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INTRODUCTION

12.1 This section of the ES describes the ecological baseline conditions of the application site and assesses potential impacts that the proposed development could have upon flora and fauna. It then details appropriate mitigation measures required to reduce, compensate or avoid these impacts.

12.2 The approach to ecological impact assessment (EcIA) has been undertaken as follows:

- definition of the existing ecological baseline conditions, including a review of the application site in its local and regional ecological context;
- determination of the existing ecological value of the application site and surrounding areas;
- identification of the potential ecological effects of the proposed development;
- identification of required mitigation measures for significant adverse ecological effects;
- demonstration that these activities would meet the legal requirements relating to species and habitats; and
- assessment of the significance of any residual ecological effects; *i.e.* those still remaining following mitigation and if required, identification of compensation measures required to offset these.

GUIDANCE AND INDUSTRY GOOD PRACTICE`

12.3 The scope of this EcIA, collection of baseline data, evaluation of ecological resources, description and assessment of the significance of impacts follows guidelines set out by the Institute of Ecology and Environmental Management (IEEM) and references therein[1].

12.4 Current best practice guidelines have been used to plan surveys for specific fauna. Any deviation from these guidelines is highlighted and the reasoning for the deviation explained; both in the Technical Appendices and in this chapter.

Sources of Information

12.5 Information on statutory and non-statutory sites and the presence of protected species within and near the application site has been sought through consultation with Hampshire Biodiversity Information Centre (HBIC). The results of this data search are included in Appendix 12-1. Designated sites are shown on Drawing MD12/2, which is taken from the protected sites plan received from HBIC.

[1] Institute of Ecology and Environmental Management (2006) *Guidelines for Ecological Impact Assessment in the United Kingdom* (version 7 July 2006). http://www.ieem.org.uk/ecia/index.html

Assessment Approach

Area of Survey

12.6 The application site is shown edged in red on Drawing MD12/1. The application site is approximately 3ha in extent. Habitats outside this were also surveyed where applicable for specific fauna; for example plants, in accordance with best practice guidelines.

Scoping Survey

12.7 An initial scoping assessment of the application site was undertaken in February 2012. On the basis of that survey it was assessed that an initial desk top study and a detailed 'Extended' Phase I Habitat survey would be required.

Collection of Baseline Data – Field Survey

12.8 The scope and detail of the surveys undertaken for this assessment follow recommendations made by the former Institute of Environmental Assessment[2]. The methods used for the ecological survey are in accordance with established and generally accepted methodologies for field survey, as published by the Institute of Ecology and Environmental Management (IEEM)[1] and others.

12.9 A preliminary ecological appraisal of the application site was undertaken by an environmental scientist from Pell Frischmann Limited on March 9th 2012. A preliminary Phase I habitat survey report was produced at this stage and this is presented in Appendix 12-2 (no Phase I habitat plan was produced with this report). (A detailed botanical survey of the site was subsequently undertaken by SLR botanists and a detailed Phase I Habitat plan was produced at this stage; this is presented at Drawing MD12-3).

12.10 On the basis of the preliminary ecological appraisal, it was assessed that the following additional work was necessary to fully evaluate the ecological value of the application site:

- Botany (Appendix 12-3);
- Bats (Appendix12-4);
- Reptiles (Appendix 12-5);
- Birds (Appendix 12-6); and
- Invertebrates (Appendix 12-7).

Constraints to Surveys

12.11 No constraints to the surveys undertaken for this assessment have been identified. Save for tree surveys for bats, best practice guidelines have been followed for all survey work undertaken at the application site.

[2] Institute of Environmental Assessment (1995) Guidelines for Baseline Ecological Assessment. E. & F.N. Spons.

12.12 With respect to the survey for bats in trees, the best practice guidelines[10] do not contain specific survey methodology for trees in relation to development. Therefore, the surveys undertaken have been based upon the methodologies recommended for trees affected by arboricultural work (Table 8.4, page 60, BCT Guidelines). Professional judgement was used to adapt the surveys in order to best determine the potential presence of bat roosts in these trees.

Evaluation and Impact Assessment

12.13 It is impractical and inappropriate for an assessment of the ecological effects of a proposed scheme to consider every species and habitat that may be affected. It is also contrary to the requirements of the EIA Regulations. This ecological assessment instead focuses upon identifying 'ecological receptors' (habitats and species) present within the zone of influence (considered to be a 1km radius around the application site for the purposes of this assessment) of the proposed scheme that are of sufficiently high value that an effect upon them as a result of the proposed scheme could be considered to be significant.

12.14 The value of sites, populations of species, species assemblages and habitats have been evaluated with reference to their importance in terms of 'biodiversity conservation' value (which relates to the need to conserve representative areas of different habitats and the genetic diversity of species populations), and their legal status.

12.15 The ecological receptors identified during the desk and field based studies were evaluated according to their geographical frame of reference, as follows:

- International;
- UK;
- National (England);
- Regional (South-east);
- County (Hampshire);
- District (Winchester);
- Parish (Micheldever); and/or
- Site (immediate zone of influence only).

12.16 The assessment of ecological impacts also follows the process summarised below as:

- identification of the range of potential impacts that may arise resulting from the proposed development;
- consideration of the systems and processes in place to avoid, reduce or mitigate possible effects of these impacts;
- identification of opportunities for ecological enhancement associated with the proposals;
- assessment of residual impacts, following consideration of the success of avoidance, mitigation and enhancement measures; and

- where necessary, identification of compensation measures required to offset significant residual effects.

12.17 Evaluation and impact assessment has been carried out in accordance with current IEEM guidelines (2006)[1].

Policy and Legislation

12.18 The final sub-section deals with the implication of any anticipated ecological impacts from a legal and policy perspective. Predicted impacts are considered in line with the following relevant policy documents and legislation:

- National Planning Policy Framework (2007)
- Hampshire: Minerals and Waste Core Strategy (2007)[3];
- Hampshire Biodiversity Action Plan (BAP)[4];
- Conservation of Habitats and Species Regulations (2010)[5]; and
- Wildlife and Countryside Act 1981 (as amended)[6] (WCA).

12.19 The relevant section of these policies and Acts are also provided in Technical Appendix 12-8, Policy & Legislation, of this report.

[3] Hampshire, Portsmouth, Southampton & New Forest National Park Minerals and Waste Core Strategy – Development Plan Document 2007 Hampshire County Council
[4] http://www.hampshirebiodiversity.org.uk/vol-two.html
[5] ODPM. Statutory Instruments 2010 No. 490 The Conservation of Habitats and Species Regulations 2010.
[6] Wildlife and Countryside Act 1981 (1981 Chapter 69)

BASELINE CONDITIONS

12.20 Drawing MD 12/3 shows the distribution of habitat-types within the application site and a summary of these is provided below. Detailed habitat descriptions are presented in Appendix 12-3, Botanical Survey.

Habitats

12.21 The majority of habitats within the application site are heavily influenced by the sites former use as an oil terminal. Floral species have recolonised over bare chalk, concrete and loose aggregate, which has created a mosaic of calcareous grassland, scrub and bare ground.

Within the Application Site

12.22 The application site comprises a former oil terminal, resulting in a concrete and chalk substrate which has recolonised with grassland comprising typical calcareous indicator species and patches of scrub, which in places are dense and continuous. Habitats are shown on Drawing MD 12/3.

12.23 The application site is approximately 3ha in area and is wholly contained within Micheldever Oil Terminal Site of Importance for Nature Conservation (SINC), which is approximately 5.2ha in extent (note – the citation within Appendix 12-1 states that this SINC site is approximately 12ha in area, although measurements made from OS data record this site as being 5.2ha). This SINC was designated in 1992 for its unimproved calcareous grassland communities. The grassland present in 2012 is a well-developed, herb-rich, calcareous grassland that occurs across much of the application site. Four distinct plant communities were noted.

12.24 Furthest west, the sward has developed over concrete on thin soils and is dominated by salad burnet (*Sanguisorba minor*) and creeping cinquefoil (*Potentilla reptans*). There are fewer herbs present here than elsewhere in the application site and grasses are largely absent. A high proportion of lichens and mosses, indicative of the lack of organic matter, are present here, with these lower plants dominating in the northern section of this habitat.

12.25 The central area of grassland is more herb-rich and is dominated by salad burnet and wild thyme (*Thymus praecox*); there are a wide variety of other species present, notably herbs, such as wild strawberry (*Fragaria vesca*), germander speedwell (*Veronica chamaedrys*) and hairy violet (*Viola hirta*). Grasses sedges include false brome (*Brachypodium sylvaticum*) and glaucous sedge (*Carex flacca*). The grassland is largely continuous, heavily rabbit-grazed, and edged by scrub comprising dogwood (*Cornus sanguinea*) and wild privet (*Ligustrum vulgare*) which is held in check by grazing.

12.26 East of the central area is a west and south facing embankment which runs north-south and rises steeply at the northern end, becoming shallower as it runs south. The embankment has become invaded by scrub, particularly in

the north of the application site, where it becomes dense and comprises dogwood, wild privet, hawthorn (*Crataegus monogyna*) and dog rose (*Rosa canina*). Bramble (*Rubus fruticosus* agg.) is abundant at ground level. Calcareous grassland features on the west-facing section of this embankment, but scrub is invading here also. The grassland supports similar dominant herbs as the habits further west, but also includes species such as agrimony (*Agrimonia eupatoria*), wild basil (*Clinopodium vulgare*), long-stalked cranesbill (*Geranium columbinum*) and grasses similar to the central section and including sheep's fescue (*Festuca ovina*) and red fescue (*Festuca rubra*).

12.27 The most diverse grassland habitat in terms of species mix lies further to the east, on the plateau above the central embankment. The vast majority of the species recorded elsewhere on the application site are also present in this grassland and some species are unique to it, including creeping bent (*Agrostis capillaris*), sweet vernal grass (*Anthoxanthemum odoratum*), annual meadow grass (*Poa annua*), common storks bill (*Erodium cicutarium*), eyebright (*Euphrasia nemorosa*) and hairy St. Johns-wort (*Hypericum hirsutum*), amongst others.

Within the Immediate Surroundings

12.28 The area south of the application site comprises the southern section of Micheldever Oil Terminal SINC. The habitats present in this area are a continuation of those present within the application site. The southern boundary of the SINC is marked by a steep concrete slope which leads down to the rail sidings and the village of Micheldever Station, some 0.6km to the south.

12.29 A bare chalk cliff face around 18m in height, which is colonised at its base with scrub, is located immediately north of the application site. To the north east of the application site is an area of mature trees and scrub. Both of these habitats serve to separate the application site from the A303 dual carriageway. Further north of the A303 is Micheldever Spoil Heaps Site of Special Scientific Interest (SSSI), which is also designated on the basis of its calcareous grassland habitat.

12.30 A line of mature beech trees (*Fagus sylvatica*) run along the outside of the eastern boundary of the application site, between the application site and Overton Road. Further east the land is dominated by arable farmland and Black Wood, an Ancient Semi Natural Woodland (ASNW) comprising a mix of coniferous and deciduous trees.

12.31 A concrete bank associated with the former rail sidings runs adjacent to the western boundary of the application site and separates the application site from the south-west main railway line from London Waterloo to Southampton.

Flora

12.32 No notable, rare or legally protected species were recorded from the application site or within the wider study area during the botanical survey.

12.33 The calcareous grassland recorded within the application site supports a diverse assemblage of herbs and grasses. Although no single species is particularly notable, rare or legally protected, the grassland as a whole is species-rich and diverse, and the site is designated as a SINC.

12.34 No pest species listed on Schedule 9 of the WCA, were recorded from within the application site during the extended Phase 1, botanical or faunal surveys.

Fauna

12.35 Specific surveys for bats, reptiles and birds were undertaken at the application site in 2012. Details of the survey methodology and results are presented in Appendices 12-4 to 12-7 and are summarised below.

Mammals

Bats

12.36 Full details of the bat survey results are presented in Appendix 12-4 and are summarised below.

12.37 Records for common pipistrelle (*Pipistrellus pipistrellus*) and brown long-eared bat (*Plecotus auritus*) were provided by HBIC. Both records are located approximately 0.7km south of the application site, within the village of Micheldever Station. No further information regarding type of record (i.e. roost, grounded bat *etc*) was provided by HBIC.

12.38 Some 65 mature beech trees along the outer eastern boundary were assessed for their potential to support roosting bats from a ground-based visual assessment. Seven trees were categorised as having definite potential to support bats. No bats were recorded at these trees during the emergence surveys in 2012.

12.39 Activity surveys across the wider site recorded low numbers of soprano pipistrelle (*Pipistrellus pygmaeus*) and a single *Myotis* bat foraging and commuting along the scrub which edges the north-western boundary of the application site during one of the two activity surveys. No other bat activity was recorded.

Badgers

12.40 Records provided by HBIC, contain two records for badger (*Meles meles*), the location of which is marked as confidential by HBIC (only the 1km grid square in which the record was taken was provided). In 2008, badger was recorded in the same 1km grid square as that which the application site is located and in 1997, badger was recorded in the 1km grid square to the south-west of the square in which the application site is located.

12.41 Despite their presence locally, no badgers or evidence of their presence was recorded from the application site during the Phase I habitat survey or any other surveys at the application site.

Dormice

12.42 Several records for dormouse (*Muscardinus avellanarius)* were provided by HBIC, but no details were supplied regarding record type (e.g. nest, sighting etc). The closest record for dormouse is along the northern boundary of the application site, adjacent to the A303. Further records for dormouse have been recorded within the 1km grid square in which the application site is located, as well as the squares immediately east, north-east and south-west. All records are from 2010.

12.43 No incidental evidence of presence within the application site, such as sightings or nests were recorded during any of the surveys. However, the scrub mosaic within the application site is contiguous with habitat known to support this species, particularly on the eastern section of the application site. Scrub present within the central and western areas of the application site is sporadic and dominated by species not typically associated with dormouse, namely dogwood and wild privet. As such, for the purposes of this assessment, it is assumed that this species is present within the application site.

Other Mammals

12.44 Numerous records of brown hare (*Lepus europaeus*) were provided by HBIC, three of which were located within 0.5km of the application site, in arable land to the south. This species was not recorded within the application site during any of the surveys and the habitat was considered rather unsuitable, being either very cropped turf or heavy scrub.

12.45 Roe deer (*Capreolus capreolus*) were recorded on site during almost all of the surveys, by surveyors from both Pell Frishmann and SLR. Only female hinds were recorded, with a maximum of three during any one survey.

12.46 A single fox (*Vulpes vulpes*) was recorded by Pell Frishmann during the initial Phase I Habitat survey in March 2012 and by an SLR surveyor in June. An 'earth' is present in the north of the application site.

12.47 Large numbers of rabbits (*Oryctolagus cuniculus)* occur across the application site and grazing is evident throughout.

12.48 No other mammal species were recorded during any of the surveys although the habitats present are likely to support common small mammals such as field vole (*Microtus agrestis*) and common shrew (*Sorex araneus*).

Reptiles

12.49 Full details of the reptile survey results are presented in Appendix 12-5 and are summarised below.

12.50 Three records for slow worm (*Anguis fragilis*) were provided by HBIC for the area around the application site. All three were from Black Wood to the east, with two being located within the woods at 1.2km and 1.4km east; the remaining recorded was located 1.5m north east of the site, on the boundary of the woodland with the A303.

12.51 Slow worm were recorded in two locations during the reptile surveys; one in the northern end of the application site in a grassland scrub mosaic at the top of the embankment and the second just outside the southern boundary application site in a grassland scrub mosaic. A peak count of only two slow worms was recorded; males, females and juveniles were all recorded, confirming a small breeding population is present.

12.52 No other reptile species or evidence of them (such as sloughed skins) was recorded during the surveys.

Birds

12.53 The bird survey results are presented in Appendix 12-6 and are summarised below.

12.54 Numerous bird records were provided by HBIC as part of the background data search. These are presented in Appendix 12-1. Records provided included those species listed on Schedule 1 of the Wildlife and Countryside Action (1981) as amended (WCA), and those listed on the Birds of Conservation Concern[7] (BoCC) red list. The closest record was some 0.5km from the site.

12.55 A pair of peregrine falcon (*Falco peregrinus*) was recorded nesting on the chalk cliff face immediately north of the application site during the breeding bird surveys in 2012. Peregrine is a Schedule I species, which means that it receives additional protection under the WCA, preventing disturbance of this species and its nest during the nesting season

12.56 Yellowhammer (*Emberiza citrinella*) and song thrush (*Turdus philomelos*), are both listed on the BoCC[7] red list and were recorded within and around the site, as was dunnock (*Prunella modularis*), which is listed on the BoCC[7] amber list.

12.57 Sixteen other species of bird were recorded from within and around the application site, most of which were holding territory, and all of which are listed as abundant or numerous in Hampshire[8], including wren (*Troglodytes troglodytes*) and blackbird (*Turdus merula*).

[7] Eaton, M.A., Brown, A.F., Noble, D.G., Musgrove, A.J., Hearn, R.D., Aebisher, N.J., Gibbons, D.W., Evans, A., & Gregory, R.D. (2009) *Birds of Conservation Concern 3 The population status of birds in the United Kingdom, Channel Islands and Isle of Man*. British Birds 102: 296-341

[8] Cox, A. (2011) *Hampshire Bird Report 2010*. Hampshire Ornithological Society

Invertebrates

12.58 Records for invertebrates provided by HBIC are numerous and contain mainly records for moths and butterflies collected from Micheldever Spoil Heaps SSSI and Black Wood.

12.59 For the purpose of the survey carried out at the application site in June 2012, the application site was split into two (as shown on Figure 1 in Appendix 12-7), with the area west of and including the embankment in the 'lower compartment' and the area to the east of the embankment in the 'upper compartment'. The remaining habitat within the parcel of land, but outside the application site is referred to as the 'southern compartment'.

12.60 The invertebrate survey recorded the presence of 127 different species, 14 of which are defined as 'key species'[9], as well as two UK BAP species and glow worm, which although not subject to any classification, is indicative of a healthy invertebrate community. The species, their classification and recorded location are shown in Table 12-1

Table 12-1
Key Invertebrate Species recorded at Micheldever

Species	Common name	Classification	Upper	Lower	Southern
Campiglossa malaris	Fruit fly	*RDB1*		X	
Cnemacantha muscaria	Lauxanid fly	*RDB3*	X		
Stephensia brunnichella	Moth		X	X	
Scythris picaepennis	Moth				X
Omaloplia ruricola	Chafer beetle	Nationally Scarce			X
Longitarsus dorsalis	Beetle		X		
Mogulones geographicus	Weevil				X
Sphecodes crassus	Cuckoo-bee				X
Trachysiphonella scutellata	Fruit fly			X	
Sapromyza albiceps	Lauxanid fly		X	X	
Homoneura thalhammeri	Yellowish fly	Nationally Scarce	X		
Pipizella virens	Hoverfly		X		
Micromorphus species C	Dolichopodid fly			X	
Platypalpus incertus	Hybotid fly		X		X
Coenonympha pamphilus	Small heath	UK BAP		X	
Tyria jacobaeae	Cinnabar moth		X	X	X
Lampyris noctiluca	Glow-worm	None	X		

Other fauna

12.61 A single record for common toad (*Bufo bufo)* was provided by HBIC, located in the 1km grid square, 2km north of the application site. No other records

[9] Key species are defined as 'British Red Data Book (RDB) and Nationally Scarce species (including statuses from JNCC texts which are published, 'in press' or 'in prep.), species formerly regarded as either RDB or Nationally Scarce but recently downgraded and Species proposed for national status by Butterfly Conservation.

for amphibians exist for the search area. The application site contains no waterbodies, and none are recorded within 500m of the application site. Whilst rough ground, scrub and grassland provide suitable terrestrial habitat for this faunal group, no amphibians were recorded during any surveys.

Predicted Trends

12.62 The site does not appear to have altered significantly in species composition since its original designation in 1992, although it is likely that the scrub cover has increased in extent in some areas, in particular on the embankment. Elsewhere, rabbit-grazing appears to be holding scrub in check to some extent. It is likely that in the absence of development or active conservation management, and given the continuation of grazing, the application site would continue to support calcareous grassland / scrub mosaic for at least the medium term.

NATURE CONSERVATION EVALUATION

12.63 To evaluate the significance of impacts from a development it is important to establish the value, or sensitivity, of the site and the features upon which the effect is predicted to occur.

Designated Sites

12.64 Natural England notifies sites that are of international or National importance for nature conservation as Sites of Special Scientific Interest (SSSIs) (although some sites that are of National importance for certain species have not been so designated). Internationally important sites may also be designated as Special Areas of Conservation (SAC), Special Protection Areas (SPA) or Ramsar sites. Designated non-statutory wildlife sites in this area are known as Sites of Importance for Nature Conservation (SINC) of County or Parish importance and are designated by Hampshire County Council.

Non-designated Sites

12.65 For features that have not been designated in such a way, SLR has undertaken an evaluation based upon guidelines published by IEEM. In this way the features being evaluated are considered in the context of the site and the locality and thus it is possible to provide a more accurate assessment of the impacts of the proposed development on these features.

Species

12.66 Species are evaluated based on rarity, population size and whether they are especially important to the functioning of an ecosystem. Though they may not be protected or particularly rare, consideration is also given to those species listed in National and local Biodiversity Action Plans.

12.67 The criteria used to determine biodiversity value of a species or habitat-features that may support a species include the following general considerations:

- rarity at a defined geographical level (international, National or local);
- endemism and locally distinct varieties or sub-species;
- species on the edge of their geographic range;
- size of populations in a local geographical context;
- species-rich assemblages of a larger taxonomic grouping, e.g. herpetofauna or wintering birds;
- plant communities, ecosystems or habitat mosaics/associations that provide habitat for any of the above species or assemblages; and
- populations of species considered significant in a Hampshire context, as described in the UK Biodiversity Action Plan, Hampshire BAP, or other relevant documents.

12.68 Legal protection of certain species is considered in a later section and does not specifically form part of the biodiversity evaluation.

12.69 Table 12-2 lists sites and features of ecological value within the application site.

Table 12-2
Features of ecological value within the zone of influence of the application site

Geographical Frame of Reference	Site/Feature at this Value	Location	Reason For Importance
International	River Itchen SAC	9km south east of application site	The Itchen is a classic example of a sub-type 1 chalk river, dominated throughout by aquatic *Ranunculus* spp. It also supports good populations of southern damselfly and bullhead, as well as otter, brook lamprey, Atlantic salmon and white clawed crayfish.
National	Micheldever Spoil Heaps SSSI	SU 520440 North of A303, within 100m application site	A site of exceptional botanical interest which has developed on chalk spoil heaps. Some 150 floral species were recorded in 1969.
	River Test SSSI	5.5km west of site at closest point. Entire SSSI is approx 50km long	The River Test is a classic chalk stream. It is one of the most species-rich lowland rivers in England, supports a high diversity of invertebrate species and is especially rich in aquatic molluscs.
	Bere Mill Meadows SSSI	SU 475477 5.5km to the north-west of the application site.	A group of damp, unimproved herb-rich neutral grassland on the flood plain of the upper Test valley, representing a particularly valuable for birds and invertebrates. The meadows are a type of vegetation that was formerly widespread in the chalk stream valleys.
	Bransbury Common SSSI	SU 409413 9km west of the application site	This site lies on the flood plain of the upper Test valley and consists of disused flood meadows and a common (comprising peat over gravel) which supports grassland and grass/sedge communities, probably unparalleled in southern England.
	Peregrine falcon	On cliff face to north of application site	One of 1400 breeding pairs present Nationally. Only 5 successful breeding attempts were

Geographical Frame of Reference	Site/Feature at this Value	Location	Reason For Importance
			recorded in Hampshire in 2010.
Regional-	-	-	-
	Micheldever Oil Terminal SINC	Within site	This site is designated for its species-rich unimproved calcareous grassland, which has established in the past on exposed / excavated chalk.
	Black Wood SINC	0.8km west	An outstanding assemblage of notable Lepidoptera and other invertebrates.
	Freefolk Beech Break SINC	1.2km east	No information provided.
	Black Wood North SINC	1km east	No information provided.
	Cobley Wood South SINC	1km north east	No information provided.
	Cobley Wood Middle SINC	1.2 km north east	No information provided.
County	Cobley Wood North SINC	1.6km north east	No information provided.
	Oaken Copse SINC		No information provided.
	Round Wood SINC	1.3km north west	No information provided.
	Laverstoke Wood SINC	1.7km north west	No information provided.
	Freefolk Wood SINC	1.8km north-west	No information provided.
	Field Near Freefolk Wood SINC	1.5km west	Presence of Nationally rare ground pine (*Ajuga chamaepitys*) and Nationally scarce Green-flowered helleborine (*Epipactis phyllanthes*).
	Cranbourne Wood SINC	1.8km west	No information provided.
	Upper Cranbourne/Hunton Down Farms SINC	1.5km south west	Presence of Stone curlew (*Burhinus oedicnemus*) recorded.
	Dormouse (assumed present)	Within site	There is a confirmed record of this species along northern boundary of the application site, within which suitable scrub habitats is present. Dormouse is a UK and Hampshire BAP priority.
District	-	-	-
	Slow worm	Within site	A low population of this species breed within the application site and to the south. Could be ecologically isolated within Micheldever SINC.
	Roosting bats (unconfirmed)	In beech trees outside eastern boundary of application site	Seven Cat 1 trees were located along outer eastern boundary. These have potential for roosting bats.
Parish	Breeding bird assemblage	Within site	A generally common breeding species assemblage, including two red list species and an amber list species, two of which are UK and Hampshire BAP priorities.
	Invertebrate assemblage	Within site	A large and varied assemblage that includes 2 RDB species, 12 Nationally scarce species and two UK BAP species.
Site/Within immediate	Commuting bat assemblage	Within site	Low numbers of common bat species use the north western edge of the site for commuting and

Geographical Frame of Reference	Site/Feature at this Value	Location	Reason For Importance
zone of influence (Less than Parish value)			foraging. No roosts confirmed.
	Common mammal species including fox and roe deer	Within site	Species common and widespread within the County of Hampshire and Nationally.

Evaluation of Habitats within the Application Site

12.70 The application site is 3ha in extent and comprises calcareous grassland, scrub, bare ground and a small section of woodland.

12.71 The application site lies entirely within the Micheldever Oil Terminal SINC, within which the grassland habitats are herb-rich and the habitat mosaic complex. Whilst the scrub on the embankment is becoming dominant in places and is beginning to shade out the calcareous grassland locally, the application site contains a number of calcareous grassland indicator species and the habitat quality is sufficient to meet the Hampshire criteria for SINC status for calcareous grassland. As such, the entire application site and the habitats which it supports are assessed as being an ecological receptor of County value.

Evaluation of Habitats for Protected and Notable Fauna within the Application Site

12.72 Seven of the 65 beech trees along the eastern boundary of the application site are assessed as Cat 1 trees (as defined by the BCT guidelines, page 60)[10] in respect of their potential to support bats, although no confirmed roosts were recorded during emergence surveys in spring 2012. The presence of roosts is considered unlikely but cannot be discounted and it is assumed for the purpose of this assessment that bat roosts are present. These roosts, dependant on species and roost type, are ecological receptors of at least Parish value, but could be up to County value.

12.73 A low number of foraging and commuting bats were recorded in a single area in the north of the application site during one of the activity surveys. Assessment methodology devised by Wray *et al*[11] has been used to evaluate the foraging and commuting habitat present at the site. The result of this evaluation defines the commuting and foraging habitat to be an ecological receptor of Parish value.

12.74 The presence of a confirmed record of dormouse just north of the application site and contiguous scrub habitat into the application site indicates a strong likelihood of the presence of this species. For the purpose of this assessment it is assumed that this species is present within the application site. It is assessed that the scrub habitats present in the western and central

[10] Hundt, L. (2012) 'Bat Surveys: Good Practice Guidelines' 2nd Edition. Bat Conservation Trust

[11] Wray, S., Wells, D., Long, E. and Mitchell-Jones, T. Valuing Bats in Ecological Impact Assessment December 2010. IEEM In Practice. Vol 70. Pages 23-25.

areas are sub optimal for dormouse, whilst the scrub present in the east of the application site is optimal. The presence of this species within the application site would be considered to be an ecological receptor of up to County value.

12.75 A small population of slow worm are present within the application site and the wider SINC. The grassland habitats present in the eastern habitats the SINC are suitable for this species, although the habitats in the western and central area of the application site are less suitable, supporting a less well developed grassland sward than the habitats in the east. The population is assessed as an ecological receptor of Parish value.

12.76 Peregrine falcon nested on the chalk cliff just north of the application site in 2012. This species is specially protected via its listing on Schedule 1 of the WCA and there are only 1400 breeding pairs in the UK. The presence of nesting peregrine is considered to be an ecological receptor of National value.

12.77 The invertebrates recorded comprise 14 key species. Of these key species, 10 are considered to be more common than their classification suggests, having grown in population size and/or distribution. However, the chafer *Omaloplia ruricola* and the weevil *Mogulones geographicus* are genuinely uncommon, especially in north Hampshire where there are few other records. Although not having official status, the two micromoths *Stephensia brunnichella* & *Scythris picaepennis* have only recently been put forward for classification and are therefore considered to deserve their classification. Only *Stephensia brunnichella* occurs within the application site, with the other three species being recorded from the southern compartment. Nevertheless, the assemblage present within the application site includes two RDB species and two UK BAP species within a large and varied invertebrate community and as such the assemblage at the application site is considered to be an ecological receptor of Parish value.

12.78 The site supports fox, rabbit and roe deer and is likely to support a suite of common species of small mammal. All are common and widespread in their distribution and populations, both within Hampshire and Nationally. The presence of such species within the application site is considered to an ecological receptor of site value.

12.79 No other protected or notable species are likely to be present within or supported by, the application site.

Evaluation of Designated Sites

12.80 A single internationally designated site is located within 10km of the application site. This site, the River Itchen SAC, is located approximately 9.5km to the south-east at its closest point. The river flows south-west away from this point and then continues south through Winchester and Southampton where it flows out into Southampton Water. The river is designated as a good example of a sub type 1 chalk river, which is defined as a river on chalk substrates, with a community characterised by pond

water-crowfoot *Ranunculus peltatus* in spring-fed headwater streams (winterbournes), stream water-crowfoot *R. penicillatus* ssp. *pseudofluitans* in the middle reaches, and river water-crowfoot *R. fluitans* in the downstream sections. The River Itchen SAC is separated from the application site by the M3 motorway, the A33 dual carriageway, Micheldever Wood and arable farmland. The SAC is an ecological receptor of international value.

12.81 Four SSSIs are located within 10km of the application site; the closest of which is Micheldever Spoil Heaps SSSI, which is located some 100m to the north of the application site beyond the A303, which separates the SSSI from the application site. The SSSI is designated due to its 'exceptional' botanical interest which has established on the chalk spoil heaps. The River Test SSSI is located 4km south-west of the application site and is designated due to it being one of the most species-rich lowland chalk rivers in the south of England and for the important invertebrate assemblage which it supports. All four SSSI's are ecological receptors of National value.

12.82 The Micheldever Oil Terminal SINC encompasses the entire application site as well as approximately 2ha of land south of the application site. The SINC is designated for its species-rich unimproved calcareous grassland. Full details of the species mix and habitat evaluation are presented in the botanical report in Appendix 12-3. The SINC is an ecological receptor of County value.

Identified Ecological Receptors

12.83 Designated sites identified as potential ecological receptors within the zone of influence of the proposed development are outlined in Table 12-1. In total, one SAC and four SSSI's are present within 10km of the application site, and the application site lies within a SINC. A further 14 SINC sites are present within 2km of the application site.

12.84 The principal non-designated ecological receptors that have been identified through survey within the application site and the surrounding zone of influence are:

- nesting Peregrine falcon;
- low population of slow worm;
- potential for roosting bats;
- probable dormouse population;
- commuting and foraging bats;
- breeding bird assemblage; and
- invertebrate assemblage.

12.85 All other ecological receptors of Parish value or below within the zone of influence of the application site are highly unlikely to be affected by the proposed development and are therefore not considered further in this chapter.

12.86 Ecological receptors of below Parish value are not considered further in this ecological assessment, in line with IEEM (2006)[2], except where they are legally protected.

ECOLOGICAL IMPACT ASSESSMENT

12.87 This sub-section assesses the impacts arising from the proposed development and describes how these impacts may adversely or positively affect the flora and fauna of the application site.

12.88 The assessment of ecological impacts follows the process described by the IEEM, which is summarised as:

- identification of the range of potential impacts that may arise from the proposed development;
- consideration of the systems and processes in place to avoid, reduce or mitigate the possible effects of these impacts;
- identification of opportunities for ecological enhancement associated with the proposals;
- assessment of residual impacts, following consideration of the success of avoidance, mitigation and enhancement measures; and
- where necessary, identification of compensation measures required to offset significant residual effects.

12.89 As highlighted in the first part of this , the significance of residual impacts is assessed on three separate levels. These are summarised as:

- impacts upon biodiversity resources;
- consequences in terms of National and local nature conservation planning policy; and
- the legal requirements relating to species and habitats.

12.90 To assess the effects of a proposed development on a receptor it is essential that the range of potential impacts that could arise is identified. The range of impacts that require consideration in the ecological impact assessment are based upon knowledge of the proposed development and knowledge of the receptors (features of ecological sensitivity). This can only be undertaken with a thorough understanding of ecological processes and how flora and fauna react to the range of impacts that could occur.

12.91 This sub-section also outlines the mitigation and compensation measures that have been incorporated into the scheme and, where appropriate, it provides recommendations for further mitigation or compensation that may reduce impacts, or the effects of impacts, further. The final part of this sub-section analyses the significance of the effects of the scheme following mitigation - *i.e.* the residual impacts. The significance of the residual impacts of the proposed scheme is analysed using methods outlined by the IEEM (2006)[1].

The Proposed Development

12.92 The proposed development comprises the construction of an Advanced Conversion Technology (ACT) and an Anaerobic Digestion (AD) plant, with associated access road and retaining walls, weighbridge, offices, gasometers, emergency flare, electricity substation, stacks and digestion tanks. The development comprises a land take of some 1.5ha in total.

12.93 Specific details relating to the construction and operation of the proposed development are detailed in Chapter 3

Identification of Predicted Impacts – Construction

12.94 The following potential construction impacts have been identified and are discussed below:

- habitat loss, fragmentation and isolation through land-take;
- direct and indirect effects upon fauna as a result of habitat loss, fragmentation and isolation, including effects upon protected and notable species;
- alterations to groundwater regime and surface water flow and quality;
- noise disturbance;
- dust deposition on sensitive habitats and fauna; and
- indirect construction impacts on designated sites within the zone of influence.

Habitat Loss, Fragmentation and Isolation through Land-take

12.95 Habitat loss involves direct destruction of, alteration of or physical removal of vegetation, or other structures of conservation interest, such as aquatic habitats, grasslands or some types of bare ground. Habitat loss can result in direct loss of individuals or populations of plant or animal species, or cause other populations to become demographically unstable or unsustainable, due to loss of prey species or habitat niches.

12.96 The proposed development would result in habitat loss or change in habitat type of approximately 1.5ha of the 3ha present within the application site. In total the following areas of each habitat would be lost to the proposals:

• Calcareous grassland	0.75ha
• Scrub	0.4ha
• Bryophyte dominated sward	0.1ha
• Woodland/Tree belt	0.015ha
• Bare sand	0.2ha
TOTAL	**1.465ha**

12.97 The proposed development is largely confined to the lower levels of the application site and the westernmost third would be developed on habitats

developed recently over concrete substrate. The access route enters the application site approximately 1/3 of the way up the eastern boundary (from the southern end) and cuts across the eastern upper grassland, before running down the embankment in a diagonal line to the north of the development site. In order to minimise habitat loss as far as possible, it is proposed to construct retaining walls either side; these would continue around the northern footprint of the development, as shown on Drawing Elevations provided in Volume 1.

12.98 The habitats that would be lost to the proposed development comprise calcareous grassland, scrub, bryophyte sward and bare ground; the overall mosaic of which is considered of County value. The focus of the development on the lower levels in the western half the application site generally avoids the more diverse grassland swards on the upper embankment and in the eastern section of the application site and save for the line of the access route, the majority of the most diverse habitats could be retained within the development. Despite this, loss of habitats to the development would still be considered to be a negative impact on a receptor of County value.

12.99 The designated sites within 2km of the application site are sufficiently well separated from the development and would not be affected by any land take. There would be a neutral impact on ecological receptors of up to International value.

Direct and Indirect Effects upon Fauna through Habitat Loss, Fragmentation & Isolation

12.100 The application site is confirmed as supporting very small numbers of slow worm, small numbers of commuting bats and a (mainly common) breeding bird assemblage. Nesting peregrine has also been recorded on the cliff face just outside of the northern boundary of the application site. Roosting bats and dormouse are assumed to be present within the application site.

12.101 Slow worm is present in two distinct locations, neither of which falls within the development footprint. These locations, on the upper eastern levels of the application site, support diverse and dense grassland with a good build up of thatch. The proposed access route cuts through the eastern part of the application site and therefore also through the suitable habitat, and would remove approximately 0.01ha of suitable grassland sward. The habitats within the main development footprint (buildings and digestion tanks) are considered to be sub optimal for this species, supporting bare ground, bryophytes and a less well established grassland sward. The loss of approximately 0.01ha of suitable grassland sward is considered to be a slight negative impact upon an ecological receptor of Parish value. Slow worm are protected under the WCA from reckless or intentional killing or injury; the clearance of habitat also has the potential to cause an offence under this legislation.

12.102 Construction work would require clearance of 0.3ha of scrub from the development footprint, notably on the western lower levels and on part of the

embankment. The scrub present within the main development footprint is considered sub optimal for dormouse. The scrub present within the footprint of the proposed access route is considered suitable for this species. The loss of scrub from the proposed access route (approximately 0.1ha) could result in loss of habitat for this species and this would be considered a negative impact upon a receptor of County value. This species is also a European Protected Species (EPS) and therefore, the removal of nesting habitat could only be undertaken under an EPS licence from Natural England.

12.103 Access route construction would require removal of a small number of mature beech trees from the eastern site boundary. The proposed access route enters the site in the vicinity of tree T23 and the removal of T22 - T24 would be required, none of which are Cat 1 trees. To facilitate the visibility splay pruning works to beech trees either side of the access route would be required. Where a Cat 1 tree is due for works which would affect potential roosts sites these trees would be subject to additional survey, such as climb and inspect or dawn re-entry survey. The loss of these trees, if found to support bats, would be a negative impact upon an ecological receptor of up to County value. All species of British bats are EPS and as such, if their presence is confirmed, the removal of any trees supporting bat roosts would require an EPS licence issued by Natural England.

12.104 The remainder of habitats within the application site are not assessed as being important for local populations of bats. Habitats that were recorded as being utilised by low numbers of foraging bats are not due to be lost to the development proposals and as such, a neutral impact upon an ecological receptor of Parish value would be predicted.

12.105 There are no plans to directly affect the cliff face north of the application site and the nesting peregrines would not be directly affected by habitat loss. Peregrines feed on medium sized birds, which are taken in the air, and as such do not require areas of open grassland for hunting. The loss of the grassland and the scrub mosaic to development would not therefore directly affect this species. As such a neutral impact upon an ecological receptor of National value would be anticipated, in respect of habitat loss.

12.106 The nesting bird assemblage within and around the application site was largely recorded from habitats along and outside the application site perimeter, with only a few species being recorded nesting within scrub in the central part of the application site. In total 0.3ha of the available 1ha of scrub would be removed as part of the development proposals. Suitable nesting habitat for common bird species is abundant in the locality and it is considered overall that loss of 0.3ha of nesting habitat would be a neutral to minor negative impact upon an ecological receptor of Parish value. All nesting birds are protected under the WCA during the nesting season (generally considered to be from March – August), from killing, injury, taking and destruction of nests. The removal of nesting habitat during the nesting bird season would therefore not be permitted under the WCA.

12.107 Only two of the fourteen key species and one of the UK BAP species of invertebrate were recorded solely from the lower compartment, where the majority of development is proposed. These species are the RDB1 fruitfly

Campiglossa malaris, the Nationally scarce *Micromorphus* species C Dolichopodid fly and the UK BAP Small Heath. Although only recorded during this survey in the lower compartment, the upper and southern compartments have the potential to support this species given the presence of suitable larval and adult food plants and the mosaic of grassland and scrub habitats, required to support these three species. The loss of habitat to the proposed development would be a minor negative impact upon an ecological receptor of Parish value.

Alterations to Ground Water Regime and Surface Water Flow and Quality

12.108 This assessment has not identified any changes to the groundwater or surface water regime which would adversely affect habitats or species within the application site.

12.109 The substrate of the land within the application site is concrete on the lower levels of the western half of the application site which is already generally impermeable to water. As such, alterations to ground water are likely to be minimal. Notwithstanding this, good practice measures to minimise risk of surface and groundwater contamination would be implemented during construction, including use of oil spillage kits and appropriate storage of construction materials. Further information is presented in Chapter 9 Water Environment.

Noise and Visual Disturbance

12.110 Different types of disturbance could potentially affect a number of species that occur within the application site. The effects of disturbance upon species are complex, because species show differing responses to disturbance and in many cases they are able to habituate to low levels of disturbance. In general, proximity to source, intensity, duration and frequency of disturbance are the main factors that will affect the severity of an impact.

12.111 Increased levels of noise and visual disturbance (caused by increased traffic or the construction of buildings within bird and bat flight lines, for example) have potential to have an adverse negative effect on the existing wildlife value of the application site. This is likely to be most significant for disturbance to sensitive species, notably birds.

12.112 The proposed development has the potential to cause disturbance to nesting peregrine falcon. This species is already nesting in an area subject to continuous / intermittent noise and visual disturbance, caused by traffic movements along the A303 as well as sporadic movement of trains along the railway line. The species has therefore already accommodated some disturbance and has nested in close proximity to the sources of disturbance despite this. However, it is considered unlikely that the noise and visual disturbance caused as a result of the proposed development, including the disturbance caused by the excavation of foundations, presence of humans and vehicles in closer proximity to the nest than currently experienced, as

well as the use of cranes, would be accommodated by this species and the potential exists for the nest to be abandoned as a result or for the nest site not to be reused in future. Although impacts are predicted as a result of construction, these are considered to be temporary and would cease when construction is completed. This would be considered as a temporary negative impact upon an ecological receptor of National value. As peregrine is a Schedule 1 species under the WCA, it would also be a criminal offence to disturb this species or its dependent young whilst nesting.

12.113 Potential also exists for disturbance to the wider nesting bird assemblage and this would be considered to be a temporary negative impact upon an ecological receptor of Parish value.

12.114 A full assessment of potential noise impacts has been undertaken and is presented in Chapter 8 Noise.

Dust deposition on sensitive habitats and fauna

12.115 The closest part of the River Itchen SAC is located 9.5km west of the application site. Although construction of the proposed development has the potential to create dust and other wind blown particles, it is considered that this SAC is sufficiently well separated from the site by distance, development and semi-natural habitats, whilst also being outside the line of prevailing south-westerly winds; thus a neutral impact upon this ecological receptor of international value is anticipated.

12.116 Micheldever Spoil Heaps SSSI is located within 100m of the northern boundary of the application site. Again, the potential exists for dust created from the construction of the proposed development to impact upon this SSSI; however the SSSI is located to the north, away from the prevailing winds which would minimise the amount of dust blown towards it. In addition, the SSSI is located adjacent to the A303 and a grain depot, both of which probably already create dust and wind born particles which impact upon its conservation interest. Therefore it is considered unlikely that dust created during the construction would significantly impact upon the SSSI and as such a neutral impact upon an ecological receptor of National value would be predicted. No impacts are predicted upon the other three SSSI's located within 10km of the application site.

12.117 The application site lies within Micheldever Oil Terminal SINC. The dust created during construction of the proposed development has potential to impact negatively upon retained habitats within the application site (calcareous grassland) as well as the area of SINC located outside the application site. Although impacts are predicted as a result of construction, these are considered to be temporary and would cease when construction is completed. As such this would be considered to be a temporary negative impact upon an ecological receptor of County value.

12.118 Although dust suppression methods significantly reduce the deposition of dust in the locality they cannot wholly eliminate it. The main period of dust generation arising from the development proposals would be during the

construction period when standard suppression techniques would be used to reduce any effect that may occur over this short time period. Dust suppression techniques are further discussed in Section 7 Air Quality.

Indirect construction impacts on designated sites within the zone of influence

12.119 Indirect construction impacts upon Micheldever Oil Terminal SINC have been discussed in the relevant section above.

12.120 No indirect impacts upon designated sites as a result of the construction of the proposed development have been identified.

Identification of Predicted Impacts – Operation

12.121 The following potential operational impacts have been identified and are discussed below:

- noise and visual disturbance;
- alterations to ground and surface water quality;
- dust and litter arising from the transportation of waste;
- dust and aerial contaminants arising from the operation the facility; and
- indirect operational impacts on designated sites within the zone of influence.

Noise and Visual Disturbance

12.122 From the noise assessment the operation of the proposed facility would produce noise levels below that of the current level of background noise at the application site. Although the plant would operate for 24 hours a day and therefore produce noise during the hours of darkness, the application site is located in close proximity to the railway line and A303, which both produce noise levels 24 hours a day. As such, the level of noise created is considered unlikely to impact upon any features of ecological value within and around the application site, and as such, no impact as a result of noise is predicted. The noise created by the proposed development is further discussed in Chapter 8 Noise.

12.123 Operation of the facility would be a 24 hour process and it is likely that, due to the presence of members of staff 24 hours a day, the level of artificial lighting during the hours of darkness may increase, from its current low level (which is already experienced at the application site as a result of the adjacent rail sidings). An increase in artificial lighting during the hours of darkness is most likely to have an impact upon nocturnal species, particularly bats, but possibly also on species such as nesting Peregrine.

12.124 No important commuting routes for bats were identified during the baseline surveys and it is highly unlikely that the application site is ever important or critical for local populations of bats (the trees and woodland along the north

eastern edge of the application site are confirmed as supporting commuting routes for only small numbers of bats). All artificial lighting, particularly that along the eastern and northern edge of the proposed facility would be restricted to the minimum required for health and safety and utilise low level, directional sodium lamps so as to reduce the amount of light spill. In this way, a darkened commuting corridor along the woodland edges would be maintained for bats and thus a neutral impact upon an ecological receptor of less than Parish value would be maintained.

12.125 Peregrine are well documented to show a strong bond with a successful breeding site and territory, and they are showing increasing tolerance of man and his activities, with successful breeding attempts recorded within the urban environment on pylons, bridges, church spires and other tall buildings[12]. As such, it is anticipated that should Peregrine chose to return to the nest site on the cliff face, that the level of noise and visual disturbance would likely be tolerated by this species, provided that the cliff face is not directly illuminated. A neutral impact upon a receptor of National value is anticipated.

Alterations to ground and surface water quality

12.126 The site is designed such that all storage of waste and residues would take place within the confines of the building, the floor of which would be impervious and positively drained. The drained floor would be designed to flow into the overall site drainage system associated with the proposed development. There would be no effect on groundwater and surface water quality. This is considered further in Chapter 9, Water Environment.

Dust and litter arising from the transportation of waste

12.127 Waste streams to be treated in the facility would be transported to the site in enclosed or covered vehicles and stored within the building. The likelihood of any release of waste into the surrounding habitats is considered highly unlikely.

12.128 The habitats within the application site and wider study area including calcareous grassland and scrub would therefore not be subject to contamination from the haulage of either the waste or residues/recyclate resultant from the process; a neutral impact upon receptors of up to County value has therefore been predicted.

Dust and aerial contaminants arising from the operation the facility

12.129 During the operational life of the facility, the main dust generating activities would be confined to the shedding of waste in the waste reception area. This would take place within the building with active measures in place to prevent dust escaping from the building, as described in Chapter 3. Habitats within the application site and wider study area would not therefore be subject to

[12] Dixon, N. 2000. *A new era for Peregrines – Buildings, bridges and pylons as nest sites*. BTO News 229.

any wind-blown dust. This would result in a neutral impact upon ecological receptors of up to County value in the surrounding area.

12.130 Any dust created as a result of the treatment of waste would be filtered out of the air released from the flue stack. No significant particulate matter would be released from the facility. The habitats within the application site would not therefore be subject to impacts from wind-blown dust. This would result in a neutral impact upon ecological receptors of up to County value.

12.131 Numerous stages of emissions filtration would be put in place to reduce gases and other aerial contaminants released from the ACT flue, including a fabric filter, to below minimum threshold values and therefore habitats within the application site and wider study area would be unlikely to suffer detrimental impacts as a result of any gases or particulates released, resulting in a neutral impact upon receptors of Parish value.

Indirect operational impacts on designated sites within the zone of influence

12.132 The deposition of gases resulting from the facility has been modelled and no measurable impact upon Nationally designated sites, located within the 10km area around the application site are anticipated. The closest statutorily designated site to the proposed development is Micheldever Spoil Heaps SSSI. The predicted emissions from the facility are less than 1% of the applied critical level for NOx and less than 2% critical level for SO_2 (which is less than 20% of the critical load for habitats in the SSSI) when typical operating hours and emissions are considered. Further information regarding this dispersion model is presented in Section 7: Air Quality. A neutral impact upon features of National importance is therefore predicted.

12.133 The deposition of gases upon the Micheldever Oil Terminal SINC has also been modelled. The predicted emissions from the facility are less than 1% of the applied critical level for NOx and less than 3% critical level for SO_2 (which is less than 50% of the critical load for habitats in the SINC) when typical operating hours and emissions are considered. A neutral impact upon a receptor of County value is therefore predicted.

12.134 The potential exists for indirect impacts upon Micheldever Oil Terminal SINC as a result of the operation of the facility. These impacts are largely associated with the human presence at the site.

Mitigation Measures

12.135 This sub-section outlines the suite of mitigation measures to be adopted, in addition to a range of further recommendations for practical and reasonable enhancement measures.

Compensation for Habitat Loss

12.136 In total, approximately 1.5ha of the 3ha habitat within the application site is due to be retained and protected during construction and operation of the proposed facility. Where the loss of habitat is unavoidable within the development footprint, it is proposed that habitat relocation is undertaken in order to maintain the sward and species mix.

12.137 A green roof has been included within the design of the main building to help compensate for loss of calcareous grassland. The green roof would be mostly vegetated using the existing seed bank, which would contain propagules and root fragments which would form the basis for the new plant community. A specific methodology for this feature would be prepared that would in outline comprise i) removal of existing grassland within the development footprint and the thin soils upon which this has developed using the blade of an excavator or equivalent, followed by ii) soil storage in bunds in an undisturbed area of the application site and iii) spreading these soils across the green roof upon its construction. Soils are likely to require spreading at an approximate rate of 1ha of donor soil over an area of 2ha of receptor site. Careful consideration would be given in the design of the roof in respect to base substrate and drainage; it would aim to mimic the existing thin and sharply draining soil profile present. Some areas of base substrate on the green roof would be left for natural colonisation. In total 0.75ha of calcareous grassland would to be lost to the proposals and it is anticipated that approximately 0.5ha of calcareous grassland could be reinstated upon the green roof.

12.138 In addition, an area of approximately 0.25ha of land is located within the application site, to the north of the development footprint. This area currently supports bryophyte dominated ground, scattered scrub and dense scrub. This land would be used for the re-instatement of an area of calcareous grassland, following the removal of scattered scrub (during the winter months to avoid the nesting bird season) and preparation of the ground to mimic the thin chalk soils. The methodology for creating the grassland on the green roof would then be applied to this area. This would result in the re-instatement of approximately 0.25ha of calcareous grassland.

12.139 With reference to the Micheldever Oil Terminal SINC designation from 1992; it is clear that the existing grassland is contracting in area, having suffered from scrub encroachment over the past 20 years. Whilst rabbit grazing will be slowing scrub invasion in many areas, rabbit populations are known to be subject to periodic outbreaks of Myxymatosis, and during such events scrub would be expected to increase in extent. Once scrub is fully established across the site, nutrient enrichment associated with increasing levels of leaf

litter would make re-establishment of species-rich grassland difficult. In order to secure retained species-rich grassland communities in the long-term, it is proposed that a conservation management programme, focussing on scrub clearance, be implemented in selected areas post-planning. The introduction of a conservation management programme would result in a positive impact upon an ecological receptor of County value.

12.140 Retained habitats would be fenced off and regular access by staff and visitors to the site would be discouraged. Access where strictly necessary for maintenance or health and safety would still be permitted, along with access for conservation management.

Surface Water Contamination

12.141 The risk of accidental spillages would be mitigated through off-site storage, inspections, maintenance of vehicles and pumps, and the formulation of a spill response plan.

12.142 Mitigation measures relating to surface water contamination are discussed fully in Chapter 9.

Mitigation and Avoidance for Protected and Notable Species

Slow worm

12.143 In order to minimise the potential for impacts upon individual slow worms, it is proposed that a scheme of habitat modification is introduced prior to any ground preparation works. Habitat modification would comprise the phased removal of suitable habitats, namely grassland, by or under the direction of a suitably qualified ecologist. Modification would be carried out from within the development footprint towards the eastern grassland habitats, in order to encourage slow worms to migrate in this direction. Modifications would ideally be timed to be undertaken during periods of the day and weather conditions where slow worms would be most active (notably the middle part of the day during warm sunny weather). Where slow worms are recorded in habitat to be modified, their movement by hand may also be necessary.

12.144 No enhancements for slow worm are proposed at this stage as the habitats to be retained already support a breeding population of this species. However, in order to aid the movement of slow worms across the proposed access route, to maintain connectivity, it is recommended that dropped kerbs be installed at regular intervals under the access road and that there is at least one corridor through the development which supports re-instated calcareous grassland, enhanced with rubble and reptile refugia.

Bats

12.145 All Cat 1 trees required to be removed to facilitate the access route / visibility splay would be subject to a climbing inspection by a licensed bat ecologist at an appropriate time of year. In the event that roosts are found, bats would need to be first excluded prior to felling / surgery under the aegis of an EPS

licence and an appropriate method statement. Mitigation for roost loss would include such measures as fitting one-way exclusion devices prior to felling or surgery; 'soft-felling' limbs (i.e. lowering to the ground and leaving in situ for a 24 hour period for bats within crevices to disperse); provision of 20 bat boxes of various types (wooden, woodcrete, crevice, cavity and hibernation boxes) and retention of the original roost feature where possible by strapping cut sections to retained trees within the tree belt so as to maintain the overall roost resource available.

12.146 No external lighting would be used in the vicinity of any roost feature. Use of artificial lighting would be controlled in the vicinity of semi-natural habitats. Lighting in these parts of the site would be cowled and/or directional to minimise spill. Security lighting would be motion triggered.

Dormouse

12.147 An EPS licence to facilitate the removal of dormouse habitat would be applied for. The EPS application would comprise surveys, a method statement designed to protect dormouse during habitat removal and mitigation for the loss of dormouse habitat. Standard methodologies would be followed in this plan, with above ground habitat removed during the winter period and below ground habitat, such as root stumps removed in May to avoid any hibernating individuals. It is proposed that 0.3ha of scrub would be lost to the proposed development, of which approximately 0.1ha is considered optimal (in the eastern section of the site). This scrub habitat would ideally be replanted within the application site, using species suitable for dormouse and appropriate to the substrates and species already present. However, a balance would have to be struck between replanting of dormouse habitat, without impacting upon the existing calcareous grassland. In this the re-planted dormouse habitat would be incorporated into the conservation management programme, outlined in paragraph 12.140 above, so as to only replace dormouse habitat in areas where sub optimal scrub species have already been removed.

Breeding Birds

12.148 Construction activities likely to disturb nesting peregrine falcon would commence outside the nesting season, which is typically February to June, so as to avoid disturbance during the breeding season. If the birds then choose to nest at the cliff face to the north of the application site following start of works it would be assumed that disturbance levels are tolerable to this species.

12.149 It is proposed to incorporate at least three artificial Peregrine nest sites within the development. Two of which would be attached to the western aspect of the main building, one at each end. The third would be attached to the flue stack in a south east facing direction. The box in this location would be attached in such a way that it was not directly touching the chimney stack, to minimise the transfer of any fluctuations in heat from the chimney to the nest box. This would provide alternative nesting sites, in addition to the cliff face already present.

12.150 To avoid destruction of any wild bird nests, scrub or trees would be removed outside the breeding season (March to August) where possible. If active bird nests are observed in any habitat scheduled for destruction, operations within that area would cease immediately and would not recommence until the breeding attempt has concluded to avoid committing an offence.

Invertebrates

12.151 The creation of a green roof utilising the existing substrates and seed bank from the application site would serve to re-instate the majority of invertebrate habitat due to be lost to the proposed development. The introduction of the conservation management plan would also be of benefit to the invertebrate assemblage present, increasing the available habitat for colonisation. Overall, this would be a positive impact upon an ecological receptor of Parish value.

12.152 In addition, features designed to support solitary bees would be installed within the retaining wall at the northern end of the development. Such features can be purchased ready made, or constructed from wooden blocks sunk into the wall in which holes measuring between 2 – 10 mm have been drilled.

Potential Additional Ecological Enhancements

12.153 Installation of information boards, detailing the wildlife present and the ecological value of the habitats around the application site would be installed as part of the development. This would serve to further explain the reasoning for preventing public access to the remaining SINC habitats by staff or visitors to the site.

MAGNITUDE AND SIGNIFICANCE OF RESIDUAL IMPACTS

12.154 The predicted impacts of the proposed development, following mitigation, *i.e.* the residual impacts, are assessed using the following criteria, based upon current IEEM guidance. In order to provide an objective assessment of the nature of each impact, descriptors set out in Table 12/3 are used.

12.155 To fully evaluate the effects of a predicted impact upon valued ecological receptors it is necessary to assess the significance of the impact upon that feature. Significance is assessed at the geographical scale at which the feature is considered important. For instance, the loss of the majority of a hedgerow resource within a site, which is assessed as being of local value, would be significant at the local scale. The loss of a small area of a nationally designated site may not be significant at a National level if the loss did not affect the integrity of the site. However, the loss may be significant at the County or local scales, if the features lost were rare in that geographical context. In most cases, the range of significance levels is determined by careful consideration of factors such as existing baseline, ecological context of the proposed development, predicted trends (ecological succession and

factors affecting it), probability of effects occurring and the likely effectiveness of the proposed mitigation measures.

12.156 Residual effects are only considered for those ecological features assessed as being of Parish or greater value. Features of less than Parish value are excluded from the assessment.

12.157 Table 12/4 shows the predicted residual effects of the proposed development of the application site.

Table 12/3 – Key Considerations when Characterising Impacts

	Descriptor	Definition[4]
I	Direction of impact	Positive or negative impact
II	Probability of occurring	Broadly defined on 3 levels: Certain, Probable or Unlikely
III	Complexity	Direct, Indirect or Cumulative
IV	Extent and Context	Area/number affected and % of total
V	Magnitude	Describe severity of effect in words
VI	Duration	Permanent or Temporary in ecological terms (e.g. within the lifetime of the species affected)
VII	Reversibility	Whether or not the effect can be reversed in an meaningful timescale

[4] Definitions for these terms and further information relating the methods of assessment are given in Guidelines for Ecological Impact Assessment (IEEM, 2006)

Table 12/4
Residual Impact Assessment

Important Ecological Feature	Description of Potential Impact	Characterisation of Impact	Ecological Significance of Impact if unmitigated	Mitigation and Compensation Proposals	Residual Impact following Mitigation and Significance
River Itchen SAC	Indirect effects caused by dust, aerial pollutants and particulate matter	I Neutral II Unlikely III Indirect IV one V Low VI Temporary and permanent VII Reversible and irreversible	Neutral National	None required	Not significant
Micheldever Spoil Heaps SSSI and three other SSSI's within 10km	Indirect effects caused by dust, aerial pollutants and particulate matter	I minor negative II Unlikely III Indirect IV up to 4 V Low to high VI Temporary VII Reversible and irreversible	Minor negative National	Implementation of Air quality management plan.	Not significant
Micheldever Oil Terminal SINC	Direct effects as a result of habitat loss	I Negative II Certain III Direct IV 0.75ha of 1.4ha within the application site V High VI Permanent VII Irreversible	Negative at County level	Retention of remaining habitats and management to increase calcareous grassland Re-instatement of grasslands on green roof and implementation of conservation management plan to remove and manage encroaching scrub to aid grassland re-instatement throughout application site. Restriction of public access to retained	Minor negative - Overall loss of approximately 0.25ha of calcareous grassland (not including potential areas re-instated through scrub management)

Important Ecological Feature	Description of Potential Impact	Characterisation of Impact	Ecological Significance of Impact if unmitigated	Mitigation and Compensation Proposals	Residual Impact following Mitigation and Significance
				habitats	
	Indirect effects caused by dust, aerial pollutants and particulate matter	I Negative II Probable III Direct IV entire of remaining site V low VI Permanent or temporary VII Reversible or irreversible	Negative at County value	Dust suppression techniques	Not significant
Slow Worm	Removal and fragmentation of habitat which supports low population of slow worm	I Negative II Probable III Direct IV Approx 0.01ha of suitable habitat V medium VI permanent VII Irreversible	Negative at Parish level	Slow worm habitat displacement Habitat management to enhance retained habitats Creation of grassland wildlife corridor through site	Not significant
Bats (roosts assumed present)	Removal of Cat 1 trees	I Negative II Probable III Direct IV definitely 1 of 7, potentially 3 of 7 V low VI permanent VII Irreversible	Negative at Parish level	Climb and inspect survey Licensed exclusion and (soft) felling / surgery under EPS licence. Relocation of suitable roost features onto retained trees Installation of 20 bat boxes	Not significant

Important Ecological Feature	Description of Potential Impact	Characterisation of Impact	Ecological Significance of Impact if unmitigated	Mitigation and Compensation Proposals	Residual Impact following Mitigation and Significance
	Installation of artificial lighting	I Negative II Probable III Direct IV small bat population V low VI temporary or permenant VII Reversible	Negative at Parish level	Installation of cowled directional lighting, angled away from semi-natural habitats. Security lighting triggered by movement	Not significant
Dormouse (assumed present)	Loss of nesting habitat and connectivity across application site	I Negative II Probable III Direct IV approx 0.1ha of suitable habitat V high VI permanent VII Reversible	Negative on a County level	Implementation of EPS licence and mitigation strategy to include cutting scrub at least-sensitive time of year (winter) and replacement habitat planting.	Not significant
Peregrine falcon	Disturbance of nesting peregrines	I Negative II Probable III Direct IV one breeding pair V high VI permanent VII Irreversible	Negative on a National level	Commencement of development outside of peregrine nesting season Installation of 3 artificial nest sites to secure nesting pair on site in long term	Not significant
Nesting birds	Removal of habitat with the potential to support nesting birds	I Negative II Likely III Direct IV 0.3ha of available 1ha scrub	Negative at Parish level	Removal of habitat outside of nesting season or following survey and fencing off nest sites if required by a suitably qualified ecologist.	Not significant

Important Ecological Feature	Description of Potential Impact	Characterisation of Impact	Ecological Significance of Impact if unmitigated	Mitigation and Compensation Proposals	Residual Impact following Mitigation and Significance
Invertebrates	Removal of habitat known to support invertebrate assemblage	V Low to high VI permanent VII Reversible Negative II Likely III Direct IV 1.5ha of available 3ha V Low VI permanent VII Reversible	Negative at Parish level	Reinstatement of green roof Introduction of conservation management programme to improve retained habitats for use by invertebrate assemblage Installation of solitary bee habitat within northern retaining wall	Not significant to minor positive

CONCLUSION

12.158 This section presents an ecological impact assessment, following guidelines published by IEEM (2006), on the likely effects upon flora and fauna for the proposed development of an ACT and AD facility at Micheldever Station, Hampshire.

12.159 In 2012, an Extended Phase I Habitat survey of the application site was undertaken. The application site was surveyed using the extended Phase I methodology, as recommended by the former IEA and IEEM. In addition, a detailed survey of the grassland botanical resource was undertaken, along with work on bats, reptiles, birds and invertebrates. Adaptations of best practice guidelines for bat have been identified in the relevant locations within the EcIA and Technical Appendix. Best practice guidelines were followed for all other survey work undertaken at the site.

12.160 The application site is wholly contained within Micheldever Oil Terminal SINC and comprises calcareous grassland, scrub and bare ground mosaics.

12.161 The ecological evaluation identified the following receptors of ecological importance within the application site:

- Micheldever Oil Terminal SINC supports species-rich calcareous grassland plant communities;
- Slow worm;
- roosting bats in trees assumed present for the purposes of mitigation;
- commuting / foraging bats;
- Dormouse assumed present for purposes of mitigation (present locally);
- Nesting peregrine falcon;
- Nesting birds; and
- Invertebrate assemblage

12.162 The habitat receptors have been identified for the range of functions they provide to fauna species as well as their inherent value as semi-natural habitats.

12.163 The assessment of impacts upon receptors within and around the application site have identified a range of potential impacts, *i.e.* habitat loss, fragmentation, hydrological, dust, noise and visual impacts; that could result from the construction and operation of the proposed development. The ecological receptors have been assessed against these impacts to identify the likelihood of significant ecological effects.

12.164 Mitigation measures have been devised to avoid, minimise or compensate for potential impacts upon plant communities, slow worms, bats, dormouse, invertebrates, peregrine falcon and birds, specifically in regard to habitat loss and noise and visual disturbance.

12.165 The implementation of operational good practice with regard to dust suppression, protection of surface water, minimisation of noise and visual disturbance would ensure that there would be no significant adverse effects upon flora and fauna associated with the site whilst the development is being constructed or operated

12.166 Residual impacts of the proposed development have been highlighted with specific regard to habitat loss from the Micheldever Oil Terminal SINC. Residual habitat loss associated with Micheldever Oil Terminal SINC has been quantified at 0.25 ha of calcareous grassland, although this does not take into account areas of calcareous grassland which could potentially be re-instated as part of the proposed conservation management programme, which at this stage are not quantifiable. The implementation of the conservation management plan would help to secure the presence of calcareous grassland at the SINC into the long term. At present this residual impact is considered to be of minor significance in the short term.