A47 North Tuddenham to Easton Dualling

Scheme Number: TR010038

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6.3 Environmental Statement Appendices
Appendix 8.9 - Barn Owl Survey Report

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

March 2021

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

The A47 North Tuddenham to Easton Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT APPENDICES
Appendix 8.9 - Barn Owl Survey Report

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Sweco

A47 North Tuddenham to Easton

Barn Owl Survey

MLM. Group

Part of Sweco

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778575-MLM-ZZ-DR-J-0002 - Barn Owl Foraging Habitat

1 Non-technical Summary

This barn owl (*Tyto alba)* survey report has been prepared by MLM for Sweco and relates to proposed duelling of the A47 from North Tuddenham to Easton.

Wintering passage and breeding bird surveys undertaken by Sweco in 2019 identified two sites as potential barn owl roost given the evidence found there. The purpose of this report is to present the findings of barn owl surveys undertaken by MLM in 2020 and to update these findings and identify any appropriate mitigation or enhancements.

The MLM surveys found two nesting sites, two roosting sites and a historic roosting site. The proposed road scheme will result in the loss of one confirmed nesting site and considerable foraging habitat along the A47, in order to mitigate the loss of a nesting site and foraging habitat the following has been recommended;

- The barn owl box at site 3 should be removed over winter, under supervision of a licenced ecologist, outside the main breeding season (March-September inclusive).
- At least 30 days prior to the removal two alternative roosting boxes will need to be erected within 200m of the original box.
- A more permanent provision for barn owls should be sought through the installation of internal boxes into nearby farms.
- Compensatory rough grassland should be created alongside the motorway and the numerous balancing ponds that are due to be created.
- Woodland or hedgerow should be planted alongside the A47 main carriageway to provide a physical screen of the road; this will force barn owls up and over the carriageway and reducing the chances of collision.
- All species used for planting should be locally sourced and native.
- Five barn owl nest boxes should be sited in areas of created rough grassland or within receptive local farms to improve the total population within the area.
- Post development monitoring of the barn owl numbers is recommended to determine if the new road is causing an increase in fatality's to barn owls.

Providing the above mitigation is impalement the proposed development should comply with wildlife legislation and reduce the overall impact of the proposed development. The monitoring provision will ensure that if negative effects are encountered, they can be addressed in the future. Overall the scheme should provide a gain for barn owls in the local area.

2 Limitations and Exceptions

This report and its findings should be considered in relation to the terms and conditions proposed and scope of works agreed between MLM and the client.

Interpretations and recommendations contained in the report represent our professional opinions, which were arrived at in accordance with currently accepted industry practices at the time of reporting and based on current legislation in force at that time.

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This report is prepared and written in the context of the proposals stated in the introduction to this report and should not be used in a differing context. Furthermore, alterations to the initial proposals or changes in conditions on site over time may necessitate an alteration to the report in whole or in part after its submission. Therefore, in the event of any change in proposals or lapse of one year or more from the date of the report, the content of the report should not be relied upon unless referred to MLM for validation and, if necessary, re-appraisal.

Scientific survey data will be shared with local biological records centre in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) professional code of conduct.

This report was prepared only for our client and is not intended to be relied on by any other party. Third parties should not rely on the facts, matters or opinions set out in this report without the express written permission of MLM.

Please note that MLM does not purport to provide specialist legal advice.

Unless stated specifically, drawings and plans are indicative only. As such, the position of features marked on the plans or drawings should not be taken as 100% accurate.

2.1 Site-specific Limitations

The barn owl surveys were undertaken in good weather conditions with access available to all areas for a thorough inspection, except for area 1 Oak Farm, as the landowner could not be available on both visits to open the buildings and site 2 where the landowner was unknown for the metal barn. In both cases an external inspection could still be undertaken, which found that the buildings present were not suitable for supporting barn owls.

3 Introduction

3.1 Purpose

This barn owl survey report has been prepared by MLM for Sweco and relates to proposed duelling of the A47 from North Tuddenham to Easton.

The proposals are understood to involve converting the existing single carriageway road between Blofield and North Burlingham to dual carriageway, altering some of the junctions onto the dual carriageway from the existing country road network and adding additional ancillary roads, bridge and infrastructure to accommodate the proposed duelling as shown on drawing HE551489-GTY-HML-000-SK-CH-30028-P05.0.

Wintering, passage and breeding bird surveys undertaken by Sweco 2019 identified a number of sites suitable for supporting barn owl roosts and found evidence of barn owls at Hall Farm Cottages, and Lodge farm cattle sheds with a kestrel box and little owl box located at St Andrews Church. (ref. 1).

A specific barn owl survey consisting of internal inspections was not undertaken by Sweco in 2019. Hence the purpose of this report is to present the findings of specific barn owl surveys undertaken by MLM in 2020 to update the results of the 2019 incidental findings and identify any breeding sites along with detailing appropriate mitigation or enhancements.

3.2 Site Description

The site is located along the A47 in Tuddenham, Norfolk and is located between Ordnance Survey National Grid Reference (GR) TG0525413792 to the west and TG1347511031 to the east, approximately 7.5km.

The barn owl survey area comprised the impact zone for the works and additional historic sites identified by the 2019 Sweco surveys, included due to proximity to development, as shown on drawing 778575-MLM-ZZ-XX-DR-J-0001.

The area consisted of a mixture of agricultural land, woodland, associated hedgerows and trees, farm buildings and residential properties.

4 Relevant Legislation

The main piece of legislation relating to barn owls within England and Wales is The Wildlife and Countryside Act 1981 (as amended) which provides detail on a range of protection and offences relating to wild birds, other animals, and plants. Barn Owls are listed under Schedule 1 (Sch 1) of the act which affords protection of the nest when in use, further under Sch 1 the act protects barn owls from disturbance when nesting. Licences are available for specific purposes to permit actions that would otherwise constitute an offence in relation to this species.

4.1 Planning Policy

The recommendations of this report are in line with the key principles of the National Planning Policy Framework (ref. 2) and Government Circular 06/05 (ref. 3).

4.2 Local Planning Policy

The Broadlands local plan was adopted in January 2014 and is the current active local planning policy for the Tuddenham area. The following local policies are considered relevant to the site.

Policy 1: Addressing climate change and protecting environmental assets

Development and investment will seek to expand and link valuable open space and areas of biodiversity importance to create green networks. Where there is no conflict with biodiversity objectives, the quiet enjoyment and use of the natural environment will be encouraged and all proposals should seek to increase public access to the countryside.

All new developments will ensure that there will be no adverse impacts on European and Ramsar designated sites and no adverse impacts on European protected species in the area and beyond including by storm water runoff, water abstraction, or sewage discharge. They will provide for sufficient and appropriate local green infrastructure to minimise visitor pressures. Development likely to have any adverse effect on nationally designated sites and species will be assessed in accordance with national policy and legislation.

In areas not protected through international or national designations, development will:

- *minimise fragmentation of habitats and seek to conserve and enhance existing environmental assets of acknowledged regional or local importance. Where harm is unavoidable, it will provide for appropriate mitigation or replacement with the objective of achieving a long-term maintenance or enhancement of the local biodiversity baseline*
- *contribute to providing a multifunctional green infrastructure network, including provision of areas of open space, wildlife resources and links between them, both off site and as an integral part of the development*
- *help to make provision for the long-term maintenance of the green infrastructure network*
- *protect mineral and other natural resources identified through the Norfolk Minerals and Waste Development Framework*

The built environment, heritage assets, and the wider historic environment will be conserved and enhanced through the protection of buildings and structures which contribute to their surroundings, the protection of their settings, the encouragement of high-quality maintenance and repair and the enhancement of public spaces.

5 Methodology

5.1 Personnel

The site survey was undertaken by two surveyors on 20 March 2020 and 7 June 2020. The survey was led by Joshua Stafford BSc (Hons) Grad CIEEM (Natural England Barn Owl Survey Class Licence Registration No CL29/00321) and assisted by Beck Harrington-Harding BSc (Hons) MCIEEM (Natural England Barn Owl Survey Class Licence Registration No CL29/00494). Both are licenced barn owl surveyors and have experience of surveying for barn owls in a range of buildings, supporting structures and trees.

The report was written by Joshua Stafford, verified by Sophie Barrel MEcol (Hons) GradCIEEM who is an experienced ornithologist with over 4 years constancy experience and approved by Gemma Linacre MRes BSc (Hons) ACIEEM who has over 10 years' experience in ecological consultancy including bird surveys and ecological impact assessments.

5.2 Survey Method

The barn owl survey method followed recommendations by Shawyer 2011 (ref. 6) and the Barn Owl Trust 2010 (ref. 7). This comprised a visual inspection of the buildings, nest boxes and sites within the impact zone identified as having potential to support barn owls, shown on drawing 778575-MLM-ZZ-XX-DR-J-0001.

Two visits to the site were undertaken. The first visit on 20 March 2020 was undertaken before breeding started. Initially only zones 1 and 2 of the site were to be surveyed during the March visit with zone 3 covered in the June visit. However, access was available throughout the whole impact area and therefore the surveyors inspected zones 1, 2 and 3 taking the opportunity to check for any additional sites which had potentially suitable habitat for barn owls within the impact zone not identified previously by Sweco, and to confirm if barn owls were present at the sites identified by Sweco and the additional areas found.

The second visit on 7 June 2020 was to confirm if breeding had occurred at a site, this visit covered the entire site again and the additional barn owl nest box, found during the first visit. To begin, an external inspection was undertaken around each building by both surveyors, with surveyors looking for evidence in the form of whitewash, pellets and feathers which may be present outside or on the exterior of the building. After which the assistant surveyor stayed outside in a strategic position to watch for any owls exiting the building whilst the lead surveyor entered the building to make an initial search for owls.

After the initial inspection both surveyors entered each building to conduct a thorough search. The internal building inspections included a search of all surfaces and features, such as wall tops and cavities where barn owls could potentially roost, as well as roof timbers, floors or stored materials for field signs such as pellets, feathers or whitewash.

Where internal access was not possible a more through external search was undertaken.

Where possible the surveyors made efforts to speak with the building owners to ascertain if they had seen barn owls on site and if so, how long they had been present and the times they most frequency saw them.

Survey equipment comprised of ladders, binoculars, torches and an inspection camera to check into cavities which were difficult to access.

5.2.1 Weather Conditions

The weather conditions on 20 March 2020 were overcast with heavy cloud and a temperature of 14˚C and the weather conditions for the 7 June 2020 survey were clear and sunny with a temperature of 23˚C.

5.3 Habitat Suitability

During both visits, notes were made on quality of the surrounding habitats, these have been split into three forms, Type 1 and Type 2 and Type 3 habitats. These are defined as:

- Type 1 - habitats consist of good-moderate qualify foraging habitats well connected and situated in areas likely to be used. They consist of rough grassland, scrub and grassland, field margins, tall ruderal vegetation or bankside inundation vegetation where there is likely to be good small mammal populations and thus good foraging potential.
- Type 2 - habitats consist of moderate quality foraging habitats that may carry an inherent risk to barn owls and low-quality foraging habitats. This includes roadside verges, grazed paddocks, large open garden areas and game cover crops. Type 2 habitats offer some potential for small mammals and thus for barn owls to forage, but are either located adjacent to the roadway, which increase the risk of collision risk, or are generally less suitable for barn owls.
- Type 3 - habitats consist of all other habitats that offer negligible foregoing potential for barn owls, these include housing, intensively managed agricultural fields, small residential gardens and dense woodland blocks.

6 Survey Findings

The Sweco 2019 survey identified two locations where barn owl evidence had been recorded, these were site 5 and site 6 with the nest boxes at St Andrews Church also identified (site 4). The March inspection by MLM identified a further three sites, Sites 1, 2 and 3. The locations of all the sites are shown on drawing 778575-MLM-ZZ-XX-DR-J-0001. A summary of the results has been presented in table 6.1 below.

Table 6.1 Summary of barn owl survey results

Site	Breeding Confirmed	Roosting Confirmed	Suitable foraging habitat locally	Will the development result in a loss of breeding site	Will the development result in a loss of foraging habitat
Site 1	No	No	No	No	No
Site 2	No	No	Yes	No	Yes
Site 3	Yes	Yes	Yes	Yes	Yes
Site 4	No	No	Yes	No	Yes
Site 5	Yes	Yes	Yes	Yes	Yes
Siter 6	*No*	Yes	Yes	No	Yes

6.1 Site 1 Oak Farm (GR - TG 06171 13469)

A thorough search of Oak Farm was not possible as the landowner was not present to open the buildings and could not be interviewed. This site consisted of one large main house and a smaller single-story residential property, with supporting car garages. Around the main house is a large brick stable block, with paddocks, field shelters and ménage with all buildings in good condition and appearing to be in frequent use by people with the paddocks well grazed by horses. The only buildings that were open and had easy access for barn owls to use were the field shelters and the stables themselves, neither of which offered any suitable roosting or nesting potential for barn owls, the paddocks themselves were well grazed and offered no real foraging potential. **This site is considered unlikely to be used by barn owls for nesting or foraging.**

6.2 Site 2 Abandoned buildings (GR - TG 07246 12772)

The sites consisted of a number of disused and dilapidated railway cars (photo 1), lean-to shelters (photo 2) and disused static buildings (photo 3), alongside a much newer prefabricated metal barn (photo 4). A thorough inspection of all the buildings was undertaken with the exception of the metal barn which could not be accessed inside but was sufficiently secure from the outside to conclude that barn owls were unlikely to be able to access the building. Whilst the railway carts, wood store and porta cabin offered easy access inside and some perching positions, there was little in the way of potential nesting sites. Further, a detailed inspection found no evidence of barn owls in any of the buildings. The surrounding area consisted of arable land, grassland scrub and rough grassland all of which offer suitable foraging potential for barn owls.

This site is considered unlikely to be used by barn owls however the proposed development will result in a loss of the grassland, scrub, most of the arable land and some of the rough grassland resulting in a loss of potential foraging habitat for barn owls that may use the area.

Photo 1. Disused railway cars, with numerous holes or missing slats allowing access inside.

Photo 2. Collapsing wood storage shelter.

Photo 3. Abandoned and open site porta cabin.

Photo 4. Prefabricated corrugated metal barn.

6.3 Site 3 [redacted] Land (GR - TG 07873 12565)

Located to the south of the sewage treatment works, this small holding, consisted of three small stable buildings, a single-story small barn for storing straw and a number of old cabins. The site was very active with [redacted] and his wife working on site both in the morning and evening. No evidence of barn owls was found in any of the small holding buildings, however, we were informed that [redacted] had erected a barn owl box in 2016, and that whilst barn owls had been seen foraging along the river, they had never been seen using the box.

Upon reaching the box to undertake an inspection, both a male and female barn owl were flushed. An inspection of the box showed consistent use and historic breeding, with a dead barn owl chick just visible within the build up of pellets in the box. Further the number of juvenile, white, down feathers moulted within the box during the June visit suggested that a successful breeding attempt had likely occurred this year and that the pair were potentially going to try again for a second brood. **The proposed road works remove all trees along this section including the tree with the mounted barn owl box, directly impacting a confirmed nesting site.**

Photo 5. Barn owl box on tree.

Photo 6. Evidence of barn owls breeding within the box. Juvenile down feather present at the bottom left of the photo, historic egg centre, fresh pellet to the right

6.4 Site 4 St Andrews Church Honningham (GR - TG 11417 11242)

Whilst St Andrews church itself offers little suitability to support barn owls due to it being completely sealed, with no evidence of barn owl usage found around the outside, the graveyard has both a raptor and owl box in the trees facing out to the surrounding land and thus potential to support barn owls.

An inspection of the raptor box found a number of fresh pellets (photo 7) and some droppings below the box on vegetation, suggesting fairly recent roosting, with the pellet size and the nature of their coverage of the box suggested kestrel (*Falco tinnunculus*). The presence of fresh and old pellets shows that this species has historically roosted within the box, a shallow scrape at the back suggests that they may have potentially bred here in previous years, but there was no evidence of a breeding attempt in 2020.

The other box was a little owl (*Athene noctua*) box which upon inspection was completely filled up with moss, twigs and leaves, an inspection of the entrance portion of the box found a small nest cup of grass and leaves likely belonging to a robin (*Erithacus rubecula*), which had been constructed on top of the filled in chamber (photo 8). **This site is considered unlikely to be used by breeding barn owls. The proposed road works will not directly affect this site. However, expansion of the road will result in a loss of foraging habitat.**

Photo 7. Raptor nest box with a good layer of pellets, including some fresh ones, likely to be kestrel.

Photo 8. Little owl box entrance was filled up with grass, leaves and moss- the above photo shows the entrance chamber where a robin looks to have made a nest cup.

6.5 Site 5 Hall Farm (GR -TG 10853 12067)

Hall Farm consists of a mixture of old and new buildings. There is the main farmhouse and two residential dwellings which are currently lived in on site. Adjacent to the main farm house are a number of original period barns, a grain store and lean-tos, a new prefabricated metal sheet grain barn, around six cart lodges and disused chicken/pheasant coop with a wooden hutch and an old disused emergency shower block. See figure 1 below for layout of Hall Farm.

Figure 1: Hall Farm layout, in blue the main house and residential properties, red the period barn and grain stores, green the new metal sheet barn, yellow the six cart lodges, orange the chicken/pheasant coops and purple the shower block. Basemap Source: Imagery © Cnes/ Airbus, Getmapping Plc, Infoterra Ltd & Bluesky, Landsat/ Copernicus, Maxar.

Upon arrival, we spoke with the landowner who had recently flushed a barn owl roosting in an open barn adjacent to the main house and period grain store. He had also opened some of the older period grain buildings for his children to play in and had noticed dropping and pellets inside suggesting the birds had already been inside the buildings.

The main farmhouse and two residential properties, marked in blue on the figure 1 above, were well used and in good condition, they offered no suitable places for barn owls to roost or nest and no evidence was found during an external inspection.

An inspection of the period grain barn and connected period storage buildings around the main farmhouse, marked in red on the above figure, found multiple possible entry points (photo 9), numerous fresh pellets and droppings both inside the buildings and over a wall into the buildings where a window was missing. Access into the period buildings second story was not possible due to the poor condition of the floor, but it appeared that barn owls were entering though the missing window and then flying up into a large rot hole in the floor (photo 10) to access a darker and more quieter section of the building, which allowed access into all the connected period buildings.

The remains of a prey item were also observed on the flood below this hole (photo 11). The number of pellets and droppings suggest a pair are roosting here and given its undisturbed nature and easy access, it is considered likely the pair are breeding at the site.

An inspection of the new prefabricated metal barn, marked in green on the above figure, found that on two of the corner struts, under the shelter of the buildings metal skirt, a kestrel was roosting. Five pellets and numerous splats of dropping were found under one strut and three pellets and droppings were found under the other (photo 12). These struts offer roosting positions but are not wide enough for breeding. The barn itself was well sealed and offered no suitable entry point for barn owl to use, and there was no evidence of barn owl using the struts to roost.

The cart lodges and adjacent machine storage sheds, marked in yellow on the above figure, consisted of wooden framed buildings with either tiled roofs or corrugated metal sheeting. The sheds offered some potential for roosting barn owl, but no evidence of their use was found.

The disused chicken/pheasant coop and hutch building were located to the east of hall farm, marked in orang on the above figure. The main chicken/pheasant coop was a long brick building with a corrugated cement sheeting roof and multiple chimneys. The building was overgrown and had multiple doorways into each compartment and lower down smaller entrances for the birds were sealed shut. Now disused, the front of the building was now completely overgrown but access through missing windows and the open doors would be possible for barn owls. An inspection of the building found a historic nest on a ledge adjacent to the fireplace (photo 13), old chick down was found confirming use in the past. Whilst there were some fresh pellets, around 20-30 pellets were significantly older (photo 14), with the oldest being small piles of bones suggesting around 8 years old. The evidence suggests that currently the building is now used as an occasional roost as only a few of the pellets on the floor were fresh and recent. The hutch building was an old hen or pheasant hutch, it was well sealed and offered not access inside as such was unsittable for barn owl.

Just down from the chicken/pheasant block there is an old disused emergency shower cubical, marked in purple on the above figure, its brick built up to around 2m with a storage tank in the top for water (photo 15). This was a historic roost, as both barn owl pellets and some old adult feathers could be found underneath and behind the water tank (photo 16). The pellets were likely around 3 years old and it was considered likely that as the ivy covered the entranceway, access into and out of the shower became impossible and therefore this roost was abandoned.

The site supports a number of active and historic nesting sites alongside multiple roosting points. None of these buildings will be physically affected by the proposed roadway, however a large proportion of foraging habitat, including the rough grassland along the River Tud directly south of Hall Farm, will be lost by the proposed roadway.

Photo 9. Missing panel on the roof of the grain store would allow owls access inside.

Photo 10. A hole in the floor of the grain store under which barn owl pellets, droppings and prey items were found, likely entry point into the building.

Photo 11. Barn owl pellets and a piece of prey item on floor.

Photo 12. Kestrel pellets along the side of the new metal barn.

Photo 13. Historic nest site in the brick chicken sheds including a ledge adjacent to the chimney with pellets, droppings and chick down.

Photo 14. Fresh pellets and droppings around the base of the historic nesting site in the chicken sheds.

Photo 15. Emergency shower building, with now disused historic roost above the ivy.

Photo 16. A range of pellets from 2-8 years old and a small piles of bones visible at the back of the shower.

6.6 Site 6 Lodge Farm (GR - TG 06714 13660)

Lodge farm has an old cattle shelter located around 200m north of the A47. The cattle shed is timber framed with an original old brick wall and wooden cladding with a corrugated metal sheet roofing it has a sheltered section to the east and an open section around a courtyard(photo 17). Detailed inspection of the cattle shed found the building to be a regular roosting site with at least 30 fresh pellets and droppings (photos 19 and 20). Upon further inspection no wide ledge features could be found within or around the building (photo 18) suggesting that the cattle shelter is only used for roosting and not nesting. **The proposed road works will not directly affect this site however will result in a loss of foraging potential in this area and increased risk potential of barn owl collision with cars.**

Photo 17. Front of the cattle shed, showing multiple entry points and the courtyard area to the west

Photo 18. Internal view of the shelter section to the east.

Photo 19. Fresh whitewash over the roofing sheets that cover the ground

Photo 20. Very fresh pellet on roofing sheet likely under 30 days old.

6.7 Anecdotal evidence

MLM has been undertaking bat activity transects in April 2020 and crossing point surveys around Tuddenham in August 2020. Due to the nature of these surveys' surveyors are active around dusk and dawn, when barn owls are most likely to be active, as such there were a number of incidental sightings of barn owls during the April and August surveys. The April surveys recorded an individual hunting around Poppys Wood near Site 6, in addition to this sightings were also recorded south of Hockering during the activity surveys. The more recent August 2020 crossing point surveys also recorded a single barn owl foraging just south form St Andrews Church (site 4), and south of the Hall farm (site 5). The birds were recorded hunting, although none of the sightings recorded them carrying any prey and given barn owls can have territories of up to 350ha during the breeding season (ref. 7) the value of the data is considered restricted to confirming that the birds are present within the area and foraging in these areas.

6.8 Suitable Habitats

The location of Type 1 and Type 2 habitats are shown on drawing 778575-MLM-ZZ-XX-DR-J-0002, Type 3 habitats are areas unsuitable for barn owls, as such they have not been mapped on the drawing. The majority to the type 1 habitats are found within the impact zone, starting at the north west of the site and running through the east, the type 2 habitats are more spread out, found along the roadside, and in few adjacent fields located along and adjacent to the impact zone.

7 Recommendations

7.1 Potential Effects in the Absence of Mitigation

The proposed road scheme will result in the removal and clearance of Mr Elliots land located at point 3 on drawing 778575-MLM-ZZ-XX-DR-J-0001. This will result in the loss of a confirmed nesting site within the box at site 3. None of the other nesting sites identified during the survey will be lost by the proposed road development, however barn owls will likely be impacted by the increased risk of collision caused by a widening of the lane and a further increase in traffic. Studies by the Barn Owl Trust found that 90% of all barn owl mortalities are from major roads such as dual carriageways (ref. 7).

7.2 Mitigation for the Barn Owl Box at Site 3

In order to mitigate for the loss of the barn owl box on site, three specific measures and processes will need to be put in place.

1. Barn owls can breed all year round if conditions are suitable, however breeding tends to occur March-September inclusive. As such, under supervision of a barn owl licenced ecologist, it is recommended that following an inspection by the ecologist, the barn owl box at site three is removed over winter. If the ecologist checks and finds an active nest, monitoring of the nest will need to take place to determine when it can be removed.

2. Before the box can be removed, alternative provisions for the barn owls will be required in the form of two temporary box's that must be erected within 200m of the original box with a clear line of sight to the original. These boxes will need to be erected no less than 30 days prior to the removal of the existing box at site three, to give barn owls time to find the new box. These alternative provision boxes should be kept free from disturbance via on-site protection measures such as signage and heras fencing during the development works.

3. Once development has taken place a permanent provision should be provided to ensure the long-term viability of a nesting site, as external boxes only last 5-10 years. This could be sought through the introduction of an internal barn owl box into the nearby Riverside Farm or All Saints Church. Internal boxes sited inside a barn or outbuilding offer a more permanent solution and last longer that external boxes. The external boxes should also be retained as the male barn owl is usually excluded from the nest once chick have hatched and therefore the retention of the alternative provision boxes will provide a secondary roost when he is no longer allowed in the nest.

7.3 Habitat Creation

Barn owls currently hunt along the verges and in the field margins of the land surrounding the current A47 and were recorded during the bat activity and crossing point surveys foraging east of St Andrews Church, south of the Honningham estate, and along from Poppys wood. The proposed development will result in a loss of around 9.75ha of grassland (around 7.25ha Type 1 habitat and 2.5ha type 2 habitat) either through the loss of field margins, existing verges, or set aside areas of grassland and scrub. To mitigate for loss of habitat, it is recommended that suitable compensatory rough grassland should be provided off site alongside the proposed motorway or in adjacent land. The rough grassland should be created alongside the motorway and the numerous balancing ponds that are due to be created. Further grassland could be created alongside the field margins adjacent to the A47. However foraging habit should not be encouraged in pockets of land separated by multiple arms of the A47 as this will increase the risk of barn owl collision.

Where the rough grassland has been created away from the motorway, five nest boxes should be provided to offer additional nesting capacity. Alternatively the land owners at Sites 4, 5 and 6 all expressed an interest at putting boxes in their existing barns or around the churchyard which might provide a more permanent solution, given internal boxes have a longer life than external, where possible boxes should be sited near type 1 habitat.

7.4 Minimising the Risk of Vehicle Collisions

To avoid encouraging barn owls to hunt alongside the new dual A47 the planting of high hedge or lines of closely-spaced trees should take place next to the road on both sides. All species used for planting should be locally sourced and native and include some fruit or berry producing species which will provide additional food sources for small mammals in autumn and winter which in turn will assist barn owls with foraging. When combined with the acoustic earth banks to be included within the scheme, this will force the owls to fly higher and over the road at a safe height. In addition to this it is recommended that the verges undergo regular maintenance with frequent cutting to prevent the build-up of rough grassland and a dense thatch that provide suitable habitat for voles and mice that barn owls predate. If the verges are maintained unsuitable for foraging, barn owls are less likely to try and use them.

7.5 Monitoring

Further barn owl surveys should be conducted in years 1, 3 and 5 post development undertaking monitoring of the existing barn owl nesting sites and the proposed barn owl boxes. Surveys will also establish whether there has been a reduction in current population size from the works. If a reduction is observed, further mitigation may be required, if the road works are determined to be responsible.

It is recommended that post development monitoring of the site is undertaken to establish whether the new road is increasing barn owl casualties, which could be done in conjunction with project splatter, a scheme that maps animal strikes on road stretches to identify any specific area that may be a hotspot for barn owls.

8 Conclusion

Of the sites surveyed, a total of one confirmed nest site, one probable nesting site, and three roosting sites were identified, alongside a little owl box and kestrel box. The proposed road development will result in the loss of a confirmed breeding site and foraging habitat.

In order to mitigate for these potential effects the following is recommended:

- At site three, where the confirmed barn owl nesting has occurred, the barn owl box should be removed over winter, under supervision of a licenced ecologist, outside the main breeding season (March-September inclusive).
- At least 30 days prior to the removal of the barn owl box at site three, two alternative roosting boxes will need to be erected within 200m of the original box and within line of site. These will need protecting for the duration of the works program.
- Once the works have been completed a more permanent provision for barn owls should be sought through the installation of internal boxes into nearby farms, this will ensure a permanent long-term nesting site for barn owls.
- Compensatory rough grassland should be created alongside the motorway and the numerous balancing ponds that are due to be created. Further grassland could be created alongside the field margins adjacent to the A47. Grassland could also be created in areas where the carriageway isolates or cuts off land parcels however this should not be encouraged if it lures barn owls into pockets separated by multiple arms of the A47.
- Woodland or hedgerow should be planted alongside the A47 main carriageway to provide a physical screen of the road; this will force barn owls up and over the carriageway and reducing the chances of collision. Efforts should also be undertaken to render the roadside verges unsuitable for foraging barn owls, though regular cutting, this will deter them from foraging alongside the carriageway.
- All species used for planting should be locally sourced and native and include some fruit or berry producing species which will provide an additional food source for small mammal in the autumn and winter months which in turn should assist barn owls with prey availability.
- Five barn owl nest boxes should be sited in areas of created or retained type 1 habitat , providing its does not encourage birds to use the roadside verge, or within receptive local farms to improve the total population within the area.
- Post development monitoring of the barn owl numbers is recommended to determine if the new road is causing an increase in fatality's to barn owls, this could be done in conjunction with project splatter with further barn owl surveys in years 1, 3 and 5 to determine if there has been a reduction in population.

Providing the above mitigation is impalement the proposed development should comply with wildlife legislation and reduce the overall impact of the proposed development. The monitoring provision will ensure that if negative effects are encountered, they can be classified and addressed in the future. Providing this mitigation is all put in place the scheme should provide a gain for barn owls in the local area.

9 References

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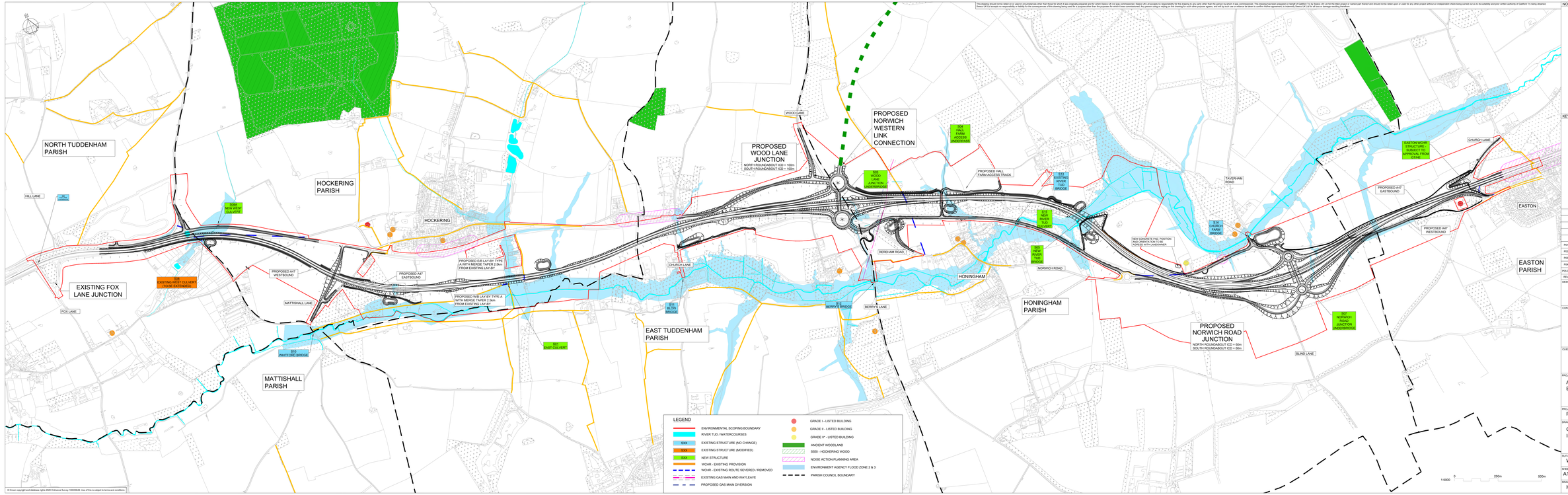
Drawings

SWECO HE551489-GTY-HML-000-SK-CH-30028-P05.01 GENERAL SCHEME LAYOUT INTERIM DESIGN FIX

778575-MLM-ZZ-DR-J-0001 – Barn Owl Survey Locations

778575-MLM-ZZ-DR-J-0002 - Barn Owl Foraging Habitat



NOTES

KEY TO SYMBOLS

REV	DATE	REVISION NOTE	ORIG	CHKD	APPD
P01	21/07/20	FOR INFORMATION	JM	JM	JM
P02	21/07/20	FOR INFORMATION	JM	JM	JM
P03	23/07/20	MINOR REVISIONS	JM	JM	JM
P04	24/07/20	MINOR REVISIONS	JM	JM	JM
P05.01	—	—	—	—	—

DESIGNER
SWECO

CONTRACTOR
GallifordTry

CLIENT
highways england

PROJECT TITLE
A47 NORTH TUDDENHAM TO EASTON DUALLING

PROJECT STAGE
PCF STAGE 3

DRAWING TITLE
GENERAL SCHEME LAYOUT INTERIM DESIGN FIX

SUITABILITY
WORK IN PROGRESS

SHEET SIZE	SCALE	STATUS	REVISION
A1	1:5000	S0	P05.01

DRAWING NUMBER
HE551489-GTY-HML-000-SK-CH-30028

LEGEND

SITE IMPACT ZONE

BARN OWL SURVEY SITES

0 0.75 1.5 km

THIS DRAWING IS INDICATIVE ONLY

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: METRE
SCALE: 1:28000
BASEMAP SOURCE: BASEMAP SOURCE: IMAGERY © CNES/ AIRBUS, GETMAPPING PLC, INFOTERRA LTD & BLUESKY, LANDSAT/ COPERNICUS, MAXAR

REV	DATE	DESCRIPTION	MADE	CKD

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DRAWING STATUS: FINAL

CLIENT: SWECO

PROJECT: A47 NORTH TUDDENHAM TO EASTON

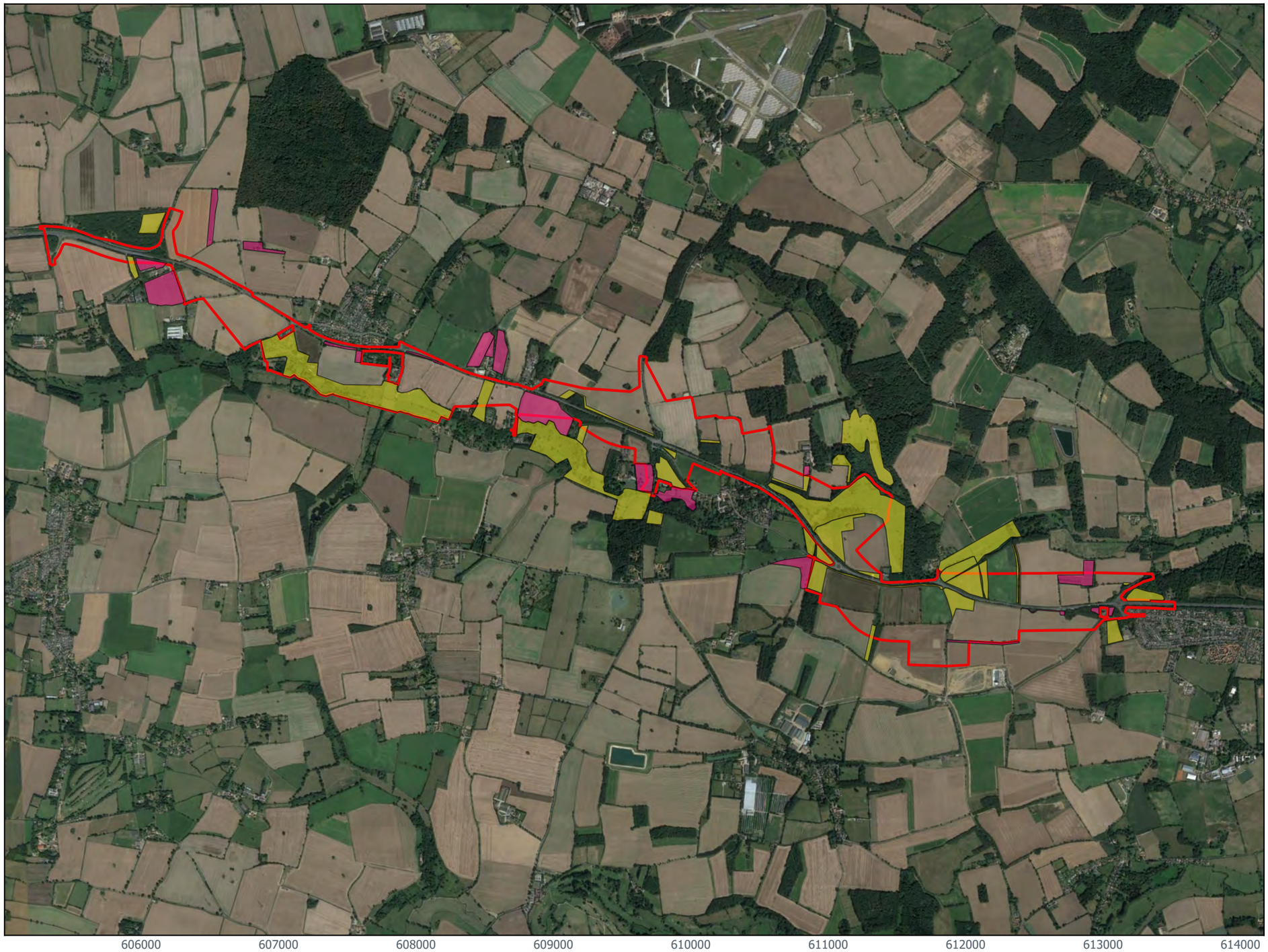
DRAWING TITLE: BARN OWL SURVEY LOCATIONS

DRAWN/DESIGN:	JS	DATE:	18//09/2020	STATUS:	S2
CHECKED:	SN	APPROVED:	MB	REVISION:	C01

DRAWING NO: 778575-MLM-ZZ-XX-DR-J-0001

LEGEND

- TYPE 1 HABITATS
- TYPE 2 HABITATS
- IMPACT ZONE



0 1 2 km

THIS DRAWING IS INDICATIVE ONLY

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REV	DATE	DESCRIPTION	MADE	CKD

MLM. Group Part of Sweco

DRAWING STATUS: FINAL

CLIENT: SWECO

PROJECT: A47 NORTH TUDDENHAM TO EASTON

DRAWING TITLE: BARN OWL FORAGING QUALTIY

DRAWN/DESIGN:	JS	DATE:	20/10/2020	STATUS:	S2
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