

APPENDIX 8.4

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ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
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MINERAL ESTATES
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WELSH GOVERNMENT

COSMESTON

DORMOUSE SURVEY REPORT

SEPTEMBER 2018

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WELSH GOVERNMENT

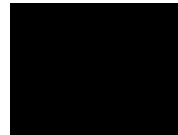
COSMESTON

DORMOUSE SURVEY REPORT

SEPTEMBER 2018

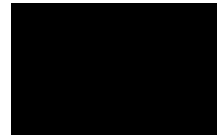
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DRAWINGS	TITLE	SCALE
CA11040-001/RevA	Site Location Plan and Ecological Survey Area	1:25,000@A3
CA11040-002	Habitat Plan	1:2,500@A2
CA11040-008	Dormouse Nest Tube Survey 2017 Results	1:2,500@A2

EXECUTIVE SUMMARY

Wardell Armstrong LLP was commissioned by the Welsh Government to undertake a dormouse survey of a site at Cosmeston, Penarth located at approximate National Grid Reference ST17964 68945. This report details the results of the 2017 dormouse surveys. Provisional mitigation and enhancement opportunities are also discussed, where appropriate.

A total of 200 nest tubes were deployed on 8th and 9th May 2017 to sample the site. The nest tubes were checked at the end of May, June, July, August, September and October with an index of probability of finding a dormouse score of 22.

Dormouse were found in two adjacent nest tubes, one in August and one in September. A confirmed dormouse nest was also observed in October. Several possible dormouse signs were observed in numerous nest tubes each month. Wood mice and signs of wood mice were also present in many of the nest tubes each month.

The same dormouse may have been responsible for several of the signs in the nest tubes and the same individual may have been observed in August and September as well as built the confirmed nest in October. This however cannot be confirmed and there may be many dormice on site.

Consideration should be given to dormouse at the masterplan and design stages to include the creation of a woodland area and maintain connectivity in the form of the retention and planting of hedgerows within the Site boundary which can accommodate the population of dormouse during the construction phases of the development.

A dormouse mitigation licence may be required from Natural Resources Wales if hedgerows and / or woodlands are to be lost to development. Early engagement with NRW is recommended to discuss results of the survey and mitigation requirements.

Provisions for scrub, woodland and hedgerow removal are made. This includes removal when dormouse is active (March-October), hand searching by a suitably qualified and licenced ecologist.

A monitoring programme is recommended to assess the effectiveness of the mitigation measures implemented for dormouse.

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Wardell Armstrong LLP (WA) was commissioned by the Welsh Government (WG) to undertake a hazel dormouse (*Muscardinus avellanarius*) survey of a site at Cosmeston, Penarth located at approximate National Grid Reference ST17964 68945.

1.2 Report Objectives

1.2.1 The purpose of this report is to detail the results of the 2017 dormouse surveys assessing presence/likely absence of dormice inhabiting the site.

1.2.2 Provisional mitigation and enhancement opportunities are also discussed, where appropriate.

1.3 Site Context

1.3.1 The site is situated in the Vale of Glamorgan to the east of Lavernock Road (B4267) and south of 'Lower Penarth' housing estate as shown on Drawing Number CA11040-001/RevA (Site Location Plan and Ecological Survey Area). Farmland borders the site immediately to the east beyond which is the coastline of the Severn Estuary, with further agricultural land present to the south east. Part of the south-western part of the site is bordered by the 'Fort Road' which leads to the Lavernock Holiday Village.

1.3.2 The area of detailed ecological study referred to as the 'site' comprises a working livery yard with stable block buildings to the east of the site and semi-improved and improved grassland fields extending to north, south and west. The Ty'r Orsaf Site of Importance for Nature Conservation (SINC) is located in the south west corner of the site surrounded by broadleaved woodland. The north and eastern boundaries of the site are bordered by intact hedgerows, with broadleaved woodland dominating the western boundary and residences to the north.

1.4 Description of Development

1.4.4 The ecological studies are required to inform an outline planning application with accompanying masterplan for a proposed residential development.

1.5 Legislative Framework

- 1.5.1 The hazel dormouse is a scarce species, whose distribution has declined by more than half in the past century. Dormice are afforded full protection through inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species (Amendment) Regulations 2017.
- 1.5.2 Dormice are included within Section 7 of The Environment (Wales) Act 2016. Species listed on this section are considered to be of principal importance for the conservation of biodiversity and as such are listed as a priority species on the UK Biodiversity Action Plan (BAP) and the Vale of Glamorgan local BAP.

1.6 Dormouse Ecology

- 1.6.1 Dormice are nocturnal animals that live predominantly in deciduous woodland, scrub, and hedgerows. Although woodland is the most important habitat type, they will also live in hedgerows, preferring species-rich hedgerows that are interconnected or connected to woodland. The best hedgerows for dormice are wide and tall with abundant mast and fruit-bearing trees and shrubs as they feed among the branches of trees and shrubs. They rarely descend to the ground, except to hibernate, and are reluctant to cross open spaces.
- 1.6.2 They feed on a wide variety of arboreal foods, including flowers (nectar and pollen), fruits (berries and nuts) and some insects (aphids and caterpillars). They will also eat buds and young leaves. A high degree of diversity among tree and shrub species is desirable to ensure that an abundance of foods is available throughout the summer. Certain tree species are particularly valuable as providers of food at different times of year. For example, Hazel appears to be an important provider of insects, and its nuts form the main food used to gain weight for hibernation.
- 1.6.3 Dormice have a restricted distribution in Britain, with few sites north of the Midlands (except where it has been reintroduced)¹.

¹ Natural England (2007) *Dormouse: European protected species*. Natural England Technical Information Notes

2 METHODOLOGY

2.1 Desk Study

2.1.1 A desk study was undertaken in February 2017 as part of the Preliminary Ecological Appraisal (PEA) (report dated August 2018) and was informed by review of existing available information provided by South East Wales Biodiversity Records Centre (SEWBReC), for a 2km search radius from the site's boundary. Ordnance Survey (OS) and satellite mapping was also used to gain contextual habitat information.

2.2 Extended Phase 1 Habitat Survey

2.2.1 An Extended Phase 1 Habitat Survey was undertaken at the site in September 2016 and updated in April 2017. The purpose of this survey was to map the habitats present within the site and to assess the potential for protected species to be present.

2.2.2 The hedgerows and woodland were identified as having the potential to support dormice.

2.3 Dormouse Survey

2.3.1 The dormouse nest tube survey was undertaken broadly following the methodology outlined within *'The Dormouse Conservation Handbook'*². A total of 200 tubes were deployed to sample the site, spaced at 20m intervals, in hedgerows and woodland, on site and along site boundaries as shown on Drawing CA11040-008.

2.3.2 Nest tubes were placed out on 8th and 9th May 2017 and checked on 30th and 31st May, 23rd June, 25th and 26th July, 29th and 30th August, 19th September and 25th October 2017. Each nest tube comprised a lightweight corrugated plastic oblong tube with an L-shaped wooden base tray which forms the end of the tube. At each location, a suitable horizontal branch was selected to fix the nest tube below (i.e. a branch between 10mm and 40mm in diameter and between 1m and 3m from the ground level or top of the bank).

2.3.3 The index of probability of finding dormice present in nest tubes in any one month varies (e.g. April = 1; May = 4; June, July, October & November = 2; August = 5; September = 7). Therefore, nest tubes are most frequently occupied in May and August/September. Using the above index of probability and the number of nest tubes used, a search effort score was calculated. It is recommended that a minimum search

² Bright et al (2006) *The Dormouse Conservation Handbook 2nd edition*, English Nature, Peterborough.

effort score of 20 is reached (tubes set out at 20m intervals from June to November inclusive); in this case the score is 22 (tubes placed at 20m intervals and checked May to October inclusive).

2.4 Constraints

2.4.1 Dormouse nest tubes consist of a plastic outer case with a wooden 'tray' insert which blocks one end of the tube and provides a platform. Two tubes in June were found with no wooden part. During the September surveys one nest tube was found on the floor, which was replaced as soon as it was discovered, one had the wooden end broken and one had the wooden part missing. One nest tube was found on the floor during the October survey. It is considered that these incidents have not significantly impacted the level survey effort.

2.5 Quality Assurance & Environmental Management

2.5.1 The surveys were undertaken by a suitably experienced and NRW licenced ecologist.

2.5.2 The surveys and assessments have been overseen by and the report checked and verified by a member of CIEEM, whom is bound by its code of professional conduct. All surveys and assessments have been undertaken with reference to the current specialist best practice guidance.

3 RESULTS AND EVALUATION

3.1 Desk Study

3.1.1 Information received from SEWBReC did not provide records of dormice within 2km of the site within the last 10 years.

3.2 Dormouse Survey Results

3.2.1 The hedgerows and broadleaved woodland currently provide good quality habitat for dormouse with hazel and other species favoured by dormouse found in all of them.

3.2.2 Presence of dormouse was confirmed in three nest tubes on the site during the August, September and October surveys. All locations at which dormice are confirmed or where possible signs of dormouse were observed are shown on Drawing Number CA11040-008. A summary of the dormouse survey results is shown in Table 1 below.

Table 1: Dormouse nest tube checks			
Date	Nest Tube Number	Findings	Conclusion
May	46	Loose, green and brown leaves, no nest structure	Small mammals, possibly dormouse using tube
June	7	Loose, green and brown leaves, no nest structure	Small mammals, possibly dormouse using tube
	44	Loose, green and brown leaves, no nest structure	Small mammals, possibly dormouse using tube
	46	Loose, green and brown leaves, no nest structure	Small mammals, possibly dormouse using tube
July	7	Green and brown leaves in a loose ball. Small mammal left at speed when nest approached	Small mammals, possibly dormouse using tube
	44	Loose, green and brown leaves, no nest structure	Small mammals, possibly dormouse using tube
	46	Fresh leaves, no woven structure	Small mammals, possibly dormouse using tube
	117	Loose, green and brown leaves, and some wheat, no nest structure	Small mammals, possibly dormouse using tube
	127	Fresh leaves, no woven structure	Small mammals, possibly dormouse using tube
	154	Full of fluffy seed heads in a ball	Small mammals, possibly dormouse using tube

August	7	Loose, green and brown leaves, no nest structure	Small mammals, possibly dormouse using tube
	46	Fresh and dead leaves, with hollow in middle. Small mammal left at speed when nest approached	Small mammals, possibly dormouse using tube
	69	Dormouse in nest tube	Dormouse presence conclusive
	146	Mainly brown leaves with some green	Small mammals, possibly dormouse using tube
	154	Full of fluffy seed heads and fresh leaves in a ball	Small mammals, possibly dormouse using tube
	191	Loose dead leaves, no nest structure	Small mammals, possibly dormouse using tube
September	6	Loose dead leaves, no nest structure	Small mammals, possibly dormouse using tube
	15	Green leaves, no nest structure	Small mammals, possibly dormouse using tube
	68	Dormouse in nest tube	Dormouse presence conclusive
	80	Green leaves, no nest structure	Small mammals, possibly dormouse using tube
	114	Green leaves, no nest structure	Small mammals, possibly dormouse using tube
	116	Green leaves, no nest structure	Small mammals, possibly dormouse using tube
	154	Full of fluffy seed heads in a ball	Small mammals, possibly dormouse using tube
October	52	Dead leaves, slightly woven base	Small mammals, possibly dormouse using tube
	63	Green and brown leaves, no nest structure	Small mammals, possibly dormouse using tube
	64	Green and brown leaves, no nest structure	Small mammals, possibly dormouse using tube
	69	Half woven, stripped bark and brown leaves	Small mammals, possibly dormouse using tube
	71	Green and brown leaves, no nest structure	Small mammals, possibly dormouse using tube
	72	Dead leaves and stripped bark, no nest structure	Small mammals, possibly dormouse using tube
	77	Green and brown leaves, no nest structure	Small mammals, possibly dormouse using tube
	80	Fresh leaves, some hazel	Small mammals, possibly dormouse using tube

	133	Dead leaves ad stripped bark, no nest structure	Small mammals, possibly dormouse using tube
	134	Stripped bark, no nest structure	Small mammals, possibly dormouse using tube
	136	Semi fresh leaves, no nest structure	Small mammals, possibly dormouse using tube
	145	Grasses and semi fresh leaves, no nest structure	Small mammals, possibly dormouse using tube
	147	Grasses and semi fresh leaves, no nest structure	Small mammals, possibly dormouse using tube
	149	Woven nest, mainly grasses with strips of bark	Dormouse presence conclusive
	154	Fluffy seed head remains	Small mammals, possibly dormouse using tube
	155	Fresh ivy leaves, no nest structure	Small mammals, possibly dormouse using tube
	179	Green and brown leaves, some grasses, no nest structure	Small mammals, possibly dormouse using tube
	191	Green and brown leaves, no nest structure	Small mammals, possibly dormouse using tube
	194	Half woven, stripped bark and brown leaves	Small mammals, possibly dormouse using tube
	200	Large amount of brown and green leaves	Small mammals, possibly dormouse using tube

3.2.3 In addition to the results in Table 1, wood mice and signs of wood mice (including cached berries, loose nests of dead leaves) were observed in many of the nest tubes in each month of the survey.

3.2.4 Nest tubes with possible signs of dormouse are spread across the site with confirmed dormouse presence located in the central north and eastern parts of the site. Dormouse were not confirmed in the south of the site, this may be due to the presence of natural nesting spots within the woodland which dormice may favour to the nest tubes.

3.2.5 Two of the confirmed sightings of dormouse were within nest tubes adjacent to each other, 68 and 69, and in consecutive months which may indicate that it was the same individual. This dormouse may be responsible for other possible nests observed on site, including the confirmed nest in October.

3.2.6 The site may be slightly isolated from nearby hedgerows and woodland blocks due to B4267 Lavernock Road to the west and Fort Road to the south. However, Fort Road is relatively narrow and aerial photography suggest that there is some linkage via the canopy and an old railway bridge crosses the road which may allow some dispersion of the dormice to woodlands further afield.

4 RECOMMENDATIONS FOR MITIGATION

4.1.1 The proposed development has the potential to result in the loss of woodland and hedgerow habitat which has the potential to disturb, kill / injure individual dormouse if present at the time of the vegetation clearance works. The loss of habitat could also fragment the habitat, thus affecting connectivity and the movement and range of dormouse.

4.2 Potential Mitigation Measures

Dormouse Mitigation Disturbance Licence

4.2.1 As dormice have been found to be present on site, a dormouse disturbance licence will be required from Natural Resources Wales (NRW) if hedgerows and areas of broadleaved woodland are lost to the development³.

Protection of Retained Habitats

4.2.2 Where retained hedgerows and woodland habitat are considered suitable for retention for dormouse (e.g. where connectivity is maintained). It is recommended that a buffer of 5m is implemented to reduce disturbance to dormice. The retained areas of broadleaved woodland will be protected from ingress by machinery during works by the erection of tree protection fencing at an appropriate distance. Fencing design will be in accordance with BS 5837:2012 *Trees in relation to design, demolition and construction*. This will provide a buffer to the woodland blocks from construction phase activities. It is important that the fencing is maintained over the course of the construction phase with regular monitoring of its position and condition undertaken and any damage or re-positioning is rectified promptly.

Avoiding killing/injury to Dormice during Vegetation Clearance

4.2.3 Potential mitigation measures that could be implemented to prevent killing / injury are outlined below.

4.2.4 To avoid killing/injury, dormouse will need to be removed from habitats impacted by the proposed development, prior to works. The two main methods, depending on the scale of works / extent of habitat loss are removal via:

Persuasion (i.e. progressive vegetation clearance; and / or

³ <https://naturalresources.wales/permits-and-permissions/protected-species-licensing/european-protected-species-licensing/do-i-need-a-european-protected-species-licence/?lang=en>

Translocation.

Vegetation clearance / persuasion

- 4.2.5 If the habitat loss is small scale and there is good connectivity with other suitable retained habitat it is possible to encourage dormouse to relocate through progressively clearing narrow strips of vegetation. Each strip should be no larger than 50m, which is the radius of a typical home range of dormouse. There are two options with regard to progressive vegetation clearance:

Clearance in Winter

- 4.2.6 Vegetation clearance is undertaken in a two-staged process with the above ground material in the scrub, woodland and / or hedgerow habitat being removed whilst dormice are hibernating amongst the roots. The ideal time for this is between November and February to avoid the period when birds are nesting and when dormouse might be found in nests above ground. When emerging from hibernation, the vegetation clearance will encourage dormouse hibernating amongst the roots to move to more appropriate habitat nearby. Once emergence is complete and dormice are active (generally by May), outstanding vegetation clearance of the below ground material can be undertaken.

Clearance in Summer

- 4.2.7 Clearance of vegetation in the summer is suitable for small areas of habitat (e.g. less than 50m² of high quality woodland, large areas of low quality habitat and short lengths of hedge). Vegetation is removed on successive days when dormice are active and when individuals are able to respond immediately. The exact timings of vegetation clearance will need to be considered in relation to dormouse ecology (and breeding) and nesting birds.
- 4.2.8 Care should also be taken to avoid displacing unnaturally high numbers of dormice into retained woodland. As a guide, no more than 10% of woodland habitat should be removed.
- 4.2.9 Vegetation clearance should be undertaken by hand to minimise the likelihood of disturbing or killing / injuring dormouse and should be hand searched by a suitably qualified and licenced ecologist for signs of dormouse nests prior to removal.

Translocation

- 4.2.10 If persuasion is not possible due to lack of suitable adjacent habitat or where a large

area of dormouse habitat is being removed in a single season, then translocation of the dormice may be the best solution.

- 4.2.11 The process of translocation involves putting up nest boxes or tubes (or a combination of both) at a density of at least 30 per ha. They need to be placed off of the ground and preferably placed out one year in advance of any works, although as a minimum they can be placed out in early May and left until late October. The nest boxes / tubes should be used by dormice meaning they can be easily caught. The nest boxes need to be checked frequently until no more dormice are being found in them.
- 4.2.12 Another method involves trapping dormice; however, this is labour intensive as they live at low densities and a large number of traps are required. Once again, the traps need to be set off the ground and checked twice per day.
- 4.2.13 Translocation is not the favourable option due to the difficulty of catching all of the dormice on site and finding a suitable receptor site for them to be translocated to in advance of the works.

Habitat creation

- 4.2.14 Habitat creation/translocation measures should be implemented to maintain connectivity and, provide a benefit to dormouse and other wildlife as well as mitigate for the losses of suitable dormouse habitat.
- 4.2.15 Early engagement with NRW is recommended with regard to the results of the survey and mitigation requirements. NRW may request 1:3 replacement 'like for like' habitat for European Protected Species.
- 4.2.16 Habitat proposals should be implemented or created to promote dormouse dispersal across the development and to provide a benefit to dormouse and other wildlife. Measures could include:

Provision of areas of dense and scattered scrub as well as coppiced broadleaved woodland⁴ within proposed green infrastructure to provide suitable habitat for dormouse;

Planting of species rich native hedgerows within landscape areas would provide suitable corridors and foraging habitat for dormice and other wildlife;

Improving the connectivity of the site by infilling gaps in existing hedgerows

⁴ ptes (2014) Managing woodlands for dormice Available at: <https://ptes.org/wp-content/uploads/2014/06/managing-woodlands-for-dormice-final1.pdf>

that are going to be retained. This should be done with native species such as hazel which will not only improve connectivity but will provide a suitable food source;

Provide more food resources on site by planting native species such as hazel, hornbeam and blackthorn; and

Appropriate management of hedgerows, planting, laying and cutting should be carried out between October and March where possible and should be cut on a three-year cycle (one side, top, other side)⁵.

Monitoring

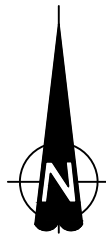
4.2.17 As dormice have been identified on site, a disturbance licence application will be submitted to NRW for approval. A suitable monitoring programme will form part of this application, if required.

⁵ ptes (2014) Hedgerow guide Available at: <https://ptes.org/wp-content/uploads/2014/06/Hedgerow-guide-web-version.pdf>

5 ENHANCEMENTS

- 5.1.1 In accordance with the requirements of the Planning Policy Wales 2016 and BSI 42020:2013, ecological enhancements should be proposed which will result in a net gain in biodiversity.
- 5.1.2 To enhance the opportunities for dormice, green infrastructure proposals should seek to maximise planting using species favoured by dormice. New planting should also link to habitats off-site to maintain and enhance the favourable conservation status of dormice in the local area.

DRAWINGS



DO NOT SCALE FROM THIS DRAWING

REFERENCE

Site boundary (29.14Ha) _____

2Km Search area _____

Original site boundary EP1 Habitat Survey in September 2016 _____

Additional land included within site boundary and subject to EP1 Habitat Survey in April 2017 _____

A	Amended to show revised site boundary.	05/10/17	RJH	JLH	JLH
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REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D
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CLIENT

WELSH GOVERNMENT

PROJECT

COSMESTON ECOLOGICAL SURVEY

DRAWING TITLE

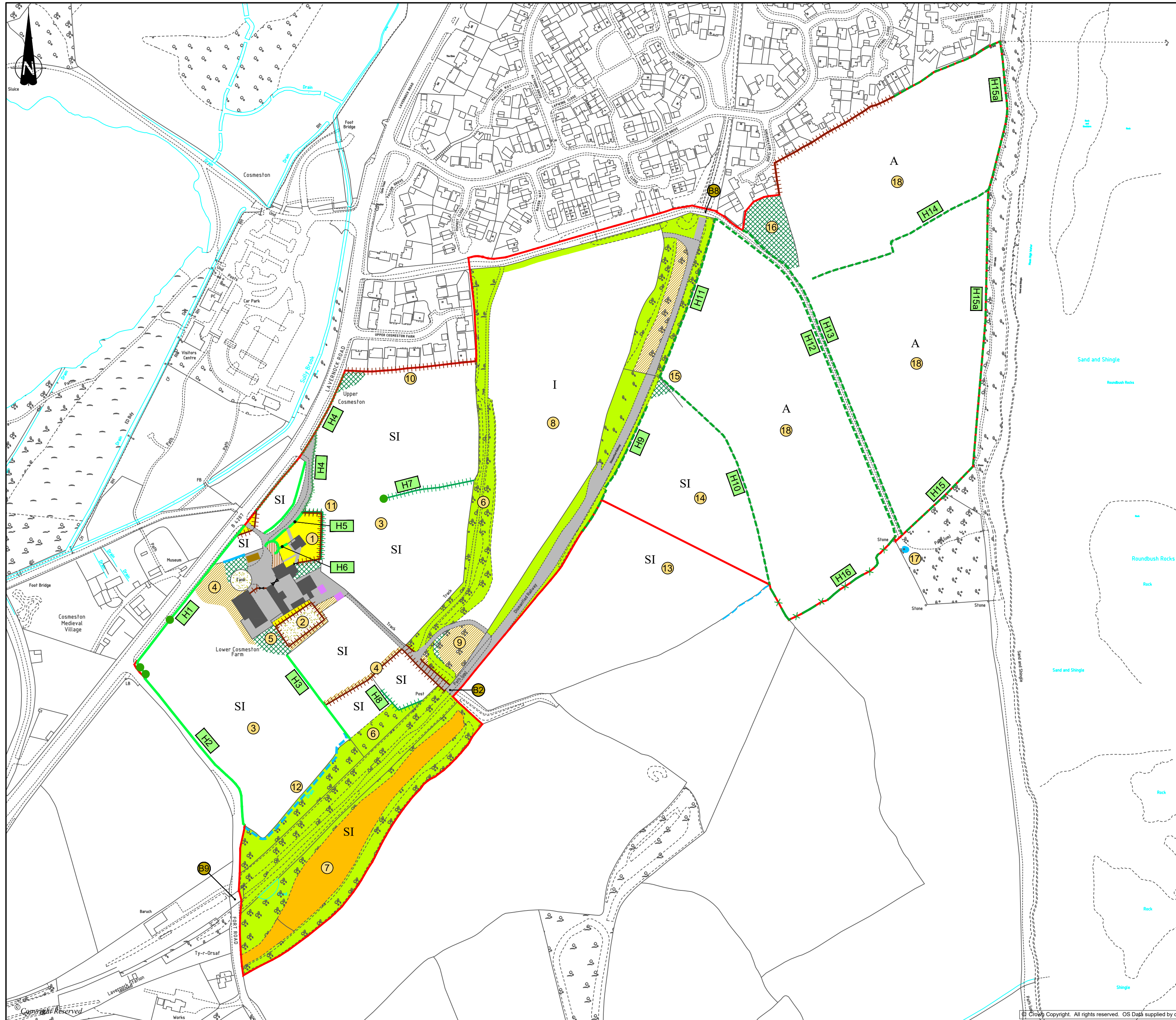
SITE LOCATION PLAN & ECOLOGICAL SURVEY AREA

DRG No.	CA11040-001	REV	A
DRG SIZE	A3	SCALE	1:25,000
		DATE	17/10/16
DRAWN BY	RJH	CHECKED BY	JLH
		APPROVED BY	JLH

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REFERENCE

Survey area	
Amenity grassland	
Improved grassland	
Semi-improved grassland	
Poor semi-improved grassland	
Arable	
Broad-leaved woodland	
Sand	
Tall ruderal	
Pond/Standing water	
Wet watercourse	
Dry watercourse	
Storage container	
Gate	
Building	
Hardstanding	
Disturbed ground	
Scrub	
Chicken coop	
Fence	
Hedgerow intact species poor	
Hedgerow intact species rich	
Hedgerow defunct species poor	
Hedgerow defunct species rich	
Defunct species poor remnant hedgerow	
Tree	
Target note	
Target note hedgerow	
Bridge reference number	

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D

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PROJECT
COSMESTON ECOLOGICAL SURVEY

DRAWING TITLE
HABITAT PLAN

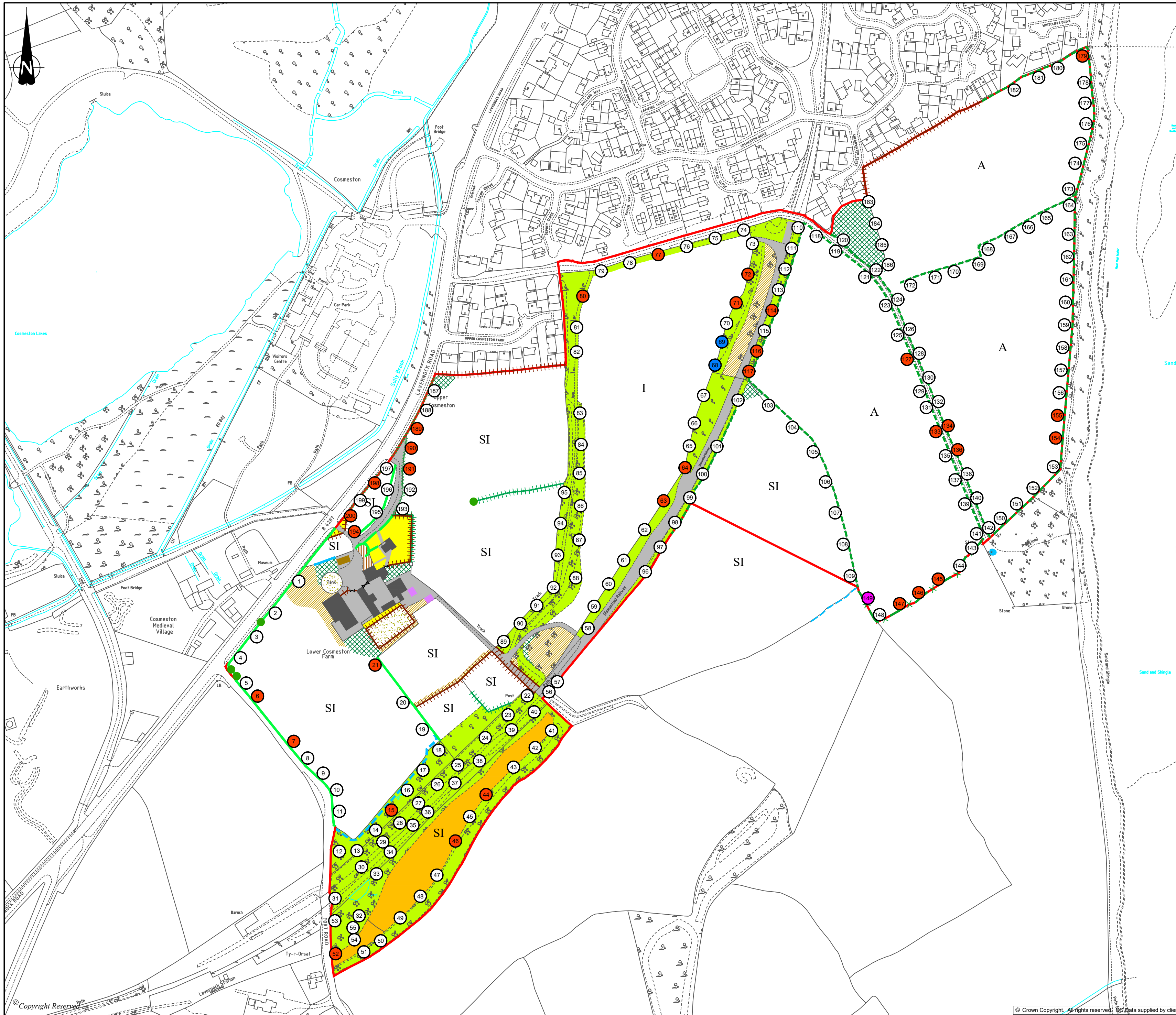
DRG No. **CA11040-002** REV

DRG SIZE **A2** SCALE **1:2500** DATE **05/10/17**

DRAWN BY **RJH** CHECKED BY **KH** APPROVED BY **JLH**

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REFERENCE

- Survey area _____
- Dormouse tube location _____
- Dormouse _____
- Dormouse nest _____
- Partial/Suspected Dormouse nest _____
- Amenity grassland _____
- Improved grassland _____
- Semi-improved grassland _____
- Poor semi-improved grassland _____
- Arable _____
- Broad-leaved woodland _____
- Sand _____
- Tall ruderal _____
- Wet watercourse _____
- Dry watercourse _____
- Storage container _____
- Gate _____
- Building _____
- Hardstanding _____
- Disturbed ground _____
- Scrub _____
- Chicken coop _____
- Fence _____
- Intact species poor hedgerow _____
- Intact species rich hedgerow _____
- Defunct species poor remnant hedgerow _____
- Tree _____

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D

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PROJECT
COSMESTON ECOLOGICAL SURVEY

DRAWING TITLE
**DORMOUSE NEST TUBE SURVEY
2017 RESULTS**

DRG No.	CA11040-008	REV	
DRG SIZE	A2	SCALE	1:2500
		DATE	14/12/17
DRAWN BY	RJH	CHECKED BY	KH
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