



APPENDIX 2

REPTILE METHOD STATEMENT

**Chiltern Railways Bicester to
Oxford Improvements Order**
Reptile Method Statement

August 2013



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1 Introduction

Background

- 1.1 The Chilterns Railways route between Bicester and Oxford will be subject to essential railway track maintenance works, to be carried out under a Transport and Works Act Order (TWAO), works will include the widening of the existing railway track and the re-profiling of existing railway embankments, scheduled to start in the summer of 2013.
- 1.2 Reptile surveys were undertaken to support the Environmental Impact Assessment for the Scheme, and reported in the Environmental Statement, which accompanied the above TWAO application. These surveys were undertaken in September 2009 (presence/absence surveys of 8 sample sites along the Chiltern Railways line between Bicester and Oxford) and May 2010 (population count surveys in three areas where reptile presence was confirmed).
- 1.3 The results of these surveys are summarised in the table below. Plans showing the locations of the three known reptile sites are provided in Appendix 1.

Table 1: Results of reptile survey

Site	Species	2009 Peak count	2010 Peak count	Population size
Wolvercote tunnel south	Slow worm	3	14	Medium
	Grass snake	0	1	Low
Wolvercote tunnel north	Slow worm	3	6	Medium
	Grass snake	9	3	Low
Langford industrial estate	Slow worm	2	0	None
	Grass snake	0	0	None

- 1.4 The reptile population scores in the above table are based on the peak count of adults observed under artificial refugia placed at a density of up to 10 per hectare, by one person in one day. At the Wolvercote tunnel sites (north and south) refugia were placed at a density of approximately 34 per hectare at the time of the 2010 survey: the population size class assessment is therefore likely to suggest a larger population size than if refugia had been placed at a density of 10 per hectare. Despite the high density of refugia, only very low numbers of grass snakes were recorded at both the Wolvercote Tunnel sites (north and south), along with a low/medium population of slow-worm.
- 1.5 Only very low numbers of slow worm were recorded at the Langford Industrial Estate in 2009. No grass snakes were recorded at the Langford Industrial Estate site during either survey.
- 1.6 Ahead to the start of construction works required under the approved scheme, vegetation clearance will be required in order to remove existing areas of semi-natural habitat and create a clean and barren works footprint. A method of working has therefore been discussed and agreed with Natural England, to be employed by those contractors undertaking pre-commencement vegetation clearance works. This method statement sets out the agreed methods for undertaking the vegetation clearance works and has been prescribed with a view to ensuring the works are undertaken in a manner that can be reasonably expected to avoid breach in protected species legislation relating to the UK's common and widespread species of reptiles.



2 Legislation

- 2.1 The common, widespread species of reptile (slow worm *Anguis fragilis*, grass snake *Natrix natrix*, adder *Vipera berus* and common lizard *Zootoca vivipara*) are protected through Sections 9(1) and 9(5) of the Wildlife and Countryside Act 1981 as amended by the Countryside and Rights of Way Act 2000, making it an offence to:
- a. Intentionally or recklessly kill or injure any reptile
 - b. Sell, offer for sale, possess or transport for the purchase of sale or publish advertisements to buy or sell any reptile



3 Method Statement

- 3.1 Due to the legislation protecting reptiles, and given the nature of the proposed vegetation clearance works, a method statement for the works is necessary to minimise the risk of an offence being committed. In general, the measures to be adopted include the employment of sensitive working techniques and avoidance of damage and/or destruction to suitable reptile hibernating habitat/features. This approach has been discussed in consultation with Natural England and was approved by them in August 2013 (Charlotte Frizzell, Land Use Operations – 2nd August 2013), superseding a previously approved strategy prepared in support of the original TWAO application in 2010¹.
- 3.2 The strategy below is designed specifically for both Wolvercote tunnel south and north where there are medium populations of slow worm and low populations of grass snake, as well as the Langford Industrial Estate site, where very low numbers of slow-worm were recorded.
- 3.3 Whilst populations of reptiles have been identified within discrete areas of habitat within the scheme boundary where it runs between Oxford and Bicester, given the nature of the habitats present and the fact that the railway corridor itself will provide a dispersal corridor for reptiles, it is conceivable that low numbers of reptiles also occur within other areas included within the scheme boundary outside of those identified in Table 1. It is therefore essential that the potential for reptiles to occur elsewhere within the scheme is communicated effectively across the project team to ensure that, where necessary, appropriate precautions are taken elsewhere within the scheme to ensure that no reptiles are intentionally or recklessly killed or injured as part of the works. This includes making all staff/contractors on site aware of the potential for reptiles to occur, how to identify them and the relevant legislation that protects them as detailed in Section 2. This method statement should therefore be circulated to all contractors involved in the project and undertaking construction works.

Method statement principles

- 3.4 The broad principles of this method statement, as discussed and agreed with Natural England, are as follows:
- c. Undertake habitat management works within the sites during the reptiles' active period (i.e. spring/summer) to allow reptiles to safely disperse from the works footprint into areas of retained and suitable habitat adjacent to the Scheme.
 - d. Ensure vegetation clearance works within known reptile areas adopt sensitive techniques, to allow reptiles the opportunity to safely disperse from the areas of works into adjacent and retained habitats.
 - e. Where appropriate an Ecological Clerk of Works (ECoW) will be present during vegetation clearance works to ensure compliance with the method statement.
 - f. Reinstate habitat following completion of the works suitable for reptiles (i.e. scattered scrub and tussocky grassland); including features that can be used by sheltering reptiles (e.g. log piles).

Method statement approach

- 3.5 The vegetation removal will be undertaken in phases and will accord with the methodology below:
- a. Vegetation removal will be undertaken using hand tools (strimmers etc.), and under the supervision of a suitably qualified ecologist, reducing the vegetation height first to approximately 30cm.
 - b. All arisings will then be removed and any exposed features suitable for sheltering reptiles, e.g. log and brash piles, dismantled by hand under the supervision of a suitably experienced ecologist.
 - c. Once the working footprint has been checked and any suitable features removed, the vegetation will be immediately further reduced to a height of 5-10cm and maintained at this

¹ ERM (2010) Chiltern Railways (Bicester to Oxford Improvements) – Reptile Mitigation Plan. ERM, July 2010.



level for the duration of the works (i.e. minimum mowing regime of once every six weeks during growing season)

- d. All vegetation removal will commence closest to the railway corridor and progress outwards to encourage reptile dispersal away from the works area.
- e. The works outlined above will be undertaken at a time of year when the majority of the reptile population are active and thus more able to disperse away from clearance works (i.e. March to September). As detailed above, the works will be supervised by a suitably experienced ecologist.
- f. Vegetation will then be kept unsuitable for reptiles for the duration of the construction works.
- g. Low numbers of grass snakes have been recorded at both Wolvercote Tunnel sites. Where there might be features suitable for breeding grass snake (e.g. piles of grass clippings), their removal will be undertaken in September once hatchlings have begun to disperse. This will also be undertaken in the presence of a suitably qualified ecologist.

- 3.6 Following completion of the works, reptiles will be free to recolonize the reptile sites. This will be encouraged by providing features suitable for sheltering reptiles within the sites (i.e. log and brick piles). Reinstated habitat, where this falls within the reptiles sites, will also be planted with a mosaic of scrub and tussocky grassland such that it provides high quality habitat for reptiles in the same locality in the longer term.

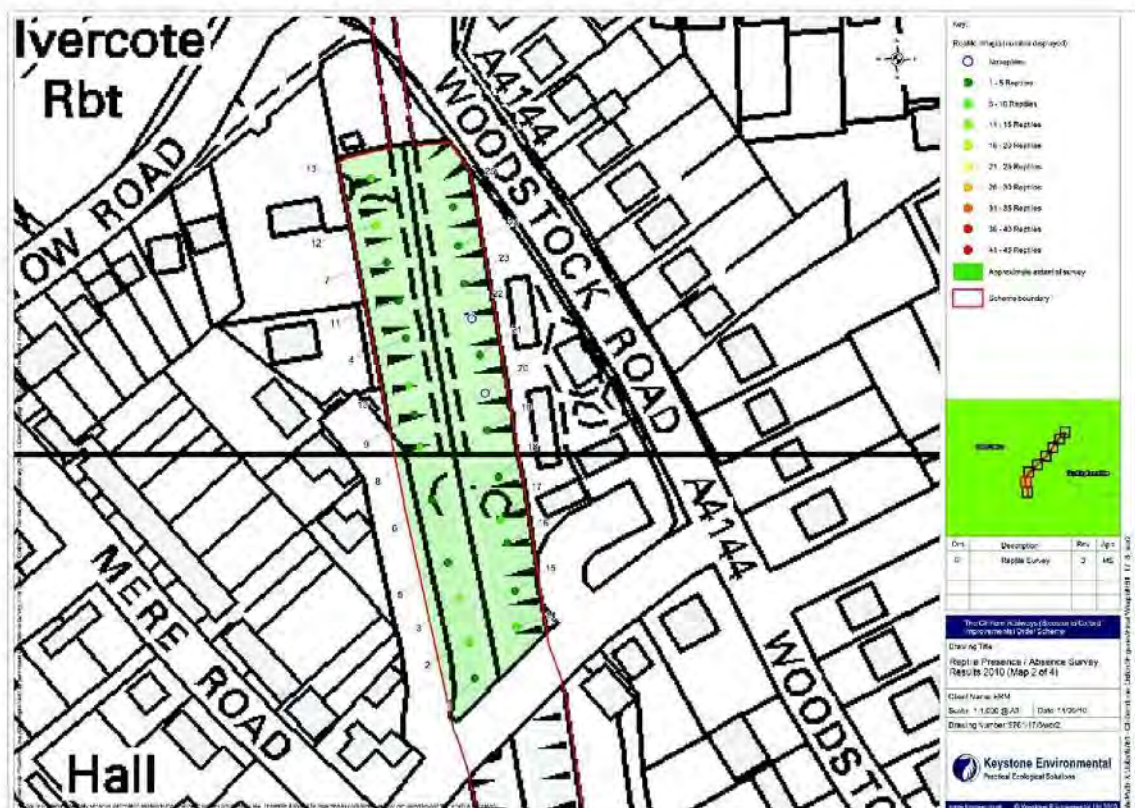
Method statement conclusion

- 3.7 It is considered that the proposed mitigation strategy represents reasonable avoidance measures to avoid harm to individual reptiles that is proportionate to the identified risk of killing and injury during construction works. Through the reinstatement/creation of features suitable for sheltering reptiles, and the provision of high quality habitat suitable for reptiles in the form of a tussocky grassland/scrub mosaic, the extent of suitable reptile habitat offered by the sites will be maintained in the long-term. Reinstated habitat will be like for like in terms of total area, ensuring that there is no net loss of local reptile conservation status in terms of habitat quality, quantity and connectivity.



4 Appendices

Appendix 1: Reptile Site Location Plans





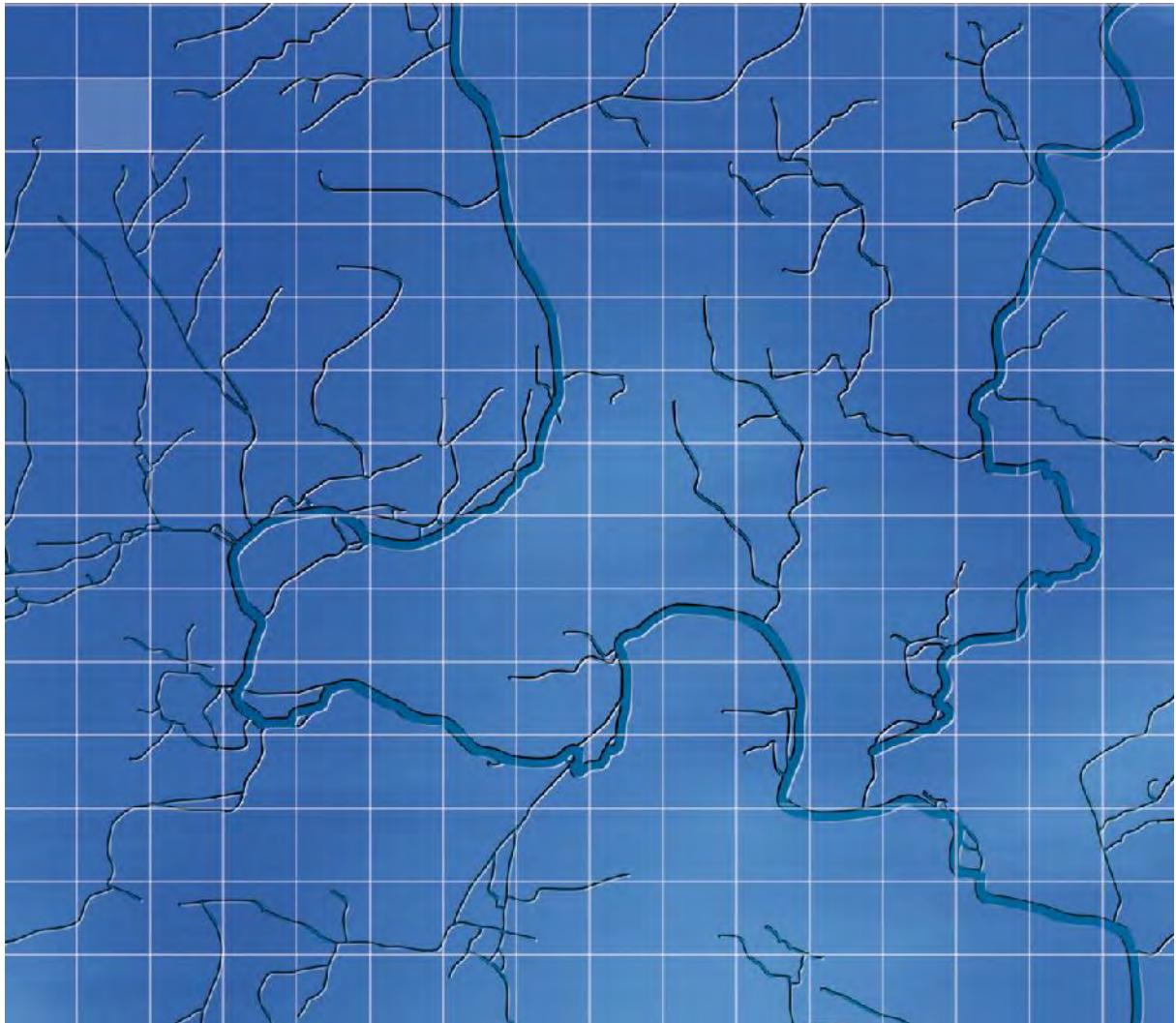


APPENDIX 3 WALLINGFORD HYDROSOLUTIONS LIMITED REPORT

Network Rail - Home Farm barn and access track

October 2015

Potential effects on the hydrological integrity of the Wendlebury Meads and Mansmoor Closes SSSI



Wallingford HydroSolutions Limited

Network Rail - Home Farm barn and access track

Potential effects on the hydrological integrity of the Wendlebury Meads and Mansmoor Closes SSSI

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For and on behalf of Wallingford HydroSolutions Ltd.

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Date **20th October 2015**

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1 Introduction

This report provides an assessment of the impacts of development activities associated with East West Rail Phase 1 project on the Wendlebury Meads and Mansmoor Closes Special Site of Scientific Interest (SSSI). Wallingford HydroSolutions has been commissioned to assess the impacts the development of Home Farm barn and access track will have on the hydrological and hydrogeological integrity of the SSSI as part of the associated planning application. The development activities assessed within this report consist of the construction of a 3.65m wide 150mm unreinforced concrete access track and development of a barn at NGR SP560180 which are identified in Figure 1. This report firstly describes the assessment methodology in Section 2, followed by a description of the designated site and an assessment of baseline conditions in Section 3. An assessment of the impacts on the designation and a description of any proposed mitigation is presented in Section 4. A summary of the findings are then presented in Section 5.

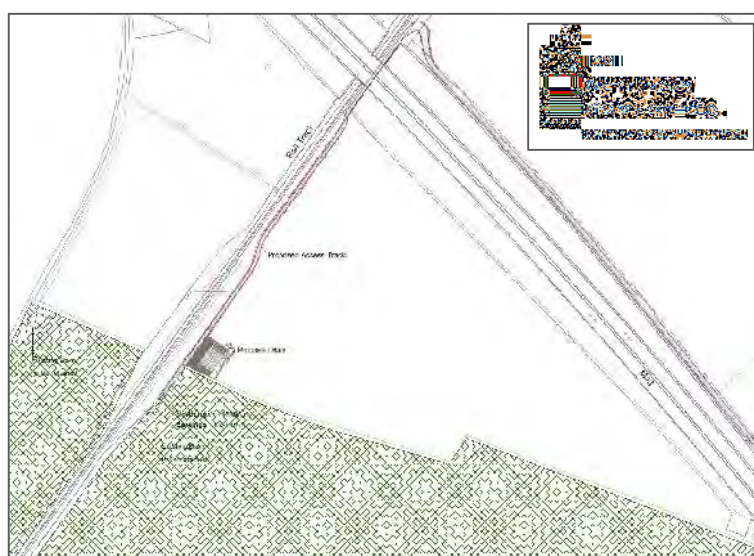


Figure 1: Home Farm proposed development with respect to Wendlebury Meads and Mansmoor Closes SSSI.

2 Methodology

Evaluation of the existing SSSI baseline environment will be assessed through a desk based study considering the following sources of information:

- Natural England SSSI Citation
- OS Mapping at 1:10,000
- LiDAR 2m Topographic Data
- British Geological Survey 1:50k scale superficial and bedrock geological mapping and Borehole records
- Environment Agency Groundwater vulnerability mapping

Due to the presence of a designated site this area is considered to have a high sensitivity. The assessment of impacts on the surface and groundwater and SSSI baseline environment of the development has been conducted using the following process:

1. Examination of infrastructure design and construction methodologies.
2. Identification of potential impacts.
3. For each potential impact, identification of best practice and mitigation measures to avoid, minimise or remedy any adverse effects and enhancement measures to deliver potential positive benefits.
4. Identification of residual impacts and assessment of effects following the implementation of mitigation measures. The residual magnitude of change will be determined using the criteria presented in Table 1.

Table 1: Magnitude of Change

Magnitude	Changes to the Baseline Environment
Large	Long term loss of resource and/or quality; partial loss of or damage to key characteristics, features or elements.
Moderate	Long term measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one or more key characteristics, features or elements; or Short term loss of resource and/or quality; partial loss of or damage to key characteristics, features or elements.
Small	Long term very minor loss or detrimental alteration to one or more characteristics, features or elements; or Short term measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
Negligible	Short term very minor loss or detrimental alteration to one or more characteristics, features or elements.
No Change	No loss or alteration of characteristics, features or elements.

The final level of effect of the residual impacts upon the SSSI is defined as a function of the sensitivity of the receptor (high) and the magnitude of change to the baseline environments as presented in Table 2. Moderate or Major effects are deemed significant. Effects that are of a Minor, Negligible change or result in No Change are judged to be not significant.

Table 2: Significance Criteria

Site Sensitivity	Magnitude of Change				
	Large	Moderate	Small	Negligible	No Change
High	Major	Moderate	Minor	Negligible	None

3 Baseline Assessment

The Wendlebury Meads and Mansmoor Closes SSSI is located approximately 5km south of Bicester, 1.5km southeast of the village of Wendlebury and 100m south of the M40 motorway (approx. 20m at its closest point) as presented in Figure 1. The SSSI lies either side of the railway line, totals 254.1 ha in size and includes 10 fields.

The SSSI consists of a series of traditionally-managed unimproved neutral meadows supporting a complex variety of plant communities¹. The meadows represent a rare calcareous clay pasture community which have increased in rarity as a result of agricultural improvement and urbanisation. The history of the fields is varied with some being used for arable farming during the early 1900's and others used primarily for summer grazing and haymaking. The use of pesticides and herbicides has been very limited and ploughing has not been undertaken since 1920.

The ridge and furrow fields (historically ploughed) and hayfields contain different grassland and plant species. The hedgerows also provide further habitat not found within the fields themselves. A full description of the plant communities are presented in the SSSI citation in Appendix 1. One field located on the edge of the tributary of the River Ray, consists of the sedge-rich meadow type which is predominantly a western community. This field is the only known place where the community is found growing in association with several ridge and furrow species.

The majority of the SSSI and development area is underlain by superficial deposits of Alluvium overlying impermeable Oxford Clay. Much of the area is covered by loamy or clayey soil. There are four recognised soil types within the area and short term flooding from the River Ray is common. The area has a gentle downward sloping gradient to the south east with a total elevation change of approximately 7 m. The two highest points are located in the far west of the site (66 m Above Ordnance Datum (AOD)) and northwest point of the eastern section (65 m AOD) as shown in Figure 2.

The superficial deposits of Alluvium are classified as a Secondary (type A) Aquifer based on the interpretation of geological mapping provided by the British Geological Survey. This classification suggests that the Alluvium is a permeable layer capable of supporting groundwater supplies at a local scale. There are a number of boreholes located along the M40 which are in close proximity to the north eastern boundary of the SSSI (borehole ID Numbers: SP51NE73, SP51NE72, SP51NE74 and SP51NE71). All four boreholes intersect deposits of Alluvium of various thicknesses which overlie deposits of Oxford Clay. Two of the boreholes encounter water seepage between 2.4m and 2.5m below ground level within the Alluvium. Water is also encountered at 19.5m in borehole SP51NE73 within the Kellaways Sand deposit which underlies the Oxford Clay.

¹ Wendlebury Meads and Mansmoor Closes SSSI Citation. Available at: ([http://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1001141&SiteName=WENDLEBURY MEADS &countyCode=&responsiblePerson=](http://designatedsites.naturalengland.org.uk/SiteDetail.aspx?SiteCode=S1001141&SiteName=WENDLEBURY%20MEADS&countyCode=&responsiblePerson=))

Potential effects on the hydrological integrity of the Wendlebury Meads and Mansmoor Closes SSSI

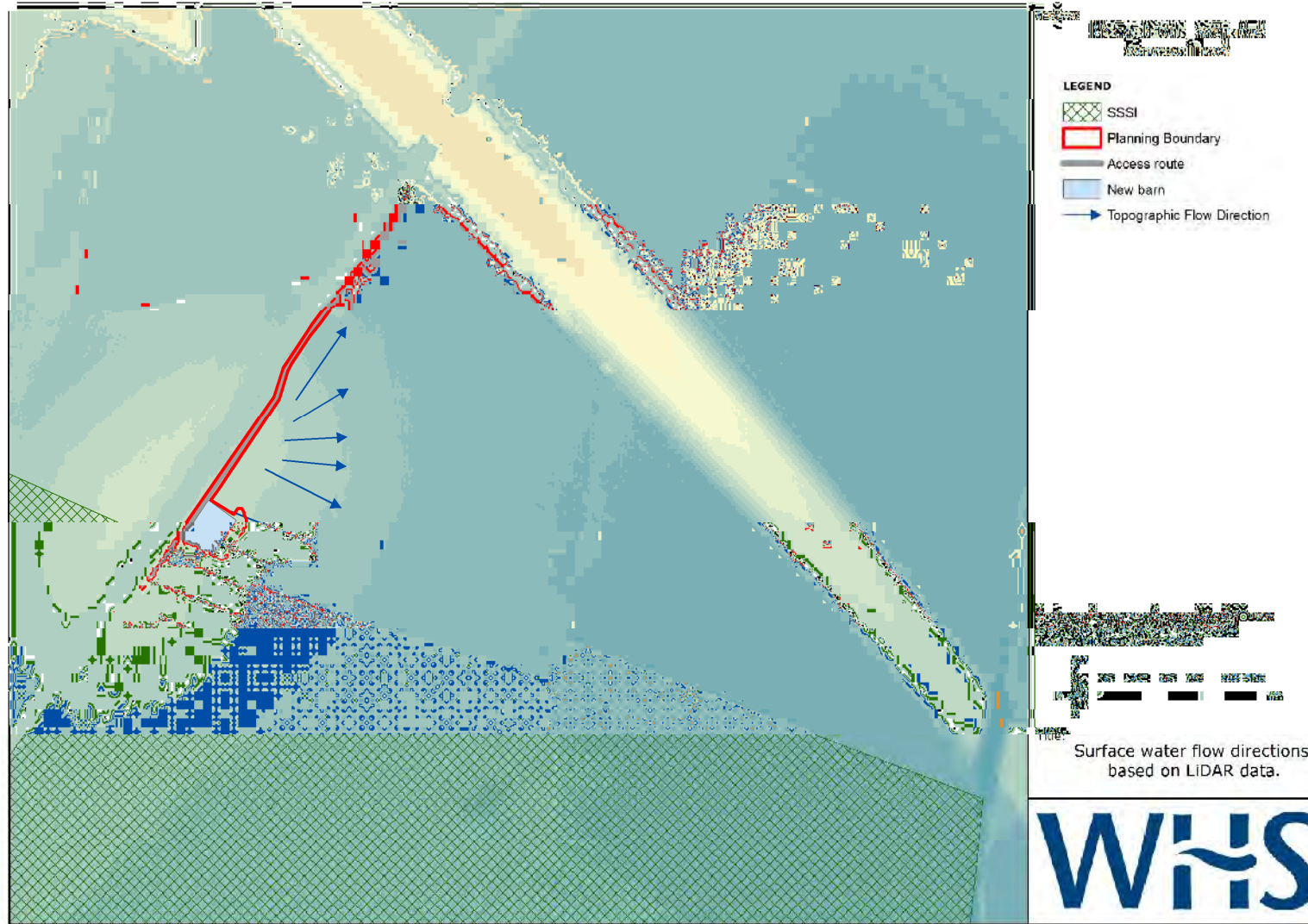


Figure 2: Topographic drainage pathways of the development site.

4 Assessment of Impacts

This section assesses the potential impacts on the SSSI which could arise as a result of the development described in Section 1. This is then followed by a description of any mitigation measures which would alleviate or reduce the potential impacts. The resultant residual impacts following the implementation of the mitigation measures are then presented.

4.1 Potential Impacts

The Home Farm barn development and the associated access track are located alongside the railway line to the north of the SSSI boundary (Figure 1). Therefore the direct potential impacts of the proposed development on the SSSI are on the surface drainage and flood risk, groundwater and water quality as detailed below.

4.1.1 Surface Drainage and Flood Risk

Figure 2 presents the detailed topography of the area on a 2m grid and 0.5m contours. This is a very flat and dry area (Standardised Annual Average Rainfall: 608 mm) and therefore surface runoff would be limited and slow. The proposed barn is located towards the peak of a small rise in the local topography. The peak is located to the west of the barn within the SSSI and therefore surface runoff from the barn would flow away from the SSSI. Due to the slight ridge along the edge of the field to the south east of the proposed barn, surface runoff from the barn would flow south east away from the SSSI, as illustrated in Figure 2. The impermeable access track and the hardstanding areas associated with the barn have the potential to increase runoff rates in these areas. The southernmost portion of the access track, which connects the existing barn with the proposed barn, is the only development which would drain directly into the SSSI (Figure 2) and is approximately 55m in length. This section of access track would drain to the south east onto land within the SSSI which appears to be heavily modified due to agricultural use, based on aerial imagery, and therefore is considered to have a low vulnerability. This 55 m long 3.65 m wide track along the crest of the hill parallel to the railway cutting would not have any significant impact upon surface water runoff into the SSSI.

Rainwater runoff from the barn roof will be collected within a rainwater harvesting tank which will be located adjacent to the barn and provide a water supply to the cattle. Surface water runoff from the hard standing associated with the barn will be limited due to the semi-pervious nature of the hardstanding. Any surface runoff from the hardstanding and overflow from the rainwater harvesting tank should be design to discharge away from the SSSI. The development of the access track and the proposed barn structure are both within Flood Zone 1, meaning that it is not at any significant risk of flooding.

4.1.2 Groundwater

As discussed within section 3 the majority of the SSSI and the development site is underlain by deposits of Alluvium which have regionally been classified as Secondary (type A) aquifers based on BGS geological mapping and are located within a minor aquifer groundwater vulnerability zone. Based on BGS geological mapping the new barn is not underlain by Alluvium and hence is not within a groundwater vulnerability zone, see Figure 3. The groundwater flow direction in this area is thought to be dictated by topography and therefore any flow from the proposed developments that enters groundwater will flow in the same direction as surface flow as shown in Figure 2. Any potential contaminants or increased nutrient levels entering groundwater due to the proposed barn and access track will flow away from the SSSI and therefore would not impact upon the groundwater quality of the SSSI.

Any direct or pumped runoff from the excavation works is likely to contain very high sediment concentrations. Boreholes located approximately 300m to the south east of the proposed barn indicate groundwater seepages at depths of 2.4m below ground level. The proposed barn is located at a higher elevation than these boreholes and is not believed to be underlain by alluvium, therefore groundwater is likely to be at a depth greater than 2.4m, if present. It is unlikely that surface water flows would enter excavations and therefore control of groundwater levels are unlikely to be required during excavation works for the barn foundations.

The railway track located along the north western boundary of the site is located within a cutting and is situated at an elevation of several metres below the surrounding land and therefore is acting as a barrier to any shallow groundwater flows from the North West. The construction of the access track, which will not have foundations, and the construction of the cattle barn with foundations of up to 2m will not affect the groundwater flow regime in the area.

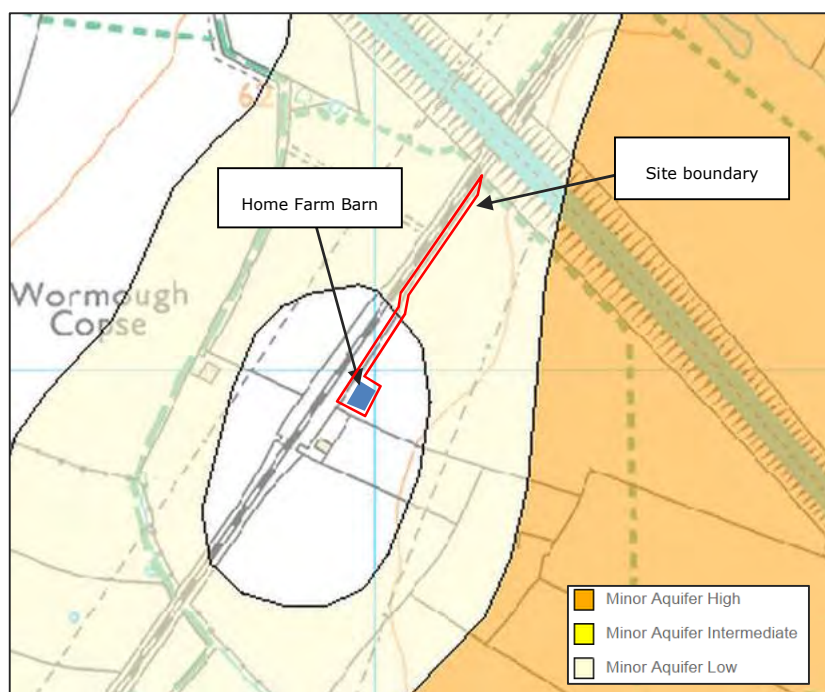


Figure 3: Development site shown in reference to groundwater vulnerability zones. Contains public sector information licensed under the Open Government Licence v3.0.

4.1.3 Reduced Water Quality

Any reduced water quality within runoff from the development areas during construction or in the long term could impact on the plant species of the SSSI resulting in a detrimental effect.

Necessary ground disturbance would occur during the construction period, where the covering vegetation would be disturbed within construction zones, exposing the underlying soils. Temporarily exposed and stockpiled soil offer a readily mobilised source of sediment. The access track and barn are will be located within an agricultural field, which is shown to be ploughed within aerial photography. The exposure of the soils during construction would be no greater than following ploughing, where the exposed soils would cover a much greater area than the constructions zone.

There would be the potential during the construction period for pollution from accidental spillage, leakage of stored materials, incorrect use of toxic substances and runoff during storm events which could pollute the areas surrounding the construction zone.

In the long term, use of the barn and hardstanding within animal husbandry could also result in increased nutrient levels within the runoff from these areas. As noted above the topography of the area, means that runoff from the application boundary would not directly flow into the SSSI.

4.2 Mitigation

The following measures would be used to mitigate any potential impacts on the water quality and surface water drainage:

- Best practice construction methods would be followed in accordance with the Environment Agency Pollution Prevention Guidance.
- During construction cut-off drains would be utilised along the western boundary, if existing field drains are not present along the field boundaries, to ensure that the runoff from the construction area does not enter the SSSI.
- Equipment would be provided to contain and clean up any spills. If any on-site storage of fuels, lubricants or chemicals is required, these would be contained within an area bunded to 110 %.
- Any refuelling of machinery would be within the bund or have secondary containment. Associated pipework would be located above ground and protected from accidental damage.
- Drip trays would be placed under standing machinery.
- Routine monitoring of any sediment control measures implemented would be undertaken by the contractor on a weekly basis (more frequently following heavy rainfall) to ensure the measures are still functioning correctly.
- If dewatering of excavations is required, pumped discharges would be treated before release to the surrounding land away from the SSSI. Measures would be taken to ensure water flowing away from dewatering / washout areas does not re-enter excavations.
- The movement of construction traffic would be controlled to minimise soil compaction and disturbance.
- Correct design of the track and barn drainage is an important element in minimising erosion and the potential for pollution.
 - The hard standing associated with the barn will be semi-pervious and therefore surface water runoff will be limited. The hardstanding will follow the natural ground surface and therefore runoff will flow to the south east away from the SSSI. This will be incorporated into the final detailed design.
 - Rainwater runoff from the barn roof will be collected within a rainwater harvesting tank. The overflow requirements from the rainwater harvesting tank, which will be a proprietary product, would be determined using guidance from the supplier. The final detailed design will ensure that the overflow is directed onto the vegetated strip along the agricultural land to the east of the barn away from the SSSI.

4.3 Residual Impacts

The potential impacts of this development on the SSSI are primarily related to decreased water quality during both construction and long term use of the barn and track. Only a small section of track would drain into the SSSI. The topography of the area is such that runoff or superficial groundwater from the majority of the track and barn would not flow towards the SSSI and mitigation measures will ensure that runoff is directed away from the SSSI. Best practice pollution prevention measures would be followed throughout construction. The changes in water quality are considered to have a negligible magnitude of change resulting in a **negligible** residual impact.

It is considered that there would be no significant increase in flood risk from increased impermeable areas or changes to surface runoff or groundwater flow resulting in no significant impact.

5 Summary

The Wendlebury Meads and Mansmoor Closes SSSI is designated for its series of traditionally-managed unimproved neutral meadows supporting a complex variety of plant communities. The development areas, which consist of an access track and construction of a barn lie to the north of the main SSSI and outside of the drainage pathway to the SSSI with exception to a 55m length of access track connecting the new and existing barns. This length of access track is not thought to have a detrimental effect on the SSSI due to the small increased surface water runoff volumes involved and the heavily modified nature of land immediately adjacent to the track. The development is also thought to have no impact on the groundwater quality or regime of the SSSI.

The main potential impacts to the SSSI as a result of the development is through reduced water quality. This is both through the construction of the access track and barn foundations as well as continued use of the track and barn. Through the incorporation of pollution prevention and drainage mitigation measures the impact of reduced water quality is greatly reduced. The residual impacts of the effects of reduced water quality on the SSSI are considered to be of negligible significance.

Appendix 1 Wendlebury Meads and Mansmoor Closes SSSI Citation