

Southern Water
Solent Water Mains
Ecological Assessment
June 2005

Halcrow Group Limited

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1 Background

Southern Water are investigating options for the provision of a replacement water main between the Isle of Wight and Hampshire, and additional works/modifications to link to the existing infrastructure ensuring compatibility between the new and existing pipeline. The proposed scheme involves the placement of a temporary large 'maxi' rig at west Gurnard on the Isle of Wight and Lepe in Hampshire.

This report provides the results of an ecological survey carried out in April and June 2005, evaluation and impact assessment carried out as part of the Environmental Impact Assessment of the scheme. The approach to establishing the environmental baseline found within this report has been achieved through:

- an Extended Phase I Ecological Survey (IEA, 1995) identifying the main habitats on the site and the presence/potential presence of protected/notable species;
- an assessment of the nature conservation value of the site by identifying habitats that should be preserved;
- mitigation measures determined to negate or minimise any potentially adverse impacts arising from the proposed development on the local ecology;
- identification of ecological enhancement opportunities; and
- advice and recommendations following the findings of this survey work, which may involve additional survey work/mitigation measures which in turn would enable a more detailed evaluation to be made.

1.1 *Limitations*

All work carried out in preparing this report has utilised and is based upon Halcrow's professional knowledge and understanding of current (June 2005) United Kingdom standards, best practice codes and legislation.

An ecological survey conducted in April will not enable a comprehensive list of plants to be made for the site. However, the results do allow an initial assessment to be made of the significance of potential impacts from the proposed development and consideration of appropriate mitigation measures.

No consultation took place as part of this specific ecological study, although consultations were ongoing as part of the wider EIA process.

2 Methodology

2.1

Flora

2.1.1

Phase I Survey

An extended Phase I Survey of the site was undertaken in April and June 2005. All accessible areas of the site were examined. Habitats were identified and mapped in accordance with the “Handbook for Phase I Habitat Survey. A technique for Environmental Audit” (JNCC 2003), which describes the standard method for this survey technique, and the Extended Phase I Methodology outlined in Guidelines for Baseline Ecological Survey, (IEA, 1995).

A botanical species list was also recorded for each distinct habitat type, and all species recorded were given an abundance rating using the DAFOR scale (D - dominant; A - abundant; F - frequent; O - occasional; R - rare). Plant names follow *New Flora of the British Isles*’ (2nd edition, Stace, 1997).

The ecological values of the site were assessed using the approach to valuing ecological receptors as published in ‘Guidelines for Ecological Impact Assessment’ (IEEM 2002).

2.1.2

Hedgerow survey

Hedgerows were surveyed and assessed under the Hedgerow Regulations (1997). These Regulations apply to hedgerows adjacent to land in agricultural/horticultural use. A hedgerow may be classified as ‘important’ for archaeological or historical reasons, or according to Wildlife and Landscape criteria.

2.2

Fauna

A basic walkover of the site was undertaken at the same time as the Phase I Survey to assess the site’s potential for supporting rare/protected species and to check for their presence where reasonable. The following species/groups were specifically targeted:

Birds: Birds are protected by the Wildlife and Countryside Act, 1981 (and subsequent amendments). This legislation makes it an offence to intentionally or recklessly:

- kill, injure or take any wild bird;

- take, damage or destroy the nest of any wild bird while it is in use or being built;
- take or destroy the egg of any wild bird; and
- disturb any wild bird listed on Schedule 1 of the Act while it is nest building or is at (or near) a nest with eggs or young; or disturb the dependant young of such a bird.

Habitats were assessed to identify the potential for breeding birds in summer.

Bats: Bats and their roosts are fully protected by three pieces of legislation: 1981 Wildlife & Countryside Act 1981 (and subsequent amendments), The Conservation (Natural Habitats &c) Regulations and the CRoW Act 2000. Pipistrelle (*Pipistrellus pipistrellus*) is also a UK BAP priority species. Barbastelle (*Barbastella barbastellus*), Bechstein's (*Myotis bechsteinii*), Greater Horseshoe (*Rhinolophus ferrumequinum*) and Pipistrelle bats are the subject of species action plans in 'Biodiversity Action Plan for Hampshire.'

A survey to assess mature trees and other landscape features for the potential of roosting and hibernating sites, which may be directly or indirectly affected by any development, was undertaken.

Red Squirrels: The red squirrel (*Sciurus vulgaris*) is protected under Schedules 5 and 6 of the Wildlife and Countryside Act 1981 (and subsequent amendments). Under the Act, the species must not be intentionally killed or injured and active drays should not be disturbed. It is one of the priority species listed by the Government on the UK Biodiversity Action Plan. There is also a specific Red Squirrel Species Action Plan for the Isle of Wight, which has the aim of conserving and enhancing the squirrel population by preserving and increasing woodland and the links between woodlands.

A survey to assess the areas highlighted as working areas was assessed for the potential to support red squirrels.

Badgers: Badgers (*Meles meles*) receive protection under the Badgers Act 1973, the Wildlife and Countryside Act 1981 (and subsequent amendments), and the Protection of Badgers Act 1992. Under this legislation it is an offence to knowingly interfere with a badger sett unless a license has been obtained. Those offences, which are applicable to this project include:

- wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so;
- damage or destroy setts;
- obstruct access to, or any entrance of, a sett; or
- disturb a badger whilst occupying a sett.

A survey of the site and adjacent areas was undertaken for signs of badger, including latrines, tracks, setts and foraging areas.

Reptiles: Reptiles are afforded protection through their inclusion in Schedule 5 of the Wildlife and Countryside Act, 1981 (and subsequent amendments), Schedule 2 of the Conservation (Natural Habitats &c.) Regulations 1994 and the CROW Act 2000. Slow worm, adder, common lizard and grass snake are the subject of action plans in 'Berkshire County - A Framework for Biodiversity Action in Berkshire'. The relevant parts of the legislation, with regard to this project, make it an offence to intentionally kill or injure reptiles.

The suitability and extent of potential reptile habitat within the site was assessed. Any suitable sites with potential for providing refuges and hibernacula (hibernation sites) were also inspected.

3 Results

3.1

Flora

Descriptions of habitats indicated by target notes are found in Appendix 1, with a complete list of species recorded and their abundance provided in Appendix 2. The ecological values of the site were assessed using the approach to valuing ecological receptors as published in 'Guidelines for Ecological Impact Assessment' (IEEM 2002), definitions can be found in Appendix 3. Phase I habitat maps of the two sites with target note locations, can be found on Figures 1 and 2.

3.1.1

Gurnard - Isle of Wight

Phase I Survey

The northern most field adjacent to Cliff Farm comprises improved grassland, hedgerows and areas of ruderal herbs and scrub.

Plate 1: North-western end of field



The grassland composition was indicative of improved grassland, with low species diversity. Species included cock's-foot (*Dactylis glomerata*), dandelion (*Taraxacum officinale* agg.), white clover (*Trifolium repens*), creeping buttercup (*Ranunculus repens*) and bristly oxtongue (*Picris echioides*). Toward the edges of the field spotted medick (*Medicago arabica*), common knapweed (*Centaurea nigra*) and wild teasel (*Dipsacus*

fullonum) were present as well as areas of dense bramble (*Rubus fruticosus* agg.) and nettle (*Urtica dioica*). To the north of the field, on the seaward facing slope dense bramble and nettle was again present, with gorse (*Ulex europaeus*) and honeysuckle (*Lonicera perichlymenum*).

The site to the south at Gurnard comprises improved grassland, broad-leaved woodland and hedgerows.

Plate 2: Eastern side of field



The improved grassland, wet in places, comprised abundant perennial rye (*Lolium perenne*), with occasional common mouse-ear (*Cerastium fontanum*), common vetch (*Vicia sativa* subsp. *segetalis*), creeping thistle (*Cirsium arvense*) and meadow buttercup (*Ranunculus acris*). The broad-leaved woodland to the north of this field supported abundant mature pedunculate oak (*Quercus robur*) trees, with frequent ash (*Fraxinus excelsior*) trees and bramble.

Hedgerow survey

Hedgerow 2

This hedgerow acts as a boundary between Rew Street and the field. Woody species recognized by the Hedgerow Regulations that were recorded within a 30m stretch were frequent hawthorn with occasional blackthorn (*Prunus spinosa*), field-rose (*Rosa arvensis*) and a pedunculate oak tree. Ground flora species recognized as valuable with regard to the Hedgerow Regulations are dog's mercury (*Mercurialis*

perennis), with wild carrot (*Daucus carota* subsp. *carota*), cleavers (*Galium aparine*) and ivy (*Hedera helix*). This hedgerow would not qualify as 'important' under the Hedgerow Regulations (DoE 1997) as it lacks the criteria stated under archaeology and history; and under wildlife and landscape, species diversity and associated features.

Hedgerow 3

This hedgerow acts as a field boundary to the south of the site, and comprises abundant hawthorn (*Crataegus monogyna*) with occasional sorbus sp. (*Sorbus* sp.). This hedgerow lacks the criteria stated under archaeology and history; and under wildlife and landscape, species diversity and associated features for it to qualify as 'important' under the Hedgerow Regulations (DoE, 1997).

Hedgerow 5

This hedgerow acts as a boundary between Rew Street and the southern most field surveyed. Woody species recorded were blackthorn, ash, pedunculate oak, hawthorn, English elm (*Ulmus procera*) and field-rose. Although this hedgerow supports a diverse mix of species, it does not support enough features for it to qualify as 'important' under the Hedgerow Regulations (DoE, 1997). However under the Hedgerow Regulation, it states that a hedgerow may be classified as important due to the presence of a Schedule 5 (Wildlife and Countryside Act 1981) animal. This hedgerow connects to woodland known to support red squirrels, and sightings have been made of red squirrel in the gardens of residential properties on Rew Street. This hedgerow would then act as a route with which the squirrels would use to gain access to properties, which would classify this hedgerow as 'important'.

Hedgerow 7

This hedgerow acts as the field boundary to the south of the southern most site at Gurnard. Hawthorn dominates the hedgerow with occasional blackthorn and field-rose. The ground includes lords-and-ladies (*Arum maculatum*) and herb-robert (*Geranium robertianum*), both of which are valuable ground flora species with regard to the Hedgerow Regulations. This hedgerow would not qualify as 'important' under the Hedgerow Regulations (DoE 1997) as it lacks the criteria stated under archaeology and history; and under wildlife and landscape, species diversity and associated features.

3.1.2

Lepe Country Park - Hampshire

Phase I Survey

This site consisted of an arable field, semi-improved species-poor and species-rich grassland, broad-leaved plantation, scattered trees, scrub and hedgerows.

Plate 3: Eastern view of hedgerow boundary



The arable field had recently been ploughed. Adjacent to this field was a small area of semi-improved grassland and scrub, comprising of dense hawthorn. To the east of this area lay a broad-leaved plantation which included sycamore (*Acer pseudoplatanus*) and pedunculate oak trees with little to no ground flora due to the dense shading. To the north of the site a small area of species-rich grassland was present which comprised wood sage (*Teucrium scorodonia*), hedgerow crane's-bill (*Geranium pyrenaicum*), foxglove (*Digitalis purpurea*) and iris sp. (*Iris sp.*). Adjacent to this was an area of scattered trees supporting abundant mature oak trees, with frequent hawthorn and blackthorn, and occasional holly and nettle.

Hedgerow survey

Hedgerow 8

This section of hedgerow acts as a boundary between the field and Lepe Road. This species-poor hedge supported abundant hawthorn with occasional blackthorn (*Prunus spinosa*) and holly (*Ilex aquifolium*). Ground flora included garlic mustard (*Alliaria petiolata*), greater stitchwort (*Stellaria holostea*), wood sage (*Teucrium*

scorodonia) and herb-robert, of which the latter two are listed under the Hedgerow Regulations as valuable ground flora species. This hedgerow would not qualify as 'important' under the Hedgerow Regulations (DoE 1997) as it lacks the criteria stated under archaeology and history; and under wildlife and landscape, species diversity and associated features.

Hedgerow 11

This section of species-poor hedgerow acts as a boundary between the field and Lepe Road. It is dominated by hawthorn and blackthorn, as well as occasional elder (*Sambucus nigra*), holly, honeysuckle and dog-rose (*Rosa canina*) further north, with one pedunculate oak tree. This hedgerow would not qualify as 'important' under the Hedgerow Regulations (DoE 1997) as it lacks the criteria stated under archaeology and history; and under wildlife and landscape, species diversity and associated features.

3.2

Fauna

Descriptions of fauna indicated by target notes are found in Appendix 1.

3.2.1

Gurnard - Isle of Wight

Birds: Several common species of bird were observed on site, including great tit (*Parus major*), black bird (*Turdus merula*), goldfinch (*Carduelis carduelis*) and chaffinch (*Fringilla coelebs*). These species were of no conservation concern (JNCC 2003). Of species recorded, sparrow (*Passer domesticus*) is included on the JNCC list of Birds of High Conservation Importance and is considered to have had a rapid decline in UK breeding population over last 25 years.

The site provided potentially suitable breeding sites for birds, especially within the hedgerows, dense scrub and woodland to the north of the southern site.

Bats: During the survey no evidence of bats roosting was recorded on site. A mature oak was recorded in a hedgerow adjacent to Cliff Farm (see Target Note 2) which supported cracks and crevices that may have a low potential in supporting roosting or hibernating bats. The southern site supported mature oak trees either side of a gateway (Target Note 5). No cracks or crevices were observed, however a precautionary approach should be given.

The hedgerows and fields provided suitable foraging habitat, and adjacent woodland good roosting sites.

Red squirrel: There have been sightings of Red Squirrel within many parts of the study area on the Isle of Wight, including Hornhill Copse, the broad-leaved woodland area lying in between the two proposed drill rig sites and in the gardens of residential properties on Rew Street.

Hedgerows connected to the woodland would act as good linear connections to other sites used by red squirrel.

Badgers: To the north of the field adjacent to Cliff Farm, a small badger latrine was observed along a public footpath. No other signs of badger within the study area were observed.

The improved fields provide good foraging habitat for badger.

Reptiles: No signs of reptile were observed whilst on site. However it was considered that there may be a low potential for reptiles in the area of scrub and ruderal herbs to the north of the field adjacent to Cliff Farm, due to a mosaic of habitats offering favourable conditions for reptile.

3.2.2

Lepe Country Park - Hampshire

Birds: Several common species of bird were observed on site, including black bird (*Turdus merula*), crow (*Corvus corone corone*) and pheasant (*Phasianus colchicus*). These species are of no conservation concern (JNCC 2003). No species of conservation concern were observed.

The site provided potentially suitable breeding sites for birds, especially within the hedgerow, scrub and woodland to the east of the site.

Bats: During the survey no evidence of bats roosting was recorded on site. No potential roosting or hibernating sites were observed on the mature pedunculate oak trees within the hedgerow to the north of the site (Target Note 11), however a precautionary approach should be adopted. The mature oaks within the area of scattered trees and scrub (Target Note 12) supported cracks and crevices that may have a low potential in supporting roosting or hibernating bats.

The hedgerow and fields provided suitable foraging habitat for bats.

Badgers: No signs of badger within the study area were observed. The site appeared to be unsuitable for badger as a foraging area due to the habitats present.

Reptiles: No signs of reptile were observed whilst on site. However grassland and scrub to the south of the site provided potentially suitable habitat for reptiles (see Target Note 9, as well as the area of scattered trees and scrub to the north (Target Note 12).

The presence/absence of reptiles could not be confirmed without further surveys.

3.3

Site evaluation

An evaluation of the habitats found within the site has been undertaken. See Table 1 below and Appendix 3 for definitions of ecological values (IEEM 2002).

Table 1 - Habitat evaluation

Site	Habitat	Evaluation	Rationale
Gurnard - Isle of Wight	Broad-leaved woodland	National	Those containing viable areas of any key habitat/species (red squirrel) identified in the UK Biodiversity Action Plan.
	Species rich hedge with trees	Low local	A feature that enriches the habitat resource within the context of the Parish or neighbourhood. However mature trees have the potential to support sites suitable for roosting or hibernating bats, if so the ecological value would increase to National importance as bat species are identified in the UK Biodiversity Action Plan.
	Scrub	Negligible	A low grade habitat, of little ecological value.
	Improved grassland	Negligible	A low grade habitat, of little ecological value.
	Species poor hedge with/without trees	Negligible	A low grade habitat, of little ecological value. However mature trees have the potential to support sites suitable for roosting or hibernating bats, if so the ecological value would increase to National importance as bat species are identified in the UK Biodiversity Action Plan.
	Tall ruderal vegetation	Negligible	A low grade habitat, of little ecological value.
Lepe Country Park - Hampshire	Species-rich grassland	Low local	A feature that enriches the habitat resource within the context of the Parish or neighbourhood.
	Defunct species-rich hedge with trees	Low local	A feature that enriches the habitat resource within the context of the Parish or neighbourhood. However mature trees have the potential to support sites suitable for roosting or hibernating bats, if so the ecological value would increase to National importance as bat species are identified in the UK Biodiversity Action Plan.

Site	Habitat	Evaluation	Rationale
	Scattered trees, scrub and ruderal herb habitat	Negligible	A low grade habitat, of little ecological value. However this area also has the potential to support reptiles, if so the ecological value would increase to High local (County) importance as they are the subject of a County Action Plan. The mature trees have the potential to support sites suitable for roosting or hibernating bats, if so the ecological value would increase to National importance as bat species are identified in the UK Biodiversity Action Plan.
	Semi improved species-poor grassland	Negligible	A low grade habitat, of little ecological value. However this area has the potential to support reptiles, if so the ecological value would increase to High local (County) importance as they are the subject of a County Action Plan.
	Scrub	Negligible	A low grade habitat, of little ecological value. However this area has the potential to support reptiles, if so the ecological value would increase to High local (County) importance as they are the subject of a County Action Plan.
	Broad-leaved plantation	Negligible	A low grade habitat, of little ecological value.
	Species poor hedge with trees	Negligible	A low grade habitat, of little ecological value.
	Arable	Negligible	A low grade habitat, of little ecological value.

4 Impacts, Mitigation and Enhancement

4.1 *Potential Impacts*

The assessment of the potential impacts of the proposed works needs to consider both on-site impacts as well as those which may occur on adjacent areas of ecological value. Impacts from the proposed works can be permanent or temporary and can include:

- direct loss of wildlife habitats;
- fragmentation and isolation of habitats;
- disturbance to species; and
- off-site impacts.

4.1.1 *Flora*

The construction phase of the scheme could, in the absence of mitigation result in the following potential impacts on flora:

- Loss of a species-rich hedgerow which is 'important' under the Hedgerow Regulations (DoE 1997), and species-rich and poor hedgerow not classified as 'important', associated with the construction phase of the works;
- Temporary loss of land and terrestrial habitats associated with contractor's compound and general working area;
- Temporary disturbance to terrestrial and marginal habitats associated with the construction phase;
- The land required for permanent works would potentially mean that areas of improved grassland and arable land would be lost;
- Vehicles and machinery may have to pass immediately adjacent to some trees, resulting in the potential to adversely impact upon the trees through ground compaction affecting the root systems; and
- There is the potential for accidental discharges of materials and substances, which could lead to the pollution of surrounding habitats and adjacent water courses.

4.1.2

Fauna

The construction phase of the scheme could, in the absence of mitigation result in the following potential impacts on fauna:

- There may be some disturbance to red squirrel in Gurnard, from the physical presence of personnel and machinery, and from the noise the drilling operations will make;
- General disturbance to birds, mammals and reptiles using the land within/ adjacent to the construction work may be experienced due to the physical presence of personnel and machinery leading to a temporary increase in noise and visual intrusion;
- Potential disturbance to rare/protected species, although presence/absence of bats and reptiles could not be confirmed without further surveys;
- Removal of some trees and scrub could have the potential to adversely affect nesting birds and roosting bats; and
- Temporary and permanent loss or disturbance of terrestrial/marginal habitat during construction, which may cause wildlife to temporarily relocate to unaffected areas.

4.2

Mitigation and Enhancement

Mitigation measures can be based on:

- **avoidance** through re-location, re-design or changes in the construction programme;
- **reduction** involving lessening the severity of an impact which cannot be avoided; and
- **compensation** through habitat creation or enhancement.

The following measures or activities should be implemented to reduce or ameliorate potential adverse impacts of the scheme on wildlife interest or provide some compensation.

4.2.1

Flora

Areas that demonstrated some nature conservation interest in Gurnard was the woodland, species-rich hedgerow which would qualify as 'important' under the Hedgerow Regulations (DoE 1997), and mature trees described by Target Note Descriptions in Appendix 1. This report recommends that the proposed works should maximise their distance from the woodland where possible. The hedgerow and mature trees should, where reasonable, be conserved. The remaining areas of scrub and grassland were of little ecological interest, although if squirrel were found to be using the scrub area, this would be of conservation interest.

Habitats in Lepe that were of some nature conservation interest were the species-rich hedgerow and species-rich grassland, although the area of semi-improved grassland and scrub would be of interest if protected species were recorded.

For purposes of best practice working areas should be kept to a minimum and fenced to prevent machinery from damaging adjacent vegetation.

Spoil should not be pushed up to or stored against any trees that are to remain to prevent the compaction of tree roots and suffocation of the trees.

Wherever possible, working areas should avoid the root zones of trees (i.e. area directly under the canopy). Where this is not possible, the root zone should be protected from compaction with a protective layer (e.g. imported material and specially designed road plates). The exact areas where roots may need to be protected should be mapped at the detailed design stage.

Trees that are felled should be dealt with in an appropriate sustainable manner (for example incorporation into the scheme and used as mulching). The use of felled trees should be defined prior to the works, in accordance with Environment Agency Guidance.

Where trees are felled, they should be replaced with the same, or more appropriate native species preferably of local provenance.

All land affected by temporary works and compounds should be reinstated back to the original specification, or better, following completion of the works.

The scheme provides the opportunity for some ecological enhancements of the site:

- felled timber could be stacked in piles along the fields boundaries to provide a habitat for a range of species, in particular saproxylic invertebrates and fungi. These works will need to be carried out between the end of August and the end of February to avoid the bird breeding/nesting season;
- planting of plant species in areas where the hedgerow has become defunct; and
- replanting of removed hedgerow with a diverse species mix preferably of local provenance.

4.2.2

Fauna

Tree cutting or scrub clearance should avoid the bird breeding/nesting season (March to August) as most birds are protected during this period when breeding. If woody vegetation needs to be cleared outside of this time, an ecologist will be required to check the site first to ensure that no nesting birds will be affected.

Although no bat roosts have been confirmed during the baseline survey, care should still be taken when felling, pollarding or coppicing mature trees due to the possibility of finding bat roosts. Bats are protected under Schedule 5 of the Wildlife and Countryside Act 1981, and as such all trees scheduled to have work undertaken on them will be checked by a suitably qualified ecologist in advance of the construction. If bat roosts are found then English Nature will be notified and Defra contacted to arrange appropriate licences for movement and relocation.

To minimise the impact of the proposed works on red squirrel a screen could be placed around the northern section of the works, to act as a sound barrier and visual screen. As works are to start in may when young litters could still be present and the start of the works may affect the adult care, it is recommended that works start in late may when the majority of young squirrels will be weaned and mobile. Squirrels may have another litter mid summer, although works will have been ongoing for a number of months so the impact of the works on the adults and new kittens will be reduced.

While the presence of badger setts was not confirmed within the study area, best practice dictates that in the event of an unanticipated discovery of a potential sett the Contractor should immediately stop all work within 30m and English Nature consulted in order to identify a suitable way forward.

Consideration should be given to the coverage and intensity of temporary artificial light used in any construction works to minimise the impact on nocturnal species

and protect wildlife corridors. Mitigation in the form of good working practices will further minimise adverse impacts and protect/enhance the present habitats.

The scheme provides the opportunity for some ecological enhancements of the site:

- the provision of bird boxes to provide additional nesting sites; and
- areas that support a mosaic of habitats set aside for reptiles and managed accordingly.

5 Conclusion and Recommendations

5.1

Conclusion

The construction phase will undoubtedly cause temporary and some permanent local disturbance to wildlife. Much of the habitat in general, was considered to be of negligible ecological value and support few species of note. The species-rich hedgerows, species-rich grassland and mature trees should be retained and enhanced where possible.

If recommended mitigation is implemented residual impacts are as follows:

- Loss of 'low grade' habitat to temporary works. This would be considered to be of negligible significance; and
- Potential impacts on red squirrel, bats and reptiles which may need further investigation depending on the footprint of works.

Ensuring best practice during the construction work and undertaking necessary mitigation, including ecological enhancements will help to reduce the overall impact of the proposed development to a minimum while maximising protection/enhancement of the local ecology.

5.2

Recommendations

In order to gain a thorough understanding of the ecological constraints and opportunities within the site, a presence/absence survey of reptiles and bats is recommended if those habitats connected to these species are to be affected by the works. To determine presence or likely absence of reptiles on the site, at least 7 visits should be undertaken using direct observation and artificial refuges, during April, May and September when weather conditions are the most suitable. To determine the presence or likely absence of bats, identify species and assess levels of activity, a dusk/night-time survey is recommended in the summer months using direct observations and a bat detector.

6

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7 Appendices

Appendix 1 - Target Note Descriptions

Gurnard - Isle of Wight

- Target Note 1 This improved field supported a number of common species which included occasional grass species cock's-foot (*Dactylis glomerata*) and timothy (*Pbleum pratense*), with herbs dandelion (*Taraxacum officinale* agg.) and creeping buttercup (*Ranunculus repens*). Spotted medick (*Medicago arabica*), cow parsley (*Anthriscus sylvestris*) and common knapweed (*Centaurea nigra*) were recorded to the field edges.
- Target Note 2 This hedgerow comprised frequent hawthorn (*Crataegus monogyna*), with occasional field-rose (*Rosa arvensis*), blackthorn (*Prunus spinosa*) and elder (*Sambucus nigra*). The ground flora although sparse included occasional dog's mercury (*Mercurialis perennis*), wild carrot (*Daucus carota* subsp. *carota*) and tansy (*Tanacetum vulgare*). A mature pedunculate oak (*Quercus robur*) tree situated as part of the hedge supported a number of cracks and crevices within its limbs, and may have a potential to support roosting bats.
- Target Note 3 This hedgerow comprised abundant hawthorn with occasional sorbus sp. (*Sorbus* sp.) and ivy (*Hedera helix*). The ground flora supported abundant nettle (*Urtica dioica*), with dog's mercury. A dry ditch ran along most of its length.
- Target Note 4 This area of oak woodland supported abundant mature pedunculate oak and frequent ash (*Fraxinus excelsior*) trees. The ground was relatively sparse due to the canopy shading, although patches of bramble (*Rubus fruticosus* agg.), butcher's-broom (*Ruscus aculeatus*) and hard rush (*Juncus inflexus*) were present.
- Target Note 5 This species-rich hedgerow, which had been recently cut back, supported a relatively divers mix of species. These included frequent ash, hazel (*Corylus avellana*), English elm (*Ulmus procera*) and field-rose. Mature oak trees were present either side of the gateway into the field, no signs of cracks or crevices were observed, although there may still be a low potential for bats.

- Target Note 6 This field appeared mostly improved in composition with more species diversity towards the field edges. Perennial rye-grass (*Lolium perenne*) was abundant throughout, with occasional meadow foxtail (*Alopecurus pratensis*), creeping thistle (*Cirsium arvense*) and meadow buttercup (*Ranunculus acris*). Creeping cinquefoil (*Potentilla reptans*), common sorrel (*Rumex acetosa*) and allium sp. (*Allium* sp.) were also present in occasional patches.
- Target Note 7 This species-poor hedgerow was dominated by hawthorn, with occasional ivy, cleavers (*Galium aparine*) and nettle. The ground flora supported herb-robert (*Geranium robertianum*), lords-and-ladies (*Arum maculatum*) and lesser water-parsnip (*Berula erecta*) in the damper areas.

Lepe Country Park - Hampshire

- Target Note 8 This species-poor hedge running adjacent to a road comprised of abundant hawthorn, with occasional blackthorn, holly (*Ilex aquifolium*) and honeysuckle (*Lonicera periclymenum*). The ground flora appeared to more diverse, mainly due to its grassland verge, and supported occasional wood sage (*Teucrium scorodonia*), garlic mustard (*Alliaria petiolata*), herb-robert and greater stitchwort (*Stellaria holostea*).
- Target Note 9 This small area of hawthorn scrub and semi-improved grassland supported signs of rabbit throughout, with a potential for the presence of reptiles due to mosaic of scrub and grassland offering favourable habitat.
- Target Note 10 This area of broadleaved plantation included occasional sycamore (*Acer pseudoplatanus*) and pedunculate oak.
- Target Note 11 This section of species-rich hedgerow comprises abundant hawthorn and blackthorn, with occasional elder, holly, honeysuckle and dog-rose (*Rosa canina*). Mature oak trees were present within the hedgerow. No cracks or crevices were observed that may be potentially suitable for bats, although there may low potential.
- Target Note 12 This area of scattered trees, bramble and ruderal herbs included abundant mature oaks with occasional holly, wych elm (*Ulmus glabra*) and nettle. Rare occurrences of horse-chestnut (*Aesculus hippocastanum*) and elder were also present. The mature oaks

supported a number of sites suitable for bats. The mosaic of habitats within this area also provided suitable habitat for the presence of reptiles.

Target Note 13 This small area of species-rich grassland supports cock's-foot, Yorkshire fog (*Holcus lanatus*), herb-robert, hedgerow crane's-bill (*Geranium pyrenaicum*), ground-ivy (*Glechoma hederacea*), wood sage and foxglove (*Digitalis purpurea*), with some patches of bramble and nettle. A dry ditch contained iris sp. (*Iris* sp.), nettle and willow sp. (*Salix* sp.) saplings

Appendix 2 - The Relative Abundance of Botanical Species for Areas described by Target Notes

DAFOR SCALE

D - Dominant F - Frequent R - Rare
 A - Abundant O - Occasional OLA – Occasionally locally abundant

Plant Name		Target Note												
Latin Name	Common name	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Acer pseudoplatanus</i>	Sycamore										F			
<i>Achillea millefolium</i>	Yarrow													O
<i>Aesculus hippocastanum</i>	Horse-chestnut												R	
<i>Alliaria petiolata</i>	Garlic mustard								O					
<i>Allium</i> sp.	Allium sp.						O							
<i>Alopecurus pratensis</i>	Meadow foxtail						O							
<i>Anthriscus sylvestris</i>	Cow parsley	O							O					O
<i>Arrhenatherum elatius</i>	False oat-grass													F
<i>Arum maculatum</i>	Lords-and-Ladies					O		O						
<i>Bellis perennis</i>	Daisy	O												
<i>Berula erecta</i>	Lesser water-parsnip			O				O						
<i>Bromus</i> sp.	Brome sp.													O
<i>Centaurea nigra</i>	Common knapweed	O												
<i>Cerastium fontanum</i>	Common mouse-ear						O							
<i>Chamerion angustifolium</i>	Rosebay willowherb		O											
<i>Cirsium arvense</i>	Creeping thistle	O					O							F
<i>Cirsium palustre</i>	Marsh thistle	O					O							
<i>Cirsium vulgare</i>	Spear thistle													O
<i>Corylus avellana</i>	Hazel					F								
<i>Crataegus monogyna</i>	Hawthorn		F	A		F		D	A	A		A	F	
<i>Dactylis glomerata</i>	Cock's-foot	O												O
<i>Daucus carota</i> subsp. <i>carota</i>	Wild carrot		O											
<i>Digitalis purpurea</i>	Foxglove													O
<i>Dipsacus fullonum</i>	Wild teasel	O												
<i>Fraxinus excelsior</i>	Ash				F	F								

Plant Name		Target Note												
Latin Name	Common name	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Galium aparine</i>	Cleavers							O	O					F
<i>Geranium dissectum</i>	Cut-leaved crane's-bill								O					
<i>Geranium molle</i>	Dove's-foot crane's-bill	O												
<i>Geranium pyrenaicum</i>	Hedgerow crane's-bill													R
<i>Geranium robertianum</i>	Herb-robert							O	O					O
<i>Glechoma hederacea</i>	Ground-ivy									O				O
<i>Hedera helix</i>	Ivy		O	O		O		O	O	O		F		
<i>Heracleum sphondylium</i>	Hogweed					F								O
<i>Holcus lanatus</i>	Yorkshire-fog													F
<i>Ilex aquifolium</i>	Holly								O			O	O	
<i>Iris sp.</i>	Iris sp.													O
<i>Juncus inflexus</i>	Hard rush				F									
<i>Lamium album</i>	White dead-nettle						O							
<i>Lamium purpureum</i>	Red dead-nettle								O					
<i>Ligustrum vulgare</i>	Wild privet		O											
<i>Lolium perenne</i>	Perennial rye-grass		A				O							
<i>Lonicera periclymenum</i>	Honeysuckle		O						O					
<i>Lotus corniculatus</i>	Common bird's-foot-trefoil	O												
<i>Malva sylvestris</i>	Common mallow	O												
<i>Medicago arabica</i>	Spotted medick	O												
<i>Mercurialis perennis</i>	Dog's mercury		O	F										
<i>Myosotis sp.</i>	Forget-me-knot sp.		O											
<i>Phleum pratense</i>	Timothy	O												
<i>Picris echioides</i>	Bristly oxtongue	O												
<i>Plantago lanceolata</i>	Ribwort plantain													O
<i>Potentilla reptans</i>	Creeping cinquefoil						O							O
<i>Prunus spinosa</i>	Blackthorn		O			O		O	O			A	F	O
<i>Quercus robur</i>	Pedunculate oak		O		A	O					F	O	A	R
<i>Ranunculus acris</i>	Meadow buttercup						O							
<i>Ranunculus ficaria</i>	Lesser celandine					F								
<i>Ranunculus repens</i>	Creeping buttercup	O					O							O
<i>Rosa arvensis</i>	Field-rose		O			O		O						
<i>Rosa canina</i>	Dog-rose											O		

Plant Name		Target Note												
Latin Name	Common name	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Rubus fruticosus</i> agg.	Bramble				F	O		O	O				F	OLA
<i>Rumex acetosa</i>	Common sorrel						O							O
<i>Rumex crispus</i>	Curled dock						O							
<i>Ruscus aculeatus</i>	Butcher's-broom				F									
<i>Salix</i> sp.	Willow sp.													OLA
<i>Sambucus nigra</i>	Elder		O									O	R	
<i>Sorbus</i> sp.	Sorbus sp.			O										
<i>Stachys sylvatica</i>	Hedge woundwort													O
<i>Stellaria holostea</i>	Greater stitchwort								O					
<i>Tanacetum vulgare</i>	Tansy		O											
<i>Taraxacum officinale</i> agg.	Dandelion	O					O							
<i>Teucrium scorodonia</i>	Wood sage								O					O
<i>Trifolium repens</i>	White clover	O												F
<i>Tussilago farfara</i>	Colt's-foot	O												
<i>Ulmus glabra</i>	Wych elm												O	
<i>Ulmus procera</i>	English elm					F								
<i>Urtica dioica</i>	Common nettle		O	A				O	O				O	OLA
<i>Vicia sativa</i> subsp. <i>segetalis</i>	Common vetch						O							
<i>Vinca major</i>	Greater periwinkle	O												

Appendix 3 - An Approach to Valuing Ecological Receptors as Published in 'Guidelines for Ecological Impact Assessment' (IEEM 2002)

Level of Value	Examples
International	Internationally designated or proposed sites such as Ramsar Sites. Special Protection Areas, Biosphere Reserves and Special Areas of Conservation, or otherwise meeting criteria for international designation. Sites supporting populations of internationally important species.
National	Nationally designated sites such as SSSI's, or non-designated sites meeting SSSI selection criteria, NNR's. Marine Nature Reserves, NCR Grade 1 sites. Those containing viable areas of any key habitat/species identified in the UK Biodiversity Action Plan. Sites supporting viable breeding populations of Red Data Book species (excluding scarce species), or supplying critical elements of their habitat requirements.
Regional	Sites containing viable areas of threatened habitats listed in a Regional Biodiversity Action Plan (or some Natural Areas), conformably exceeding SINC criteria, but not meeting SSSI's selection criteria. Sites supporting viable breeding populations of Nationally Scarce species or those included in the Regional Biodiversity Action Plan (or some Natural Areas) on account of their rarity, or supplying critical elements of their habitat requirements.
County/Metropolitan (High Local)	Sites meeting the criteria for a county or metropolitan area designation (such as SINC or SMI), which may include amenity and educational criteria in urban area. Ancient semi-natural woodland. Designated Local Nature Reserves. Sites containing viable areas of any key habitat type identified in the County Biodiversity Action Plan (or some Natural Areas). Sites supporting viable breeding populations of species known to be county/metropolitan rarities (e.g. featuring in a county 'red data book' or included in the county/metropolitan Biodiversity Action Plan or some Natural Areas), or supplying critical elements of their habitat requirements.
District/Borough (Moderate Local)	Undesignated sites, or features considered appreciably to enrich the habitat resource within the context of the Borough or District, or included in the Borough or district Biodiversity Action Plan or some Natural Areas. Amenity and educational functions will be recognised in urban areas. Sites supporting viable breeding populations of species listed as rare in the district or Borough Biodiversity Action Plan or some Natural Areas, or supplying critical elements of their habitat requirements.
Parish/Neighbourhood (Low Local)	Undesignated sites or features considered appreciably to enrich the habitat resource within the context of the Parish or neighbourhood. (e.g. species – rich hedgerow).
Negligible	Low grade and widespread habitats.