

SECTION 6 - ECOLOGY

6.1 INTRODUCTION

Basis

6.1.1 In this section, the ecology of the proposed extension area (the Site) is described, a nature conservation assessment is made of species and habitats, and potential sources of ecological impact are identified and the potential effects of the proposed development are described. The possible significance of these effects is evaluated, mitigation measures are discussed and any residual effects following mitigation are identified.

6.1.2 English names of species are used throughout the text.

Scope of Survey

6.1.3 Work undertaken for the ecological assessment comprised:

- Desk based review of local nature conservation designations and search for existing records
- Field survey of the Site, recording and mapping habitats using the standard Phase 1 habitat survey technique; plant recording; and surveys for protected species, undertaken on 4 and 5 July 2006
- Great Crested Newt surveys of the single pond within the Site and five ponds outside of the Site where undertaken in the period mid-April to late May 2007.

6.1.4 The nature conservation value of habitats and species are evaluated on a national (UK) and local (Lincolnshire) basis using published nature conservation criteria commonly used in Site assessment.

Method of Impact Prediction

6.1.5 In order to predict and evaluate the potential ecological impact of the proposed development, the plans of the working scheme were compared to the ecological resource of the Site and surroundings.

6.1.6 The overall significance of the ecological impact depends on both the magnitude of the impact and the ecological importance of the habitats and/or species directly or indirectly affected.

Sources of Information

6.1.7 The information contained within the assessment of baseline conditions and used in preparing this Section of the ES has been obtained from the following sources:

- the ecological surveys conducted in July 2006 and April-May 2007 for the EIA
- information on nearby designated sites obtained from English Nature and

Lincolnshire Wildlife Trust (LWT)

- information on existing records of protected species obtained from the Lincolnshire
- Naturalists' Union (LNU)

6.2 BASELINE

6.2.1 Broad nature of the Site and adjacent land.

6.2.2 The Site comprises 9 fields (Figure 6.1). There are two blocks of three fields each, one block to the north of the other, and a further block of three smaller fields attached in the east. Field boundaries are hedges and/or ditches. The fields are improved grassland, rough grassland arising from the land being put into set-aside or arable, and also present are areas of game cover crop, tree plantings, broad-leaved and conifer woodlands and a fishing pond. The old farm of Middle Manton stands in the south-eastern corner of the Site.

6.2.3 To the east, beyond the rough track which leads to Middle Manton, there are arable fields with field boundary hedges and ditches; an area of fenced grassland paddock with a stable; a large wooded garden with conifers; rough grassland; and scrub and broad-leaved woodland. Beyond the arable there is extensive broad-leaved woodland. To the north beyond the minor road (Brigg Road) from Greetwell to Messingham there are broad-leaved woodland; Greetwell Hall Farm; set-aside arable; game cover crop and new tree planting.

6.2.4 To the west there is arable; houses and gardens; horse paddocks; and (on the other side of Brigg Road) the broad-leaved woodland of Broom Plantation. To the south there is a wide grassy track with parallel drain; sand and gravel workings; arable land with a boundary track; a broad-leaved copse and an area of dense bracken.

Site Boundaries

6.2.5 The eastern boundary from Brigg Road south to Middle Manton is a sandy track with grass verges and a grassy strip down the centre (photograph 9). The northern half of the track has low, more or less continuous hedges on each side, which have some new shrub plantings and small trees. The southern half of the track has only scattered bushes which thicken up to the south. Tree and shrub species are hawthorn, sycamore, pedunculate oak, silver birch, hazel, dog rose and elder. The grassy verges support cocksfoot, Yorkshire fog, common ragwort, red fescue, smooth hawksbeard, false oat-grass, common nettle, creeping thistle, perennial rye-grass, creeping buttercup, soft brome and ribwort plantain. South of Middle Manton the boundary is a mown and worn grassy sandy track.

- 6.2.6 The northern boundary is a hedge along the southern side of Brigg Road (photograph 5 (southern hedge side)). The hedge is virtually continuous with only small gaps (newly planted up), and it is dominated by hawthorn; also present are dog rose, elder, white bryony, hedge bindweed, elder, bramble and small oak trees. The hedge bottom flora includes mugwort, false oat-grass, cocksfoot, common nettle, hemlock, barren brome, hogweed, red fescue, goatsbeard, common couch, bracken, Yorkshire fog and a small amount of sand sedge.
- 6.2.7 Adjacent to Brigg Road the western boundary is a partly gappy hedge of hawthorn, blackthorn, bramble, grey willow, dog rose and oak trees. A remnant fence and dry ditch are also present. The hedge bottom flora includes white bryony, wood sage, bramble, false oat-grass, common nettle, Yorkshire fog, creeping thistle and cocksfoot. The remainder of the western boundary is a partly remnant fence and dry ditch (which becomes wet to the south) with scattered oak trees and bushes of grey willow, dog rose and hawthorn.
- 6.2.8 The east end of the southern boundary, against the arable field, is a stand of tall dense bracken with false oat-grass, common couch, hogweed and cleavers (photograph 12). Moving west the boundary becomes an open and scattered line of mature sycamore trees with scrub of elder, hawthorn, common gorse, grey willow and oak trees (photograph 17). The density of the trees thickens up to the west. A fence and dry ditch are also present. Beneath the trees are tall herbs, comprising dominant common nettle, also bracken, common ragwort, rough meadow-grass, broad-leaved dock, bramble, hogweed, rosebay willowherb, Yorkshire fog and creeping softgrass. The southern boundary in the west is a ditch, dry except at the western end where shallow water occurs with bulrush, grey willow, soft rush, greater birds-foot trefoil, square-stalked St Johns wort, branched bur-reed, gipsywort, great willowherb, marsh horsetail and meadowsweet. Running parallel to the ditch and on its southern side is a fence. There is much common gorse on the southern ditch bank and only scattered gorse on the north. The ditch banks support brambles and grassland of false oat-grass, rosebay willowherb, Yorkshire fog, common bent, common ragwort, wood sage, creeping softgrass, sheep's sorrel, cats-ear, smooth meadow-grass, and common cudweed. There is short scorched grassland on the south facing slope of the north ditch bank (photographs 22 & 23).

Site Habitats

- 6.2.9 For ease of description the 9 fields which make up the Site have been numbered 1-9 as given in Figure 6.1.
- 6.2.10 Field 1 is improved grassland of perennial rye-grass, and red and white clovers. An area of game cover (maize) is in the south. Field edge weeds include field forget-me-not, white campion, weld, storksbill, sheep's sorrel, black bent, squirrel tail-fescue, common

poppy, long-headed poppy and common fiddleneck. The northern and western boundaries of this field are the Site boundaries described above. The eastern boundary is a dry drain (photograph 2). The drain banks are tall herbs and coarse grasses of hogweed, false oat-grass, common nettle, cocksfoot, creeping thistle, mugwort, bramble, common reed, cleavers and Yorkshire fog. The channel has common reed abundant in the southern three-quarters and elsewhere are water figwort, great willowherb, soft rush, common rush, grey willow and osier. The southern boundary of field 1 is a hedge with trees and a dry ditch (photograph 1). In the hedge are hawthorn, oak, grey willow and bramble. The hedge bottom flora includes false oat-grass, red fescue, Yorkshire fog, white dead-nettle, barren brome, creeping softgrass and bramble.

- 6.2.11 Field 2 is improved grassland like field 1 and it too has an area of game cover maize in the south. The western boundary is shared with field 1 and the northern is that of the Site itself. The southern boundary of this field is a partly dry ditch (the channel has shallow open water in the eastern half) which supports common reed, meadowsweet and great willowherb (photograph 3). There are scattered bushes on the banks which become more continuous to the east; the species are hawthorn and elder. The banks are dominated by tall herbs and coarse grasses, including rosebay willowherb, Yorkshire fog, false oat-grass, hogweed, common nettle, hemlock, bramble, creeping thistle, common reed, common ragwort and wood sage.
- 6.2.12 The eastern boundary of field 2 is a grassy track with a parallel hedge which has a wet ditch on its eastern side (photographs 4 & 6). The hedge supports hawthorn, bramble, dog rose and white bryony, over false oat-grass, common nettle, cocksfoot, barren brome, Yorkshire fog and common ragwort. Small gaps in the hedge have been planted up. The ditch has shallow flowing water and it supports great willowherb, soft rush, clustered dock, branched bur-reed, meadowsweet, creeping bent, water starwort, brooklime, water mint, pink water speedwell, water forget-me-not and water plantain. The ditch banks support tall herbs and coarse grasses, typically false oat-grass, common nettle, hogweed, common couch, cleavers, rosebay willowherb and barren brome. There are occasional small bushes of dog rose, grey willow, hawthorn and bramble on the ditch's eastern bank and occasional small grey willow in the channel.
- 6.2.13 Field 3 is improved grassland like field 1 and it has two areas of game cover crop, one along the western side and one in the centre. The northern boundary is that of the Site itself (Photograph 5) and the western boundary (Photograph 6) is shared with field 2. The western boundary is a ditch with shallow water supporting great willowherb, bulrush, bittersweet, soft rush, pink water speedwell and common duckweed (photograph 8). The banks are dominated by tall herbs and coarse grasses, similar to those of the banks of the field's western boundary. Scattered to locally dense shrubs with one old coppiced oak tree occur on the western banks, comprising elder, bramble, hawthorn, hazel and

dog rose. There has been some recent new planting of hawthorn. The southern boundary of field 3 is a ditch with shallow open water supporting great willowherb, brooklime and water figwort (photograph 7). There is a gappy hedge on the northern bank of hawthorn, apple, elder, hazel and two oak trees. New hawthorns have been planted. The banks are dominated by rosebay willowherb with bramble, false oat-grass, common nettle, Yorkshire fog, barren brome and common ragwort.

- 6.2.14 Field 4 is triangular and partly tree planting (of birch, hawthorn, oak, larch, field maple, ash, elder and hazel), partly a fishing pond (photograph 21), and partly tall rough grassland (photograph 20). The grassland is dominated by false oat-grass and also present are Yorkshire fog, common nettle, common couch, hogweed, red fescue, cocksfoot, smooth meadow-grass, common ragwort, meadow foxtail and ribwort plantain. There is much accumulated plant litter. Small areas of damper turf support oval sedge, soft rush, common sorrel, creeping buttercup, hard rush and hairy sedge.
- 6.2.15 The fishing pond in field 4 is surrounded by the rough grassland except for the western side where it abuts an area of tall grey willow scrub which has a ground flora of hard rush, common reed, silverweed, common nettle and great willowherb. The pond has adjacent bunds of rough grassland with scrub and trees of birch, crack willow and grey willow. There is an island in the pond. The pond has some marginal grey willow, great willowherb, greater birds-foot trefoil, water mint, marsh pennywort, common spike-rush, common club-rush, bulrush, common reed, marsh bedstraw and soft rush. There are aquatic plants of algae ivy-leaved duckweed, spiked water milfoil and the moss *Drepanocladus aduncus*.
- 6.2.16 The northern boundary of this field is described under fields 1 & 2, and the western is that of the Site boundary. The eastern boundary is a deep ditch with shallow water which supports branched bur-reed, meadowsweet, soft rush, great willowherb, watercress, water figwort, water starwort, floating sweet-grass and common reed. Most of the western bank is lined by tall overhanging scrub of grey willow with hawthorn, dog rose and common gorse with oak trees. Under the scrub are bramble, Yorkshire fog, sand sedge, creeping softgrass and false oat-grass. The banks are open at the northern end (photograph 19) where they are dominated by tall herbs and coarse grasses, including false oat-grass, common ragwort, cocksfoot, common knapweed, creeping thistle, red fescue and wood sage with small scattered hawthorn, grey willow, oak and dog rose.
- 6.2.17 The more or less triangular field 5 is rough grassland. All but the eastern boundaries have been described above under fields 2 & 4 and the Site boundary; the eastern boundary is a dry ditch with much scrub of grey willow and hawthorn, over common nettle, bramble, hogweed, Yorkshire fog and false oat-grass (photograph 18). There are planted hazel, oak and hawthorn.

- 6.2.18 Field 6 is arable. In the north-western corner there is a small conifer copse of larch, hawthorn, elder and birch. The ground flora includes common nettle, bramble, false oat-grass, rough meadow-grass and Yorkshire fog. Along the western side and south of the copse there is an area of recent tree planting of oak, pine, birch, ash and guelder-rose. The northern, western and southern boundaries of field 6 have are described above. The eastern boundary is a ditch (photograph 15), mostly dry but with some shallow water to the north, and supporting soft rush and great willowherb. There is one oak tree otherwise the banks are open and support bracken, common ragwort, false oat-grass, hogweed, rosebay willowherb, Yorkshire fog and common bent.
- 6.2.19 Field 7 is rough grassland, possibly tumbledown from improved grassland since white cover is locally abundant in the sward which is otherwise dominated by Yorkshire fog. Also present are rough meadow-grass, field horsetail, common couch, white campion, common bent, vipers bugloss, smooth hawkbeard, storksbill, squirrel-tail fescue, weld and common ragwort. A grassy track runs across the field and there is an area of game cover crop in the south. The northern, western and eastern boundaries are described above. The southern boundary is a partly dry ditch with some shallow water and supporting great willowherb, soft rush, meadowsweet and square-stalked St Johns wort (photograph 16). The banks are dominated by tall herbs and coarse grasses, including rosebay willowherb, false oat-grass, hogweed, common ragwort, Yorkshire fog and red fescue. The north bank has scattered hawthorn, silver birch, rowan, elder, white bryony, oak and a large crack willow old pollard.
- 6.2.20 Field 8 is largely arable; in the north there is also some game cover crop; a weedy strip runs along the western side; recent tree plantings occur in the south-eastern corner and in the south; and further game cover occurs in the south next to a strip of rough grassland. The old farm of Middle Manton stands in the south-eastern corner of this field. The arable is wheat and weeds in the crop (also in the arable in field 6, which also has water pepper as a weed) include scentless mayweed, scarlet pimpernel, field penny-cress, common field speedwell, knotgrass, common fumitory, pineappleweed, white campion, field pansy, creeping thistle, annual meadow-grass, fat hen, bugloss, black bindweed, corn spurrey, shepherds purse, storksbill and henbit dead-nettle.
- 6.2.21 The tree plantings in field 8 include ash, hazel, oak, hawthorn, dog rose, larch and silver birch. Rough grassland occurs between the trees. To the south of the old farm there is an area of tall dense scrub of elder, hawthorn, blackthorn, field maple and plum, and an area of rough grassland of hogweed, Yorkshire fog and false oat-grass (photograph 10). The old farm site has derelict buildings with scrub of elder, tall herbs, rough grassland and a stand of Japanese knotweed which is being controlled by cutting (photograph 14).
- 6.2.22 The southern boundary of field 8 is a partly dry ditch with some shallow water supporting great willowherb, soft rush, grey willow, osier, common reed, bulrush, meadowsweet,

fools water cress, greater birds-foot trefoil and water figwort. The north bank has scrub of hawthorn, field maple and hazel, and both are dominated by coarse grasses and tall herbs, including meadowsweet, creeping thistle, hogweed, false oat-grass, common nettle, great willowherb, bramble and bracken. The southern bank has some bare sand and also field scabious, common bent, common gorse, red fescue, Yorkshire fog and sheep's sorrel.

- 6.2.23 Field 9 is rough grassland which may be tumbledown arable or improved grassland, with a diverse flora including Yorkshire fog, soft brome, common ragwort, common bent, white campion, storksbill, squirrel-tail fescue, dense silky bent, vipers bugloss, bugloss, sheep's sorrel, smooth meadow-grass, creeping softgrass and bracken. The boundaries of this field are described above (photographs 11 & 13).

Protected Species and Other Fauna

- 6.2.24 No badger setts were seen within the Site or in adjacent land where this could be accessed out to at least c30m from the Site boundary. No signs of use of the area by badgers were seen. No badger records were obtained from LNU for the Site and immediate surroundings.
- 6.2.25 The Site has no suitable habitat for the native white-clawed crayfish. There is no habitat within the Site which could be used by otter for resting during the day or for breeding. There is a remote possibility that individual otters may travel through the Site by using the ditches but the use of the Site by otter would be no more than this since it is some distance from significantly sized watercourses. No records of otter or white-clawed crayfish were obtained from LNU for the Site and immediate surroundings.
- 6.2.26 The fields, field edges, ditches, woodlands, hedges, trees and shrubs, fishing pond and old farm are likely to be used for breeding by common birds which are typical of these habitats. Casual records were made of skylarks singing over fields 3 and 7, and of red-legged partridge, whitethroat, wren, pheasant, yellowhammer, blue tit, mallard, swallow, blackcap, robin and Canada goose. Some of these species and others typical of the habitats are likely to hold territories within the Site. Old nests were seen in the larch woodland in field 6.
- 6.2.27 Great crested newt surveys were undertaken on 12 & 13 April, 3 & 4, 9 & 10 and 24 & 25 May 2007. Standard methods were used on each occasion. The surveys were undertaken within the recommended newt survey "season" of mid March to mid June. Three of the four visits were made within the peak period of approximately mid-April to mid-May. The results of the survey can therefore be relied upon with confidence.

- 6.2.28 No great crested newts were found in any of the ponds on any survey visit. It is likely therefore that great crested newts are absent in the area, that they are not breeding in the ponds, and that they are not using the terrestrial habitats surrounding the ponds (including the Site).
- 6.2.29 Great crested newts are therefore not a constraint to the proposed mineral extraction and no mitigation or enhancement is needed for this species.
- 6.2.30 No reptiles were seen and no records were obtained from LNU for the Site and immediate surroundings. The Site may support common lizard, adder, slow worm and/or grass snake since the habitats are suitable for these species. Common lizard occurs at the Messingham Sand Quarry nature reserve to the west and so it is in the general nearby area of the Site.
- 6.2.31 The dry ditches and those with shallow water (ie only 2-3cm deep) are not suitable for occupancy by water vole. The section of ditch with the greatest potential to support water vole is that which runs straight then diagonally through the Site between fields 2 & 3, 2 & 5 and 4 & 5 since it would appear to retain water for longer than the other channels, possibly all year. Water voles may occupy the fishing pond. No signs of water vole were seen however but the ditch banks and channels were very overgrown and much of the pond is not accessible. No records of water vole were obtained from the LNU for the Site and immediate surroundings.
- 6.2.32 Roosting bats could use the old farm buildings of Middle Manton although some are clearly not suitable since the roof is partly missing. Some of the mature trees have features which could be used by roosting bats. These are the old coppiced oak in the southern boundary of field 3 which has some bark flaking off dead branches; an oak tree in the eastern boundary of field 6 which also has some bark flaking off; the old willow pollard in the southern boundary of field 7 which has loose bark and splits in large branches; and oak trees in the southern boundary of field 6 which between them have holes, a hollow dead branch and loose bark. No records of bats were obtained from the LNU for the Site and immediate surroundings.
- 6.2.33 Bats from roosts on or off Site are likely to forage for insects over the Site, particularly in the lee of hedges, woodlands and trees, around the old farm and over the fishing pond.
- 6.2.34 The Site is used by ringlet, meadow brown, small tortoiseshell and small skipper butterflies. No hares were seen. Rabbits are present.

Designated and Other Nature Conservation Sites

- 6.2.35 The Site has no statutory or non-statutory nature conservation designation.
- 6.2.36 A number of Sites of Special Scientific Interest (SSSI) occur within c2km radius of the Site. To the east, north and north-east there are the three discrete parts of Manton &

Twigmoor SSSI, a heathland and peatland biological site. The nearest part of this SSSI to the east is only c250m distant from the Site's eastern boundary; the part to the north is c800m distant; and the part to the north-east is c500m distant. Arable land lies between the Site and the eastern part of the SSSI; woodland lies between the Site and the north-eastern part; and farmland and woodland lies between the Site and the northern part. To the south-east and c1100m distant is the geological SSSI of Manton Stone Quarry and beyond this at c2km is the biological SSSI of Cleatham Quarry. Farmland lies between the Site and these SSSIs. To the west and only c500m distant at the nearest point is the biological SSSI of Messingham Sand Quarry, which is owned by WBB Minerals and leased to LWT. Messingham Sand Quarry SSSI is also a nature reserve. Farmland lies between the Site and this SSSI.

- 6.2.37 A number of non-statutory sites of nature conservation interest occur within c2km of the Site. To the south-east at c2km distant at SE 945 015 there is Kirton Lindsey Quarries and at c900m at SE 945 033 there is Staniwells Plantation. To the south at c1400m there is Black Walk Nook at SE 922 050 which has broad-leaved and conifer woodland with acid grassland and damp heath. To the north-west at c1600m there are Holme Lane Verges SE 912 055-908 052 (neutral grassland) and Holme Plantation SE 910 053 (broad-leaved woodland and heath). To the north there is Black Hoe Plantation at SE 922 050 (c300m) and Greetwell Farm Ponds at SE 925 047 & 926 048 (c300m). To the north-east there is Greetwell Bog SE 940052 at c500m which is broad-leaved woodland, acid grassland and bog.

Nature Conservation Assessment: Habitats and Plants

- 6.2.38 The Site habitats are of limited nature conservation significance. The arable and improved grasslands are common and widespread habitat types, as are the recent and more mature woodlands, ditches, rough grasslands, scrub, hedges and open water. None of the hedges are of importance for wildlife under the terms of the Hedgerow Regulations or are of biodiversity importance.
- 6.2.39 Of the 188 plants recorded, the vast majority are common and widespread species of open water, ditches, scrub, woodland, arable land and grassland, especially on sandy soils, and are therefore not of nature conservation significance. The 2 exceptions are common cudweed (declining in historic Lincolnshire) and sand spurrey (uncommon in the county). Common cudweed occurs in the grassland of field 5 and in the grassland of the banks of the southern boundary ditch of the same field. Sand spurrey also occurs in field 5, near the north-eastern corner. The invasive alien Japanese knotweed occurs in the yard of the old farm where it is already subject to control.

Nature Conservation Assessment: Protected Species and Other Fauna

- 6.2.40 The Site is of little or no current significance for badger, since no sett occurs and no signs of feeding or other use were seen.
- 6.2.41 The Site is of little or no significance for otter and white-clawed crayfish, and is likely to be of little significance for water vole since only one stretch of one internal ditch and the fishing pond have suitable habitat for occupancy by voles.
- 6.2.42 The Site may be of limited significance for reptiles. The Site is likely to be of limited significance for breeding birds since it is not significantly different from the extensive surrounding arable farmland.
- 6.2.43 The Site may support small numbers of roosting bats which are using the old farm buildings and the few mature trees which have holes, cracks and other features which they can use. The Site is likely to be of limited significance for foraging bats since it is largely open, it is not a good source of flying insects (for instance compared to the old flooded quarry workings to the west and south-west) and does not have any habitat features which would attract more feeding bats than would the extensive areas of other farmland in the vicinity.
- 6.2.44 Great Crested Newt surveys carried out in 2007 determined that the Site and the terrestrial habitats surrounding the Site are not used by great crested newts for breeding, foraging, shelter and/or protection, or hibernation. Therefore great crested newts are absent in the area.

6.3 POTENTIAL & PREDICTED IMPACTS

Direct Impacts on Habitats and Plants

- 6.3.1 The quarrying would result in the direct loss of most of the improved grassland, arable, game cover crop, rough grassland, scrub and woodland habitats, and of the internal ditches and hedges.
- 6.3.2 The significance of the loss of the above habitats is however negligible since they are not of nature conservation significance.
- 6.3.3 The ditches, hedgerows, trees and shrubs of the Site boundaries would not be lost to the quarry since they occur within the stand-off around each side of the Site.

Direct Impacts on Species

- 6.3.4 The quarrying would result in the loss of the plants of the locally uncommon sand spurrey and common cudweed which occur in the body of field 5. Common cudweed however occurs elsewhere on the Site and probably also occurs on adjacent farmland, so it would not be rendered extinct locally by the quarrying although the local population would be reduced. Sand spurrey was not seen elsewhere on the Site so the quarrying would result in the loss of the Site population.

- 6.3.5 There would be no direct impact on badgers, unless a sett became established in the period between the surveys and the onset of quarrying. A watching brief is recommended during the phasing of the works in case a badger sett becomes established.
- 6.3.6 There would be no direct impact on otter or white-clawed crayfish.
- 6.3.7 There would be a direct impact on water voles if they are shown to occupy the wet ditch across the Site and the fishing pond since these habitats would be lost.
- 6.3.8 There would potentially be a direct impact on roosting bats if the mature trees which have been identified as having the potential for roosts, actually support roosts, and are lost to the quarrying. No farm buildings will be demolished or otherwise altered by the proposed mineral development therefore roosting bats supported by the buildings will remain unaffected. There would be a minor direct impact on foraging bats since although with the quarrying the nature of the fields would change and the internal boundaries lost, the Site boundaries would remain thus retaining their function as providing shelter for insects which bats would then feed on.
- 6.3.9 There would be no direct impact on Great Crested Newts.
- 6.3.10 There would be direct impact on the breeding birds which would nest in the fields, field boundaries, scrub and woodlands since these potential breeding sites would be lost. This may affect at least skylark, yellowhammer and blackcap since these birds were singing at the time of survey and so holding territories.

Indirect Impact on Habitats and Plants

- 6.3.11 There is the potential for the quarrying to result in the lowering of the local water table within 40m of the toe of the proposed sand excavation. Therefore, the quarrying may potentially result in the drying-out of the Site's boundary ditches but since these are currently dry or only damp or have very shallow water, and do not possess a high water level with associated diverse wetland and aquatic vegetation, it is unlikely that any drying-out would have a significant adverse affect on the ditch habitat.

Indirect Impacts on Species

- 6.3.12 There would be no indirect impact on badgers, otter, white-clawed crayfish, reptiles, breeding birds, Great Crested Newts or foraging bats.
- 6.3.13 There may be an indirect affect on roosting bats from the proposed quarrying but only if bats are roosting in any of the trees around the Site's perimeter, and only if the quarrying adversely affects the trees through reducing water available to the roots, thereby causing the tree(s) to prematurely shed major branches or to die and fall. This would remove the tree(s) as available habitat for bat roosts. The proposed stand-off would ensure that no roots would be lost to the quarrying.

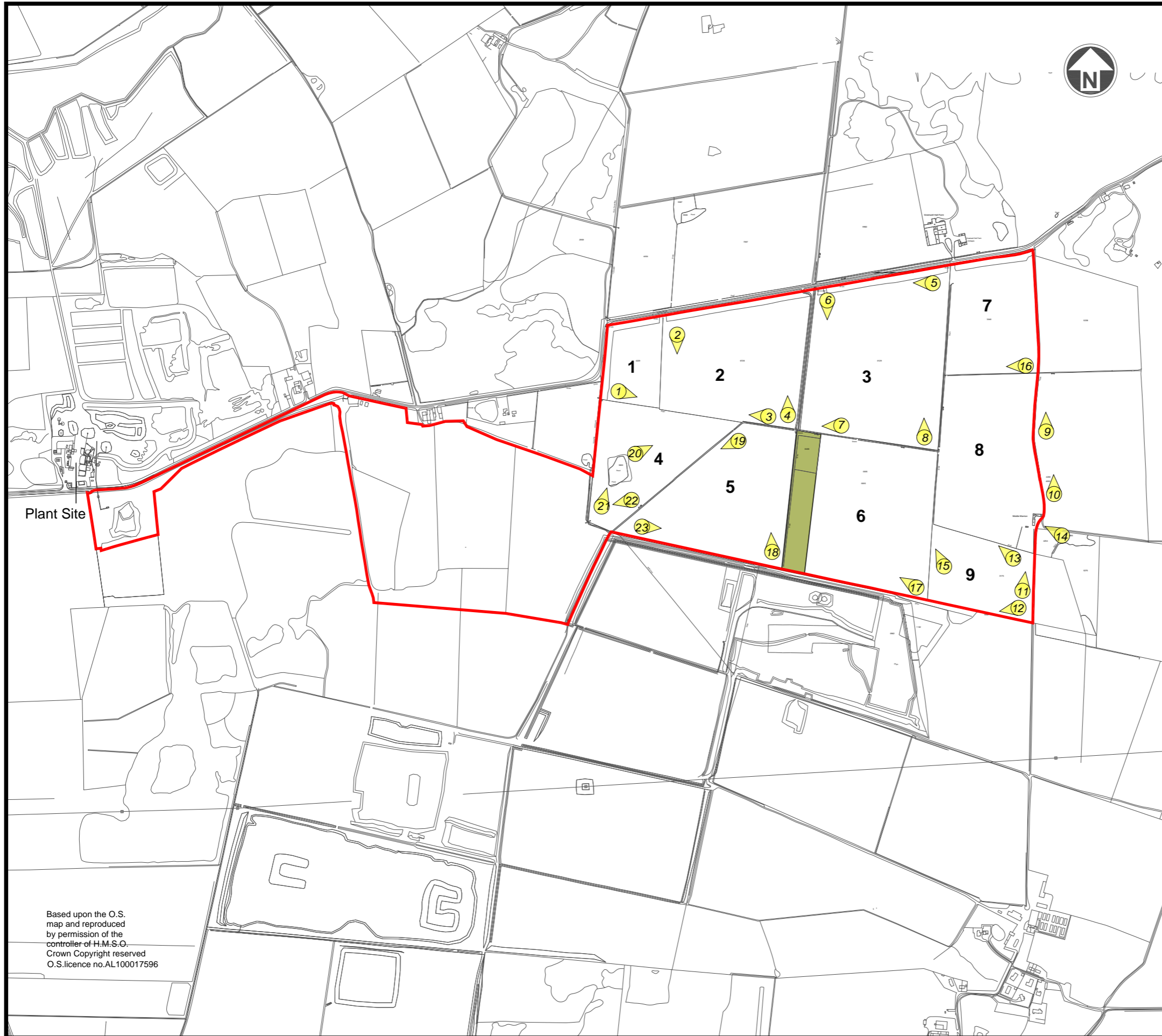
6.4 MITIGATION & ENHANCEMENT

- 6.4.1 The loss of the populations of the locally uncommon common cudweed and sand spurrey which currently occur in field 5 could be mitigated by the collection of top soil from this area in autumn or winter, which would include the seeds of these annual plants, and the spreading of the soil thinly over adjacent areas of land, such that the seeds can germinate.
- 6.4.2 Removal of the trees, hedges and bushes across the Site in winter would prevent birds nesting in these habitat features.
- 6.4.3 The close cutting of the bank and channel vegetation in the Site's internal ditches would discourage their use by breeding birds and by reptiles, which would avoid potential injury to or killing of reptiles due to the quarrying.
- 6.4.4 Trees identified as having the potential for roosting bats and which would be lost to the quarrying should be surveyed in order to determine whether bats are actually roosting, eg by use of an endoscope and/or by undertaking emergence watches, such that appropriate mitigation can be undertaken involving provision of alternative roost sites. The felling of the trees and mitigation would be undertaken according to the terms of a DEFRA licence.
- 6.4.5 The presence of water voles in the ditch across the Site and in the fishing pond should be established. If absent no mitigation would be required. If present the voles would need to be excluded or translocated to alternative habitat which has been prepared for them in advance of any exclusion or translocation.
- 6.4.6 A water level monitoring scheme would need to be established which would record the water levels in the local area in connection with the potential impact the quarrying would have on the nearby biological SSSIs which have a wetland element.
- 6.4.7 The control of the Japanese knotweed should continue with the objective of eradicating the plant at the old farm.

6.5 CONCLUSIONS



- 6.5.1 The Site of the proposed sand quarry at Messingham has been shown by desk study and field survey to be of limited nature conservation significance.
- 6.5.2 Actual or potential impacts of the proposed quarry are of no or very minor significance.
- 6.5.3 Mitigation measures would ensure that no notable plants or protected species would be affected.
- 6.5.4 The proposed Site after-use comprises the creation of areas of acid grassland with lowland heathland (c7.2ha), native broad-leaved woodland (c6.7ha), hedgerows (c2.6km length) and standing open water with islands (c8.3ha), as well as reinstatement of some

agricultural land. The restoration would progressively follow on directly from the mineral extraction. The proposed restoration would be a significant gain for nature conservation compared to the Site's current low level of importance. The creation of acid grassland and lowland heathland habitats would contribute towards the meeting of targets in the UK and Lincolnshire Biodiversity Action Plans for the expansion of the areas of these important habitats, which are listed under Schedule 74 of the Countryside and Rights of Way Act (2000) as habitats which are of principle importance for the conservation of biological diversity in England.



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-  Proposed Planning Application Boundary
-  Photo locations and directions

Scale 1:10,000

Messingham Quarry Extension
Environmental Statement

Field Numbers and Photo
Locations

Figure 6.1