use the motorway verges as corridors permitting movement between interconnected woodlands.

The Gwent Levels are characterised by a network of drainage ditches and historic floodplain grassland with no significant woodland areas, hedgerows or scrub areas large enough to support a viable population of dormice. In addition during winter months the relatively high water table may affect dormice which usually hibernate within the base of hedgerows and coppice stools within woodlands.

The potential for dormice across the Gwent Levels is therefore very low, and no surveys were originally proposed in this location. However, the opportunity to place tubes within the Gwent Levels was subsequently taken to provide evidence to support this assumption.

2.1.2 Description of Survey Sites Selected

Survey sites have been selected to repeat the previous surveys undertaken and to include the additional areas of potentially suitable habitat which have been identified. The locations of the dormouse nest tubes are shown on Drawings M4-OA-01-00-DR-Z-DM- 0001 to 0003.

Tubes were initially placed in two woodlands at the western end of the scheme (at New Park Farm) however these were subsequently moved to avoid duplicating work being undertaken as part of the monitoring for the M4 Widening. These nest tubes were redeployed in July to include the Gwent Levels area.

The selected survey sites have been grouped into areas as follows:

- **New Park Farm area**: comprising New Park Farm north (A), New Park Farm south (B) and A48(M) verges (D);
- **Castleton area**: comprising hedgerows and verges south of Pen-y-lan Farm (C), Pound Hill (E), and Spring Court woodland (K);
- **Coedkernew area**: comprising Berryhill Farm (F) and the Church Lane woodland (G);
- **Gwent Levels area**: comprising Pye Corner (L) and hedgerows south of Tata Steelworks (M); and
- **Magor area**: comprising Magor Vicarage (H); hedgerows and verges south of Upper Grange Farm (H); south of M4 J23a services (H) and verges north of Rockfield Farm, Undy (I).

Descriptions of the habitats present within each of these sub-areas are provided below.

- New Park Farm north (A) comprises semi-natural broadleaved woodland with a scrub understorey and connectivity to species-poor hedgerows with trees;

- New Park Farm south (B) is a wet woodland dominated by alder with very little ground flora or associated scrub. However, hedgerow connections to the wider area are good;
- The A48(M) verges (D) are plantation broadleaved woodland with hazel and dense bramble scrub;
- The hedgerows and verges south of Pen-y-lan Farm (C) consist of plantation broadleaved woodland with bramble scrub, connected to well established species-poor hedgerows;
- Pound Hill (E) is plantation broadleaved woodland with sparse bramble understorey, connected to well established species-poor hedgerows;
- Spring Court woodland (K) contains semi-natural broadleaved woodland with a bramble scrub understorey and connectivity to species-poor hedgerows with trees;
- Berryhill Farm (F) comprises ancient woodland with a bramble scrub understorey, species poor hedgerows, species rich hedgerows and coniferous plantation. There are also a number of orchards within the fields;
- Church Lane woodland (G) consists of plantation broadleaved woodland with patches of bramble and a species poor hedgerow to the west;
- Pye Corner (L) is a derelict laboratory site which has become overgrown with semi-natural broadleaved woodland, planted coniferous trees and bramble scrub;
- The hedgerow south of Tata Steelworks (M) is a species-poor native intact hedgerow along a wet ditch;
- Magor Vicarage (H) is an area of semi-natural broadleaved woodland with an understorey of bramble;
- The hedgerows and verges south of Upper Grange Farm (H) are species-poor intact hedgerows and plantation broadleaved woodland verges;
- The verge south of M4 J23a services (H) is an area of plantation broadleaved woodland with coppiced hazel;
- The verges north of Rockfield Farm, Undy (I) are plantation broadleaved woodland along the motorway verge, and dense bramble scrub.

A further site was selected at Gwaunhonsbrown Farm, Castleton, where dormice had previously been found during surveys for the New M4 Project. Unfortunately access permission was not granted for this area so tubes could not be erected at this site.

2.1.3 Consultation

Natural Resources Wales (NRW) were consulted on the methodology for the surveys and the proposed tube locations. The following response was received from NRW on 21st March 2014:

'*We note and welcome the proposal to carry out surveys in areas identified as having potential to support dormice and that these surveys will conform to best practice.*

We also note that surveys will not be carried out on many parts of the Gwent Levels. Historically, this habitat has not been known to support dormouse and assuming that full justification as to why areas have not been surveyed are included within the reports, NRW would not object in principle to this approach.

Therefore, in principle, NRW do not object to the proposed survey areas for dormouse. However, we would wish to take this opportunity to remind you that all areas that may support dormice and that may be impacted by the proposal should have had surveys carried out and the data submitted as part of the application. Areas that remain un-surveyed should be supported with full justification as to why surveys would not be required.'

2.2 Survey Methods

A combination of survey methods was used as recommended in DMRB Volume 10 Section 4 Part 6 (HA 97/01): Nature Conservation Management in Relation to Dormice (Highways Agency, 2001). The surveys for dormice comprised searches for gnawed hazel nuts (where hazel was present); searches for other evidence of dormice, such as nests; and the placement and monitoring of nest tubes. The surveys also followed the methodology set out in the Dormouse Conservation Handbook (Bright, Morris, & Mitchell-Jones, 2006).

2.2.1 Hazel Nut Searches

Within areas of suitable habitat where fruiting hazel trees were present, searches for hazelnuts characteristically chewed by dormouse were made. Dormice gnaw hazelnuts in a characteristic way which can easily be distinguished from other small rodents, squirrels and birds.

Areas surveyed included New Park Farm north (A), the A48(M) verges (D), Spring Court woodland (K) and the verge south of M4 J23a services (H). These areas were considered to constitute the most suitable areas for this survey due to the presence of fruiting hazel trees.

Searches were carried out within five 10m x10m quadrats for twenty minutes each, or until 100 nuts (not opened by birds or squirrels) had been collected. This survey technique readily establishes dormouse activity within an area.

2.2.2 Nest Tube Survey

Surveys consisted of putting nest tubes in areas of woodland and suitable hedgerows within the survey area. Tubes were set out in April/May 2014 and checked on a monthly basis until November 2014. As stated in 'Nature Conservation Management in Relation to Dormice' (Highways Agency, 2001), tubes were installed and left in situ during the active season (May until November) in shrubs, hedgerows and trees. The numbers of tubes used per area depended on the site, but they were set out in woodland or shrub in a grid system of 20m squares and in hedgerows at approximately 10-20m intervals. These were then checked monthly for the presence of dormice and recently constructed dormouse nests.

A total of 310 nest tubes were installed at targeted locations along the route during April/May 2014. In July 2014 the tubes at New Park Farm woodland were removed to allow for dormouse monitoring with respect to the M4 Motorway Widening Scheme. All 42 of these tubes were re-mounted in July 2014 within areas L and M described above.

Each visit to check tubes and boxes was carried out by a licensed surveyor accompanied by an accredited agent or assistant. All evidence of dormice and their activity was recorded and mapped. Where individual dormice were found, the sexes of animals were determined and their weights measured. Evidence of other small mammal activity was also recorded where this occurred. During the November check where torpid dormice were found, the sex of the animal was not determined to avoid undue disturbance.

2.3 Details of Surveyors

The surveys were led by Debbie Brown under NRW licence number 55882:OTH:SA:2014 with her accredited agents Tom Gray and Tom Shelley and assistant Angharad Owen; and Pete Wells under Countryside Council for Wales (CCW) licence number 42098:OTH:SRA:2012 with his accredited agent Pippa Wood.

2.4 Survey Effort

In accordance with the Dormouse Conservation Handbook (Bright et al., 2006) each of the four original survey areas was surveyed monthly between May and November to obtain a score of at least 20 over the survey season. This was achieved as follows:

- **New Park Farm area**: 42 tubes surveyed for three months and 36 tubes surveyed for seven months giving a score of 24.
- **Castleton area**: 59 tubes surveyed for seven months and 14 tubes surveyed for four months giving a score of 33.
- **Coedkernew area**: 106 tubes surveyed for seven months giving a score of 51.
- **Magor area**: 67 tubes surveyed for seven months giving a score of 32.

The **Gwent Levels area** was surveyed between August and November scoring a total of 9 over this period.

2.5 Limitations and Assumptions

No access was permitted to Gwaunhonsbrown Farm for the entire survey season. All surrounding areas were subject to survey though and this limitation did not adversely affect the conclusions of the survey.

At the site to the south of Pen-y-lan Farm a number of the nest tubes were damaged by cattle. These were replaced once but further damage occurred, therefore to minimise the risk to dormice the decision was made to remove the affected tubes from the survey. This is not thought to have adversely affected the conclusions of the survey due to the number of tubes placed within the wider connected habitat, and the historic presence of dormice within the area.

As the Gwent Levels area was only surveyed for the latter part of the survey period and only achieved a score of 9, results from this area are limited; however, this area was not considered likely to support dormice and this area was only included in the 2014 survey programme to gain additional evidence to support the understanding that dormice are absent from the Levels.

3 Baseline Environment

3.1 Summary

Dormice were recorded present within the New Park Farm area and the Castleton area during the 2014 surveys. No evidence of any dormouse activity was found in the Coedkernew area, Gwent Levels area or the Magor area.

3.2 Field Survey Results

3.2.1 Nut Searches

Three dormouse-gnawed hazelnuts were found in the New Park Farm north woodland (A) during the June visit. One dormouse-gnawed hazelnut was found within the A48(M) verges (D) during the September visit. No evidence of hazelnuts chewed by dormice were found along the motorway verges, which may be due to the fact that the hazel along these stretches was not fruiting very well and very limited numbers of nuts were found overall.

3.2.2 Nest Tube Surveys

The positive results of the nest tube surveys are summarised below and on Drawing M4-OA-01-00-DR-Z-DM-0004. Full details of the survey results can be found in Appendix A.

Table 3.1 Summary of Dormouse Nest Tube Survey Results

AREA	LOCATION	MONTH	RESULTS
New Park Farm area	New Park Farm north	May-July	No evidence of dormouse activity discovered.
	New Park Farm south	May-July	No evidence of dormouse activity discovered.
	A48(M) verges	May	Tube C40: Woven dormouse nest with 2 male (18g and 16g) and 1 female (22.5g) dormice. Tube C38: Dormouse nest. Tube D19: Dormouse nest.
		June	Tube C40: Dormouse nest still present. Tube C38: Dormouse nest still present. Tube D19: Dormouse nest still present. Tube D21: Dormouse nest and 19g male dormouse.
		July	Tube C40: Dormouse nest still present. Tube C38: Dormouse nest still present. Tube D19: Dormouse nest still present. Tube D21: Dormouse nest still present and 24g male dormouse.

AREA	LOCATION	MONTH	RESULTS
			Tube C39: Dormouse nest.
		August	Tube C40: Old dormouse nest. Tube C38: Dormouse nest still present. Tube D19: Dormouse nest still present. Tube D21: Dormouse nest still present. Tube C39: Dormouse nest still present and 21g male dormouse.
		September	Tube C40: Old dormouse nest. Tube C38: Old dormouse nest. Tube D19: Dormouse nest still present. Tube D21: Dormouse nest still present with 1 female (14g) and 1 male dormouse escaped. Tube C39: Old dormouse nest. Tube C23: One female dormouse (15g). Tube D23: Dormouse nest and 1 female dormouse (17g).
		October	Tube D15: Dormouse nest. Tube D2: Dormouse nest. Tube D1: Dormouse nest and 12g female dormouse. Tube C40: Old dormouse nest. Tube C38: Old dormouse nest. Tube D19: Dormouse nest still present. Tube D21: Dormouse nest still present with 1 female (17g) and 1 male (22g) dormouse. Tube C39: Old dormouse nest. Tube D23: Dormouse nest still present.
		November	Tube D15: Dormouse nest still present. Tube D24: Dormouse nest. Tube D2: Dormouse nest still present. Tube D1: Dormouse nest still present. Tube C40: Old dormouse nest. Tube C38: Old dormouse nest. Tube D19: Dormouse nest still present. Tube D21: Dormouse nest still present. Tube C39: Old dormouse nest. Tube D23: Dormouse nest still present.
Castleton area	Hedgerows and verge south of Pen-y-lan Farm	May	Tube C104: Dormouse nest and 18g male. Tube C105: Dormouse nest; dormouse escaped.
		June	Tube C104: Dormouse nest still present. Tube C105: Dormouse nest still present. Tube C124: Dormouse nest.
		July	Tube C104: Dormouse nest still present. Tube C105: Old dormouse nest. Tube C124: Dormouse nest still present.

AREA	LOCATION	MONTH	RESULTS
		August	Tube C11: Dormouse nest and 30g female. Tube C104: Old dormouse nest. Tube C105: Old dormouse nest. Tube C109: Dormouse nest. Tube C114: Dormouse nest. Tube C117: Dormouse nest. Tube C120: Dormouse nest; dormouse escaped. Tube C124: Dormouse nest still present.
		September	Tube C10: Dormouse nest and 10g male dormouse. Tube C11: Dormouse nest still present. Tube C15: Dormouse nest. Tube C104: Old dormouse nest. Tube C105: Old dormouse nest. Tube C109: Old dormouse nest. Tube C114: Dormouse nest still present. Tube C115: Dormouse nest. Tube C117: Dormouse nest still present. Tube C120: Dormouse nest still present. Tube C124: Dormouse nest still present.
		October	Tube C4: Dormouse nest and 15.5g female. Tube C7: Dormouse nest; dormouse escaped. Tube C8: Dormouse nest. Tube C10: Dormouse nest still present. Tube C11: Dormouse nest still present with 28g female and 18g male. Tube C15: Dormouse nest still present and 27g male. Tube C102: Dormouse nest. Tube C104: Old dormouse nest. Tube C105: Old dormouse nest. Tube C109: Old dormouse nest. Tube C114: Old dormouse nest. Tube C115: Old dormouse nest. Tube C117: Dormouse nest still present. Tube C119: Dormouse nest with 14g male and 18g female. Tube C120: Dormouse nest still present with 23.5g male. Tube C121: Dormouse nest. Tube C124: Dormouse nest still present; 2 juvenile dormice escaped. Tube C125: Dormouse nest with 18g male and 12g female.
		November	Tube C4: Dormouse nest still present. Tube C7: Dormouse nest still present. Tube C8: Dormouse nest still present.

AREA	LOCATION	MONTH	RESULTS
			Tube C10: Old dormouse nest. Tube C11: Old dormouse nest. Tube C15: Old dormouse nest. Tube C102: Old dormouse nest. Tube C104: Old dormouse nest. Tube C105: Old dormouse nest. Tube C109: Old dormouse nest. Tube C114: Old dormouse nest. Tube C115: Old dormouse nest. Tube C117: Dormouse nest still present with 30g male and 22.5g female. Tube C119: Dormouse nest still present. Tube C120: Dormouse nest still present with 19g male. Tube C121: Dormouse nest still present. Tube C124: Dormouse nest still present; dormouse escaped. Tube C125: Dormouse nest still present.
	Spring Court Woodland	August-November	No evidence of dormouse activity discovered.
	Pound Hill	May	Tube E15: 19.5g male and 1 adult dormouse escaped.
		June	No evidence of dormouse activity discovered.
		July	No evidence of dormouse activity discovered.
		August	No evidence of dormouse activity discovered.
		September	No evidence of dormouse activity discovered.
		October	Tube E7: Dormouse nest; adult dormouse escaped.
		November	Tube E7: Dormouse nest still present. Tube E17: 25g torpid dormouse in nest.
Coedkernew area	Berryhill Farm	May-November	No evidence of dormouse activity discovered.
	Church Lane woodland	May-November	No evidence of dormouse activity discovered.
Gwent Levels area	Pye Corner	August-November	No evidence of dormouse activity discovered.
	Road south of Tata Steelworks	August-November	No evidence of dormouse activity discovered.
Magor area	Magor Vicarage	May-November	No evidence of dormouse activity discovered.
	South of M4 J23a services	May-November	No evidence of dormouse activity discovered.
	Hedgerows and verge south of	May-November	No evidence of dormouse activity discovered.

AREA	LOCATION	MONTH	RESULTS
	Upper Grange Farm		
	Verge north of Rockfield Farm, Undy	May-November	No evidence of dormouse activity discovered.

Nests and food caches of wood mice were present in some tubes, particularly those located close to Berryhill Farm and at Pye Corner. Some of the tubes showed evidence of having been used by small birds, such as blue tit, as roost sites.

3.2.3 Jacobs Results

Survey results for the remainder of the 2014 season were obtained from Jacobs to supplement the data for New Park Farm north and New Park Farm south. These are referred to as RP8 and RP12 respectively within the Jacobs table (Appendix B).

No evidence of any dormouse activity was discovered at the New Park Farm south site. At the New Park Farm north site a partial dormouse nest was recorded in one box during July, and another partial dormouse nest was recorded in a different box in September. No other evidence of dormice was found.

3.3 Interpretation of Results

Dormice have been confirmed to be present at the western area of the study area within two areas: the New Park Farm area and the Castleton area. The survey results provided evidence that dormice are present to the north and south of the M4, and also to the north and south of the A48(M). This is important as it indicates connectivity of the habitat along the verges to the west, where known populations of dormice exist, and possibly between the north and south of these major roads. There is evidence that dormice may cross major roads up to 35m to access habitat of a suitable size (greater than 0.2ha), suggesting that dormice occupying these roadside habitats are adapting to access previously inaccessible areas of suitable habitat (Schulz, 2012) and (Chanin, 2012).

Dormice may disperse up to 1200m from their natal sites during the autumn dispersal period (Juskaitis, 1997) where suitable linkages are present. However, this also depends on the dormouse population size which is affected by other factors including proportion of breeding adult females; number of litters produced by one female during the season; average litter size; breeding by young-of-the-year females; and environmental factors (weather and feeding conditions). Dormice are therefore able to self-regulate their population size to some extent which leads to comparatively stable populations (Juskatis, 2013). The lack of suitable habitat connections between the known populations of dormice and habitat to the south is the likely explanation for the lack of dormouse activity at Berryhill Farm and the Church Lane woodland, particularly the fragmented hedgerows. These woodlands were also less suitable for dormouse feeding throughout the year, with a limited understorey and sheep grazing also having an adverse impact on the food availability of these woodlands.

Within the Gwent Levels area suitable habitat such as large woodland blocks are absent, and habitat fragmentation is likely to affect their dispersal as described above. The lack of suitable hibernation habitat within this generally wet landscape is also likely to be an influencing factor on the lack of dormice found, due to the instability of the temperature required for dormice to hibernate successfully and the risk of flooding of hibernation nests.

Based on these results and the desk study data obtained, it is considered that a breeding population is resident within the woodlands and hedgerows in the New Park Farm area and the Castleton area. The sub-populations of dormice here are likely to be small, as suitable habitat conditions are limited by the small overall size of the woodlands. However, the survey results indicate that there is a possible metapopulation of dormice which are likely to benefit from the habitat connectivity between these areas, as evidenced by the presence of dormice within the motorway verges.

To date, no dormice have been recorded in the Magor area despite having suitable habitat situated north of the existing M4. Again, this may be attributed to the lack of habitat linkages such as hedgerows between these potentially suitable habitats and known existing populations of dormice, which may be constrained by other factors limiting their population size.

4 Conclusions and Recommendations

4.1 Conclusions

Dormouse presence has been confirmed within woodland and hedgerow habitat and within motorway verges in the western part of the study area. The habitat connectivity between the areas where dormice have been found during the surveys and the known historic populations to the west are the most likely explanation for this.

No evidence of dormouse presence has been found within the central and eastern parts of the study area. Although dormice may successfully cross roads and disperse more widely from natal sites, the general lack of suitable habitat linkages between suitable areas of habitat is the likely explanation for the lack of dormouse activity at Berryhill Farm and the Church Lane woodland. This is also likely to be the case within the Gwent Levels where suitable habitat such as large woodland blocks are absent and the habitat is fragmented, along with the unsuitable ground habitat for hibernation. In the Magor area, the lack of habitat linkages between potentially suitable habitats and the known existing, likely stable populations of dormice is the probable reason for their absence within the study area.

4.2 Recommendations

Where populations of dormice have been identified it is recommended that monitoring through continued use of nest tubes is undertaken during 2015 to ensure any scheme assessment is made using up to date data.

It is also recommended that surveys are also continued in those areas where dormice were not recorded in order to ensure confidence in the likely absence of dormice from these areas.

Any scheme taken forward through the Environmental Impact Assessment process will need to consider the presence of dormice within the Castleton and New Park Farm Areas and subject to details of junction design, mitigation and or compensation may be required. The spatial coverage of the 2014 survey work should also be reviewed to ensure all potentially suitable habitat has been adequately surveyed, in line with NRW's comment provided in Section 2.1.3.

The potential exists for enhancing the dormouse populations through improving connectivity between the north and south sides of the M4 corridor and A48(M). These should also be considered in the design of any scheme to help ensure the maintenance of the dormouse population in favourable conservation status.

The requirements for mitigation and compensation for dormice should be discussed with Natural Resources Wales at the earliest opportunity to inform the scheme design.

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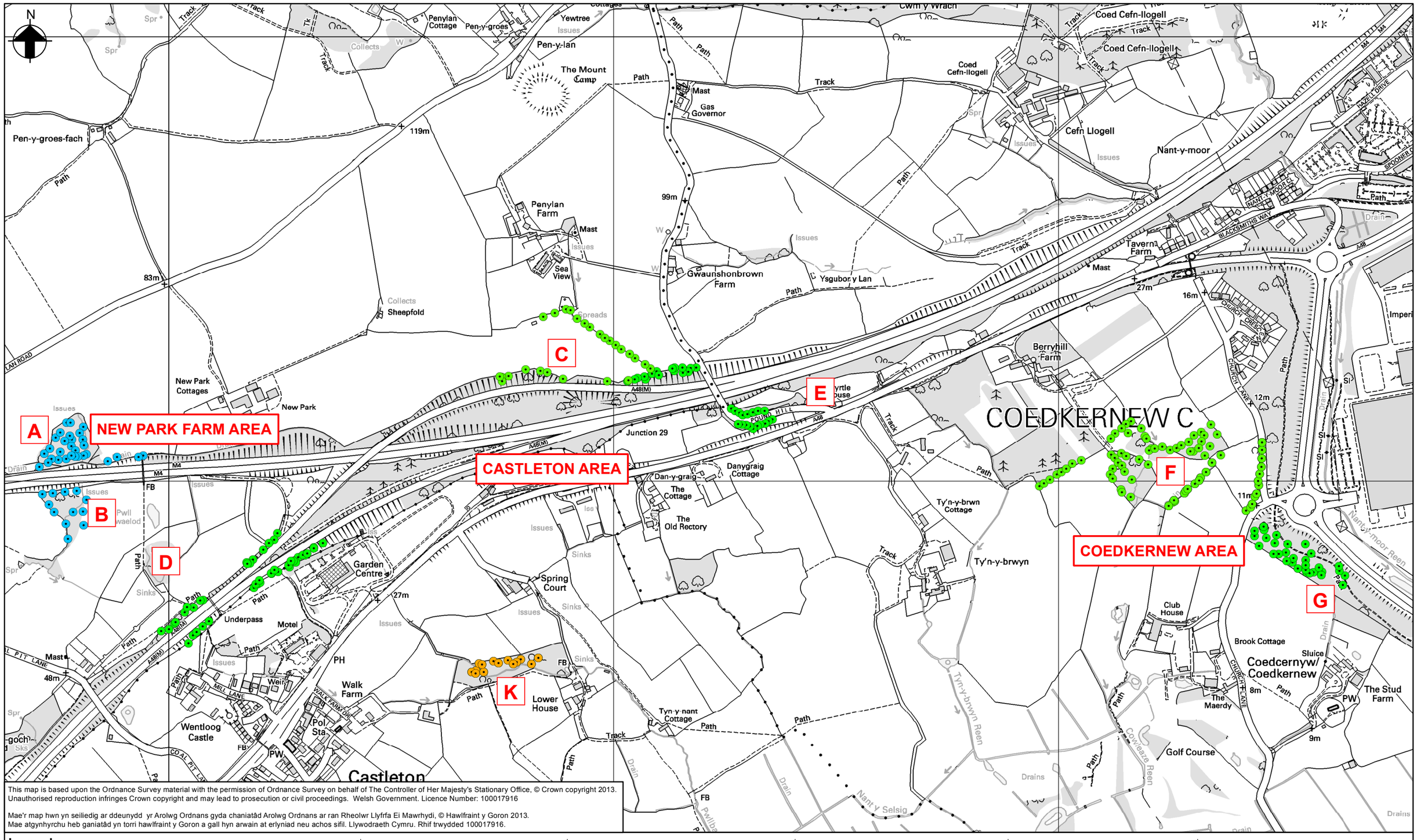
Figures

A3



Legend

- Dormouse Tube Locations : August - November 2014
- Dormouse Tube Locations : May - November 2014
- Dormouse Tube Locations : May - July 2014

Issue	Date	By	Chkd	Appd
P1	2014-10-15	SJ	TS	PW
For Issue				

Client

Llywodraeth Cymru
Welsh Government

Transport
Department for Economy, Science and Transport
Welsh Government
Cathays Park
Cardiff
CF10 3NQ

Trafnidiaeth
Adran Economi, Gwyddoniaeth a Thrafnidiaeth
Llywodraeth Cymru
Parc Cathays
Caerdydd
CF10 3NQ

Job Title

M4 Corridor Around Newport

Metres
0 50 100 200

Scale at A3
1:8,000

ARUP

4 Pierhead Street, Capital Waterside
Cardiff, CF10 4QP
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Drawing Title

Dormouse Tube Locations West

Job No	Drawing Status
117300-00	For Issue

Drawing No	Issue
M4-OA-01-00-DR-Z-DM-0001	P1

12/12/2014 15:21:25

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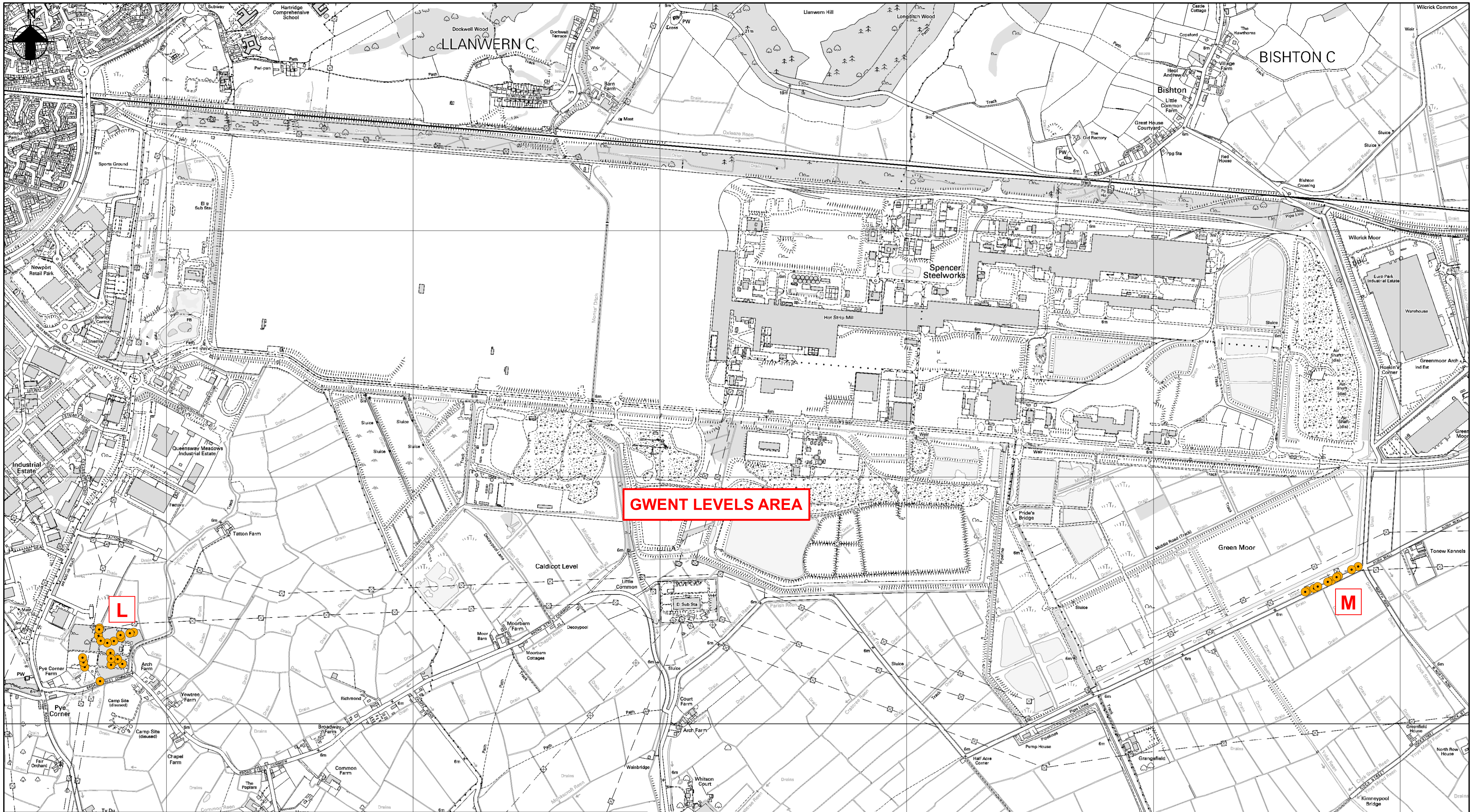
A3

12/12/2014 15:23:10



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Legend

● Dormouse Tube Locations : August - November 2014

Issue	Date	By	Chkd	Appd
P1	2014-10-15	SJ	TS	PW
For Issue				

Client

Llywodraeth Cymru
Welsh Government

Transport
Department for Economy, Science and Transport
Welsh Government
Cathays Park
Cardiff
CF10 3NQ

Trafnidiaeth
Adran Economi, Gwyddoniaeth a Thrafnidiaeth
Llywodraeth Cymru
Parc Cathays
Caerdydd
CF10 3NQ

Job Title

M4 Corridor Around Newport

Metres

0 90 180 360

Scale at A3

1:15,000

ARUP

4 Pierhead Street, Capital Waterside
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Drawing Title

Dormouse Tube Locations Central

Job No: **117300-00**

Drawing Status: **For Issue**

Drawing No: **M4-OA-01-00-DR-Z-DM-0002**

Issue: **P1**

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A3

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H

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MAGOR AREA

Legend

- Dormouse Tube Locations May - November 2014

Issue	Date	By	Chkd	Appd
P1	2014-05-06	SJ	TS	PW
For Issue				

Client

Llywodraeth Cymru
Welsh Government

Transport
Department for Economy, Science and Transport
Welsh Government
Cathays Park
Cardiff
CF10 3NQ

Trafnidiaeth
Adran Economi, Gwyddoniaeth a Thrafnidiaeth
Llywodraeth Cymru
Parc Cathays
Caerdydd
CF10 3NQ

Job Title

M4 Corridor Around Newport

Metres
0 62.5 125 250

Scale at A3
1:10,000

ARUP

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Drawing Title

Dormouse Survey Locations East

Job No	Drawing Status
117300-00	**For Issue**

Drawing No	Issue
M4-OA-01-00-DR-Z-DM-0003	**P1**

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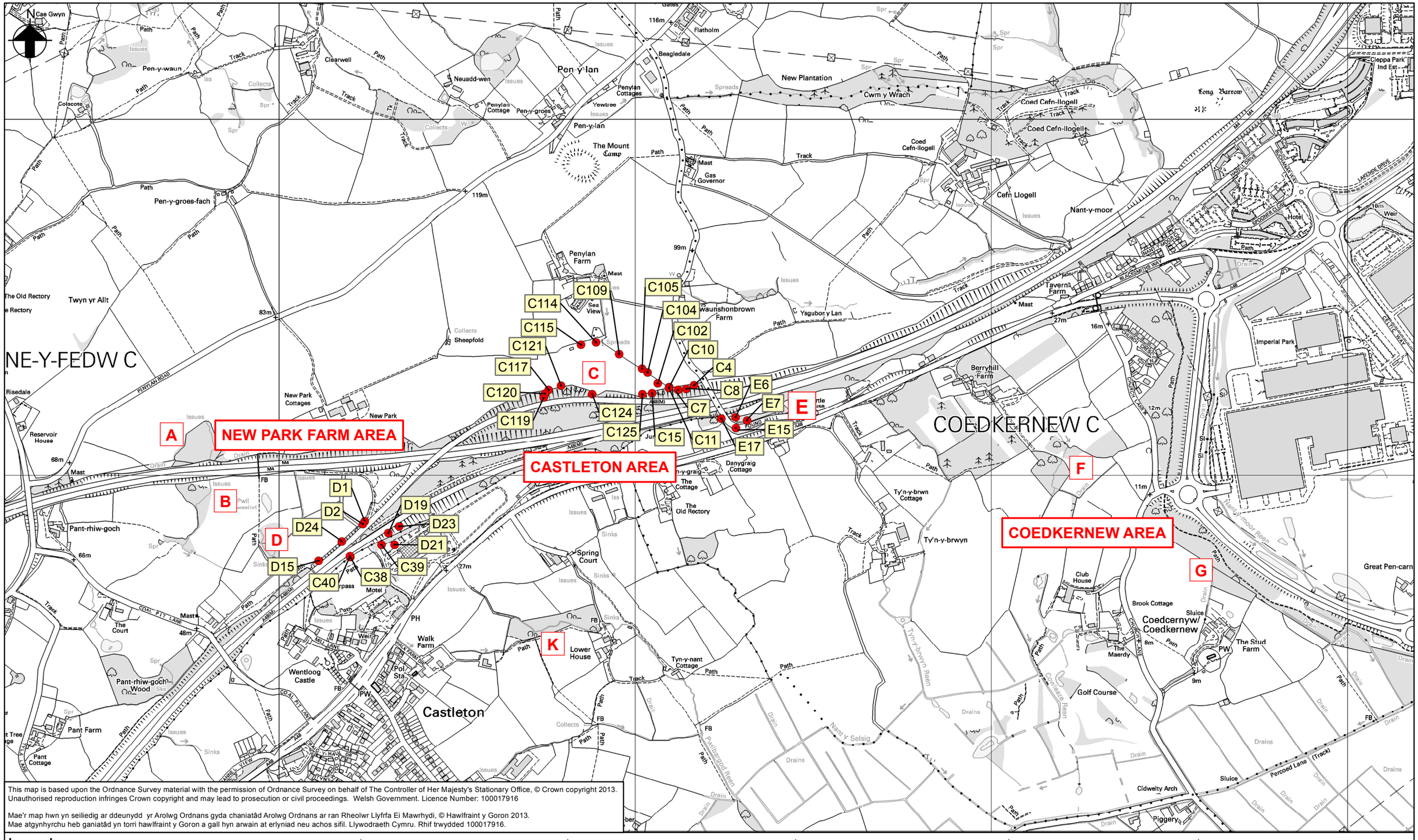
A3



Legend

- Dormouse Present

Issue	Date	By	Chkd	Appd
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For Issue				

Client

Llywodraeth Cymru
Welsh Government

Transport
Department for Economy, Science and Transport
Welsh Government
Cathays Park
Cardiff
CF10 3NQ

Trafnidiaeth
Adran Economi, Gwyddoniaeth a Thrafnidiaeth
Llywodraeth Cymru
Parc Cathays
Caerdydd
CF10 3NQ

Job Title

M4 Corridor Around Newport

Metres
0 62.5 125 250

Scale at A3
1:10,000

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Cardiff, CF10 4QP
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Drawing Title

Dormouse Presence

Job No	Drawing Status
117300-00	For Issue

Drawing No	Issue
M4-OA-01-00-DR-Z-DM-0004	P0

12/12/2014 15:22:17

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Appendix A

Results

Area	Location	Name	Tube Number	Results						
				May	**June**	**July**	**August**	**September**	**October**	**November**
New Park Farm Area	A	New Park Farm	A1	Empty	Empty	Empty				
		(14th May-8th July)	A2	Empty	Empty	Empty				
			A3	Empty	Empty	Empty				
			A4	Empty	Empty	Empty				
			A5	Empty	Empty	Empty				
			A6	Empty	Empty	Empty				
			A7	Empty	Empty	Empty				
			A8	Empty	Empty	Empty				
			A9	Empty	Empty	Empty				
			A10	Empty	Empty	Empty				
			A11	Empty	Empty	Empty				
			A12	Empty	Empty	Empty				
			A13	Empty	Empty	Empty				
			A14	Empty	Empty	Empty				
			A15	Empty	Empty	Empty				
			A16	Empty	Empty	Empty				
			A17	Empty	Empty	Empty				
			A18	Empty	Empty	Empty				
			A19	Empty	Empty	Empty				
			A20	Empty	Empty	Empty				
			A21	Empty	Empty	Empty				
			A22	Empty	Empty	Empty				
			A23	Empty	Empty	Empty				
			A24	Empty	Empty	Empty				
			A25	Empty	Empty	Empty				
			A26	Empty	Empty	Empty				
			A27	Empty	Empty	Empty				
			A28	Empty	Empty	Empty				
			A29	Empty	Empty	Empty				
			A30	Empty	Empty	Empty				
	B	New Park Farm South	B1	Empty	Empty	Empty				
		(17th April-8th July)	B2	Empty	Empty	Empty				
			B3	Empty	Empty	Empty				
			B4	Empty	Empty	Empty				
			B5	Empty	Empty	Empty				
			B6	Empty	Empty	Empty				
			B7	Empty	Empty	Empty				
			B8	Empty	Empty	Empty				
			B9	Empty	Empty	Empty				
			B10	Empty	Empty	Empty				
			B11	Empty	Empty	Empty				
	D	A48(M) verges	C29	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		(15th April-12th November)	C42	Empty	Empty	Empty	Empty	Empty	Empty	Woodmouse nest
		SW	C35	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C24	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C33	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C34	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C41	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C36	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		NW	D15	Empty	Empty	Empty	Empty	Empty	Nest	Old nest
			D9	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			D14	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			D18	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			D17	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			D16	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			D11	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			D12	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			D13	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		NE	D29	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			D25	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			D24	Empty	Empty	Empty	Empty	Empty	Empty	Old nest
			D22	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			D27	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			D26	Empty	Empty	Empty	Empty	Empty	Empty	Woodmouse nest
			D2	Empty	Empty	Empty	Empty	Empty	Nest	Nest
			D1	Empty	Empty	Empty	Empty	Empty	Nest and 1x12g juvenile female	Nest
		SE	C37	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C38	Nest	Nest	Nest	Nest	Old nest	Old nest	Old nest
			C40	Nest with 3 dormice: 1x18g male, 1x16g male, 1x22.5g female	Nest	Nest	Old nest	Old nest	Old nest	Old nest
			C30	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C31	Empty	Empty	Empty	Empty	Empty	Woodmouse nest	Empty
			C32	Empty	Empty	Empty	Empty	Dormouse chewed hazelnut	Empty	Empty
			C39	Empty	Empty	Nest	1x21g male dormouse in nest	Old nest	Old nest	Old nest
			C23	Empty	Empty	Woodmouse nest	Empty	1x15g female	Wet nest and woodmouse	Empty
			D19	Nest	Nest	Nest	Nest	Nest	Nest	Nest

			D21	Empty	Nest and 1x19g male dormouse	Nest and 1x24g male dormouse, white tipped tail	Nest	Nest with 1x14g juvenile female and 1x male dormouse, white tipped tail	Nest with 1x22g female and 1x17g male	Nest
			D23	Empty	Empty	Empty	Empty	Nest and 1x17g female	Nest	Old nest
Castleton Area	C	Hedgerows and verge south of Pen-y-lan Farm	C1	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C2	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C3	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C4	Empty	Empty	Empty	Empty	Empty	Nest and 1x15.5g female	Nest
			C5	Empty	Empty	Empty	Empty	Empty	Empty	Woodmouse nest
			C6	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C7	Empty	Empty	Empty	Empty	Empty	Nest; adult dormouse escaped	Nest
			C8	Empty	Empty	Empty	Empty	Empty	Nest	Nest
			C9	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C10	Empty	Empty	Empty	Empty	Nest and 1x10g male dormouse	Nest	Old nest
			C11	Empty	Empty	Empty	Nest and 1x30g female with white tipped tail and white spot near eye	Nest	Nest with 1x28g female with white tipped tail and white spot near eye and 1x18g male	Old nest
			C12	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C13	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C14	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C15	Empty	Empty	Empty	Empty	Nest	Nest and 1x27g male	Old nest
			C16	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C101	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C102	Empty	Empty	Empty	Empty	Empty	Nest	Old nest
			C103	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C104	Nest and 1x18g male	Nest	Nest	Old nest	Old nest	Old nest	Old nest
			C105	Nest; dormouse escaped	Old nest	Old nest	Old nest	Old nest	Old nest	Old nest
			C106	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C107	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C108	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C109	Empty	Empty	Empty	Nest	Old nest	Old nest	Old nest
			C110	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C111	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C112	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C113	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C114	Empty	Empty	Empty	Nest	Nest	Old nest	Old nest
			C115	Empty	Empty	Empty	Empty	Nest	Old nest	Old nest
			C116	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C117	Empty	Empty	Empty	Nest	Nest	Nest	Nest with 1x30g male and 1x22.5g female
			C118	Empty	Empty	Empty	Empty	Woodmouse nest	Empty	Empty
			C119	Empty	Empty	Empty	Empty	Empty	Nest with 1x14g male and 1x18g female	Nest
			C120	Empty	Empty	Empty	Nest; dormouse escaped	Nest	Nest with 1x23.5g male	Nest with 1x19g male
			C121	Empty	Empty	Empty	Empty	Empty	Nest	Nest
			C122	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C123	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			C124	Empty	Nest	Nest	Nest	Nest	Nest; 2 juveniles escaped	Nest; dormouse escaped
			C125	Empty	Empty	Empty	Empty	Empty	Nest with 1x12g female and 1x18g male	Nest
	K	Spring Court Woodland	A30				Empty	Empty	Empty	Empty
			A26				Empty	Empty	Empty	Empty
			D3				Empty	Empty	Empty	Empty
			C18				Empty	Empty	Empty	Empty
			C21				Empty	Empty	Empty	Empty
			A29				Empty	Empty	Empty	Empty
			C25				Empty	Empty	Empty	Empty
			E34				Empty	Empty	Empty	Empty
			A28				Empty	Empty	Empty	Empty
			C20				Empty	Empty	Empty	Empty
			C17				Empty	Empty	Empty	Empty
			B2				Empty	Empty	Empty	Empty
			W101				Empty	Empty	Empty	Empty
			C22				Empty	Empty	Empty	Empty
	E	Pound Hill	E1	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			E2	Empty	Empty	Empty	Empty	Empty	Woodmouse nest	Empty
			E3	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			E4	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			E5	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			E6	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			E7	Empty	Empty	Empty	Empty	Empty	Nest; dormouse escaped	Nest
			E8	Empty	Empty	Empty	Empty	Empty	Woodmouse nest	Empty
			E9	Empty	Empty	Empty	Empty	Empty	Empty	Woodmouse food cache
			E10	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			E11	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			E12	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			E13	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			E14	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			E15	1x19.5g male and 1x adult dormouse	Empty	Empty	Empty	Empty	Empty	Woodmouse nest
			E16	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			E17	Empty	Empty	Empty	Empty	Empty	Empty	25g torpid dormouse in nest

			E18	Empty	Empty	Empty	Empty	Woodmouse nest	Empty	Woodmouse nest
Coedkernew area	F	Berryhill Farm	F1	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F2	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F3	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F4	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F5	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F6	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F7	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F8	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F9	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F10	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F11	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F12	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F13	Empty	Empty	Empty	Empty	Empty	Woodmouse nest	Woodmouse nest
			F14	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F15	Empty	Empty	Empty	Empty	Empty	Woodmouse nest	Empty
			F16	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F17	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F18	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F19	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F20	Empty	Empty	Empty	Empty	Empty	Woodmouse nest	Woodmouse nest
			F21	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F22	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F23	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F24	Empty	Empty	Empty	Empty	Empty	Woodmouse nest	Woodmouse nest
			F25	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F26	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F27	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F28	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F29	Empty	Empty	Empty	Empty	Empty	Empty	Woodmouse food cache
			F30	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F31	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F32	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F33	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F34	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F35	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F36	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F37	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F38	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F39	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F40	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F41	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F42	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F43	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F44	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F45	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F46	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F47	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F48	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F49	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F50	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F51	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F52	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F53	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F54	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F55	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F56	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F57	Empty	Empty	Empty	Empty	Empty	Empty	Woodmouse food cache
			F58	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F59	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F60	Empty	Empty	Empty	Empty	Empty	Empty	Empty
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			F65	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F66	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F67	Empty	Empty	Empty	Empty	Empty	Empty	Woodmouse food cache
			F68	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F69	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F70	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F71	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F72	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F73	Empty	Empty	Empty	Empty	Empty	Woodmouse food cache	Empty
			F74	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F75	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			F76	Empty	Empty	Empty	Empty	Empty	Empty	Empty
G		Church Lane Woodland	G1	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G2	Empty	Empty	Empty	Empty	Empty	Woodmouse nest	Empty
			G3	Empty	Empty	Empty	Empty	Empty	Empty	Empty

			G4	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G5	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G6	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G7	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G8	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G9	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G10	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G11	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G12	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G13	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G14	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G15	Empty	Empty	Empty	Empty	Empty	Woodmouse nest	Empty
			G16	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G17	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G18	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G19	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G20	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G21	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G22	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G23	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G24	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G25	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G26	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G27	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G28	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G29	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			G30	Empty	Empty	Empty	Empty	Empty	Empty	Empty
Gwent Levels area	L	Pye Corner	A20				Empty	Empty	Empty	Empty
			A22				Empty	Empty	Empty	Four adult woodmice
			A23				Empty	Empty	Empty	Empty
			C103				Empty	Empty	Empty	Empty
			A24				Empty	Empty	Woodmouse nest	Empty
			A9				Empty	Empty	Empty	Empty
			A14				Empty	Empty	Woodmouse adult and nest	Empty
			A6				Empty	Empty	Woodmouse nest and two adult woodmice	Woodmouse nest
			A25				Empty	Empty	Empty	Empty
			A16				Empty	Woodmouse adult	Empty	Empty
			A19				Empty	Woodmouse nest with two adults and one juvenile woodmouse	Empty	Empty
			A17				Empty	Woodmouse nest	Empty	Woodmouse nest
			A7				Empty	Empty	Empty	Woodmouse nest
			A18				Empty	Empty	Empty	Empty
			A11				Empty	Empty	Empty	Woodmouse nest
			A21				Empty	Empty	Empty	Empty
			A27				Empty	Empty	Empty	Empty
			A18				Empty	Empty	Empty	Empty
			A12				Empty	Empty	Empty	Empty
	M	Road south of Tata Steelworks	A1				Empty	Empty	Empty	Empty
			A3				Empty	Empty	Empty	Empty
			A17				Empty	Empty	Empty	Empty
			A2				Empty	Empty	Empty	Empty
			A4				Empty	Empty	Empty	Empty
			A10				Empty	Empty	Empty	Empty
			A8				Empty	Empty	Empty	Empty
			A111				Empty	Empty	Empty	Empty
			A5				Empty	Empty	Empty	Empty
			A115				Empty	Empty	Empty	Empty
Magor area	H	Magor Vicarage	H31	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H32	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H33	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H34	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H35	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H36	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H37	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H38	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H39	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H40	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H41	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H42	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		South of M4 J23a services	H1	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H2	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H3	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H4	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H5	Empty	Empty	Empty	Empty	Empty	Empty	Woodmouse nest
			H6	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H7	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H8	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H9	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H10	Empty	Empty	Empty	Empty	Empty	Empty	Empty
			H11	Empty	Empty	Empty	Empty	Woodmouse food cache	Empty	Empty

		H12	Empty	Empty	Empty	Woodmouse food cache	Empty	Woodmouse food cache	Empty
		H13	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H14	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H15	Empty	Empty	Empty	Empty	Empty	Empty	Empty
	Hedgerows and verge								
	south of Upper Grange Farm	H16	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H17	Empty	Empty	Empty	Woodmouse nest	Empty	Woodmouse food cache	Empty
		H18	Empty	Empty	Empty	Empty	Empty	Empty	Woodmouse nest
		H19	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H20	Empty	Empty	Empty	Empty	Empty	Woodmouse nest	Woodmouse nest
		H21	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H22	Empty	Empty	Empty	Empty	Empty	Woodmouse nest	Empty
		H23	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H24	Empty	Empty	Empty	Woodmouse nest	Empty	Woodmouse nest	Empty
		H25	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H26	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H27	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H28	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H29	Empty	Empty	Empty	Woodmouse food cache	Empty	Empty	Empty
		H30	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H101	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H102	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H103	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H104	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H105	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H106	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H107	Empty	Empty	Empty	Woodmouse food cache	Empty	Empty	Empty
		H108	Empty	Empty	Empty	Woodmouse food cache	Empty	Woodmouse food cache	Empty
		H109	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H110	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H111	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H112	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H113	Empty	Empty	Empty	Woodmouse food cache	Empty	Empty	Empty
		H114	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		H115	Empty	Empty	Empty	Empty	Empty	Empty	Empty
I	Verge north of Rockfield Farm, Undy	I1	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		I2	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		I3	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		I4	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		I5	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		I6	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		I7	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		I8	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		I9	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		I10	Empty	Empty	Empty	Empty	Empty	Empty	Empty

Appendix B

Jacobs results

Results 2014						
RP8-(Park farm wood)-ch 11400-11550						
Box number	**May 20th – 23rd**	**June 16th – 19th**	**July 20th – 23rd**	**August 18th-21st**	**September 15th-18th**	**October 21st-24th**
Date	20/05/2014	16/06/2014	22/07/2014	19/08/2014	16/09/2014	21/10/2014
Surveyors	REL and JC	REL and JC	REL and JC	JC	LG and JC	LG and JC
Weather	Warm, sunny, heavy showers	Hot and Sunny 20℃	Hot and Sunny 25℃+	Sunny, heavy showers, light breeze, 18℃	Dry, still, clear sky, 19℃	Clear sky, dry, moderate-strong winds, 14℃
1	-	-	-	-	-	-
2	-	Wood mouse nest	-	-	-	-
3	-	-	-	-	-	-
4	-	-	-	-	-	-
5	-	-	-	**-**	-	Wood mouse nest
6	-	-	Wood mouse nest	-	-	-
7	-	-	-	-	-	-
8	-	-	1 x wood mouse in nest	-	**Dormouse nest (partial)**	-
9	-	Wood mouse nest	1 x wood mouse in nest	-	-	**-**
10	-	-	1 x wood mouse in nest	Wood mouse nest	-	-
11	-	-	1 x wood mouse in nest	-	-	-
12	-	-	Full of cobweb like fungal growth	-	Wood mouse nest	-
13	-	-	-	-	Wood mouse nest	-
14	-	-	-	-	-	1 x wood mouse in nest
15	-	-	-	-	-	-
16	-	-	-	-	-	-
17	-	-	-	-	-	1 x wood mouse in nest
18	**-**	-	**Partial dormouse nest**	-	-	Shrew in nest
19	-	-	-	**-**	-	-
20	-	-	-	-	-	-
21	-	-	-	-	-	-
22	-	-	-	-	Wood mouse nest	-
23	-	Wood mouse nest	Start of wood mouse nest	-	-	-
24	-	-	-	**-**	-	-
25	-	-	Start of wood mouse nest	-	-	-
26	-	-	-	-	-	-
Dormouse Total	**0**	**0**	**0**	**0**	**0**	**0**
Dormouse Nest Total	**0**	**0**	**1**	**0**	**1**	**0**

Results 2014						
RP12-(Park Farm South)-Ch 11400-11500						
Box number	**May 20th – 23rd**	**June 16th – 19th**	**July 20th – 23rd**	**August 18th-21st**	**September 15th-18th**	**October 21st-24th**
Date	20/05/2013	16/06/2014	22/07/2014	19/08/2014	16/09/2014	21/10/2014
Surveyors	REL and JC	REL and JC	REL and JC	JC	LG and JC	LG and JC
Weather	Warm, sunny, heavy showers	Hot and Sunny 20℃	Hot and Sunny 25℃+	Sunny, heavy showers, light breeze, 18℃	Dry, still, clear sky, 19℃	Clear sky, dry, moderate-strong winds, 14℃
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	-	-	-	-	-	-
5	-	-	-	-	-	-
6	-	-	-	Wood mouse nest	Wood mouse nest	3 x wood mouse in nest
7	-	-	-	-	-	-
8	Birds nest	Birds nest – dead chicks	-	-	-	-
9	-	-	-	-	-	-
10	-	-	-	Wood mouse nest	Wood mouse nest	-
11	-	-	-	-	-	-
12	-	-	-	-	-	-
13	-	-	-	-	-	-
14	-	-	-	-	-	-
Dormouse Total	**0**	**0**	**0**	**0**	**0**	**0**
Dormouse Nest Total	**0**	**0**	**0**	**0**	**0**	**0**