



Ardley Trackways SSSI Oxfordshire

***Notification under Section 28 of the Wildlife
and Countryside Act 1981***

Issued by Natural England's Cotswolds and Thames Clay Vales Land Management Team
on **19 January 2010**

Contact points and further information

This notification document is issued by Natural England's Cotswolds and Thames Clay Vales Land Management Team. Our address for correspondence is:

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Your contact point for enquiries relating to this notification is **Rebecca Tibbetts**.

A second document (*Ardley Trackways SSSI - supporting information*) is available on request from the address above. This contains information and extracts from relevant documents that have been used in the decision to notify this SSSI.

The date of notification of Ardley Trackways SSSI is 19 January 2010

Contents

1. Summary.....	4
2. The legal background.....	4
3. Making representations.....	4
4. Reasons for notification.....	5
5. Site boundaries and relationships with other SSSIs.....	5
6. Management of the SSSI.....	6
7. Supporting information.....	7
8. Legal documents.....	7
<i>Annex 1 Citation</i>	8
<i>Annex 2 Views about Management</i>	11
<i>Annex 3 List of operations requiring Natural England's consent</i>	13
<i>Annex 4 Map(s) showing the land notified</i>	16

1. Summary

- 1.1 This document explains why Ardley Trackways is notified by Natural England as a Site of Special Scientific Interest (SSSI).
- 1.2 Ardley Trackways SSSI is a nationally important site by reason of the following geological features of special interest: a rock horizon at the top of the Shipton Member of the White Limestone Formation which, in the immediate vicinity of the SSSI, has revealed a nationally and internationally rare example of preserved dinosaur footprints and trackways. These show fossil footprints of both two-legged, carnivorous (theropod) and four-legged vegetarian (sauropod) dinosaurs, which provide details of the animals' locomotion. Based on the orientation of the trackways studied to date, the Geological Conservation Review has identified the area of the SSSI as containing a finite buried reserve of the trackway bed, which is accessible for scientific study.
- 1.3 The annexes to this document comprise the legal papers that detail the interest and the management required to maintain that interest. You have a right to make representations or objections to this notification. Part 3 of this document explains how to do this.
- 1.4 Natural England's consent is required by owners and occupiers before any of the operations listed in *Annex 3* can be carried out. We will work closely with owners and managers, as well as other bodies, to ensure that existing operations and new works that are not considered likely to damage the special features of the SSSI can be carried out.

2. The legal background

- 2.1 Ardley Trackways SSSI is notified under Section 28 of the Wildlife and Countryside Act 1981, as substituted by Schedule 9 to the Countryside and Rights of Way Act 2000.
- 2.2 Part 8 of this notification document contains the following legal documents required by Section 28 of the Wildlife and Countryside Act 1981.
 - a citation detailing the reasons for notification (*Annex 1*)
 - a statement of Natural England's views on the management of the SSSI (*Annex 2*)
 - a list of operations requiring Natural England's consent (*Annex 3*)
 - a map identifying the land subject to this notification (*Annex 4*).
- 2.3 This notification has several effects. The key ones can be summarised as follows:
 - owners and occupiers must give Natural England notice before carrying out, causing or permitting to be carried out any of the activities in the list of operations at *Annex 3*;
 - owners of land included in the SSSI have a legal obligation to notify Natural England within 28 days if the ownership or occupancy of the land changes;
 - it is an offence for any person intentionally or recklessly to destroy or damage the special features of the SSSI or to disturb any of the fauna;
 - other public bodies must consult Natural England before carrying out or authorising any works that may damage the SSSI.

If you require any further information or advice on how this notification affects you, please do not hesitate to contact Natural England at the address shown at the beginning of this notification document.

3. Making representations

- 3.1 You have a legal right to make objections and representations about this notification. Any representations or objections should be made in writing by **19 May 2010** to Natural England's Cotswolds and Thames Clay Vales Land Management Team at the address

shown on page two. You may wish to seek legal or independent advice and your representative may wish to write to us on your behalf.

- 3.2 The Cotswolds and Thames Clay Vales Land Management Team will consider your objections or representations and will try to resolve them. Any unresolved objections or representations will be considered by the Board of Natural England within nine months of this notification. If you wish to emphasise any of your objections or representations to the Board in person, you should tell us when you write to us. You will then be advised of the date and location of the Board meeting. Following consideration of objections and representations, the Board may confirm or withdraw all or part of this notification.
- 3.3 Natural England has a policy of openness, which reflects our obligations under the Environmental Information Regulations 2004 and the Freedom of Information Act 2000. This legislation provides a legal right of access to information held by public bodies. This means that we will provide information on how we make our decisions on SSSIs to any person on request. This includes details of objections and representations received. We will assume, therefore, that your representation or objection can be made publicly available unless you indicate with clear and valid reasons which (if any) part(s) of these you wish to be excluded from this arrangement. However, you should be aware that the requirements of the legislation may mean that we cannot comply with your request that this information be withheld. We do, however, respect people's privacy and will take all reasonable steps to consult you before reaching a decision on disclosure of the information.

As an individual or organisation with an interest in Ardley Trackways SSSI, your information will be stored and processed on a computer database that will be operated within the Data Protection Act 1998. This Act gives individuals the right to know what data we hold on them, how we use it and to which third parties it is disclosed. For the purposes of the Data Protection Act, the data controller is Natural England, Northminster House, Peterborough, PE1 1UA.

4. Reasons for notification

- 4.1 Ardley Trackways SSSI is of special interest by reason of the following nationally important features:

- **Geology**

Ardley Trackways SSSI contains part of a rock horizon close to the top of the Shipton Member of the White Limestone Formation. Study of this rock horizon in the immediate vicinity of the SSSI has revealed a rich assemblage of fossil trackways formed by sauropod and theropod dinosaurs that roamed this part of Oxfordshire during the Middle Jurassic (approximately 165 million years ago). Extensive trackways, such as these, are currently unique in Britain and rare internationally. This assemblage provides evidence (some unique) relating to a range of aspects of sauropod and theropod dinosaur palaeobiology. Based on the orientation of the trackways studied to date, the Geological Conservation Review has identified the area of the SSSI as containing a finite buried reserve of the trackway bed, which is accessible for scientific study.

5. Site boundaries and relationships with other SSSIs

- 5.1 During aggregate extraction operations at Ardley Quarry (the land between the two units of Ardley Trackways SSSI), extensive dinosaur trackways were discovered in the bed forming the floor of the quarry. The trackways were studied and recorded but rapidly deteriorated when exposed to the elements. This deterioration and the subsequent use of the quarry for landfill have destroyed the interest in Ardley Quarry. The trackway-bearing bed underlies the whole of the area subject to a new minerals planning permission covering land to the north and south of Ardley Quarry. The new quarrying operations are underway and the trackway-bearing bed in these areas is becoming accessible for study (although it will remain protected by the clay unit that rests upon the trackway bed). Based on the orientation of the trackways studied to date, the Geological Conservation Review site

comprises that land which, as a consequence of the quarrying operations, includes the features of special interest accessible for future study. The SSSI boundary reflects this.

- 5.2 Whilst the trackway-bearing bed extends beyond the area for which the new minerals planning permission exists, it lies at a depth too great to ever be practically accessible in the absence of commercial quarrying operations. Mineral extraction within the boundary of the permission makes this horizon accessible. It is for this reason that the boundary of the SSSI has been drawn to reflect the area for which the minerals permission has been granted.
- 5.3 The SSSI consists of two units: Ardley North, at the northern end of the site, and Dewars Farm at the southern end. The south-western boundary of the Ardley North unit follows the railway boundary fence (shared with Ardley Cutting and Quarry SSSI). The south-eastern boundary (also partly shared with Ardley Cutting and Quarry SSSI) does not follow a fixed feature but is formed by straight lines between three defined points, as described on the map in Annex 4. Along the south-eastern edges of the Dewars Farm unit, the boundary runs 4 metres within a fence line and 2 metres within the line of a footpath (FP8) which skirts the site. Along the north-eastern edge, the boundary runs 10 metres within the line of Gagle Brook. Other sections of the boundary in both units follow existing hedgerows and fence lines and reflect the area which is being excavated during quarrying.. The two units are distinct from each other and are not adjoining. See the map at Annex 4 for detail of the SSSI boundary. Further clarification of the precise location of the boundary in specific parts of the SSSI can be obtained from Natural England's Cotswolds and Thames Clay Vales Land Management Team at the address on page 2 of this document.
- 5.4 The Ardley North unit of Ardley Trackways SSSI is adjacent to and shares its south-western boundary with Ardley Cutting and Quarry SSSI. This latter site is also notified for its geological interest, but this interest is unrelated to the fossil trackways for which Ardley Trackways SSSI is of special interest.
- 5.5 This site forms part of the Geological Conservation Review subject block known as Jurassic–Cretaceous Reptilia. Ardley Trackways SSSI is the only English site within this subject block where the interest consists exclusively of footprints and trackways, with no skeletal remains.

6. Management of the SSSI

- 6.1 This notification includes at *Annex 2* a statement of the management that Natural England considers is needed to conserve and enhance the features of special interest. Different management may be appropriate in different parts of the site and this statement is not intended to detail the exact requirements at specific locations. The statement is intended to explain how we can work with and support owners and managers in continuing to achieve positive management of the SSSI.
- 6.2 This notification also includes a list of the operations requiring Natural England's consent at *Annex 3*. Some of the operations may already be taking place and where they do not cause any damage they will be given consent. We will work with landowners and managers to agree lists of such existing and planned activities, which can be approved.
- 6.3 Where an operation has been granted a consent, licence or permission from another public body a separate consent will not generally be required from Natural England. However, other public bodies are required to consult Natural England before such consents, licences or permissions are issued.
- 6.4 In particular, we recognise the important roles of the owners and managers of the land in managing this site. We will work with them to develop means to secure the sustainable management of Ardley Trackways SSSI.

7. Supporting information

- 7.1 The detailed information, which has been used to assess the importance of this SSSI, is available on request from the address on page 2 of this document.

8. Legal documents

- 8.1 Attached at *Annexes 1 - 4* are the legal documents that are required by section 28 of the Wildlife and Countryside Act 1981.

Annex 1

Citation

This is a legal document on which you have a right to make objections or representations, as explained in part 3 of this notification document

Site Name: Ardley Trackways SSSI

County: Oxfordshire

District: Cherwell

Status: Site of Special Scientific Interest (SSSI) notified under section 28 of the Wildlife and Countryside Act 1981, as substituted by Schedule 9 to the Countryside and Rights of Way Act 2000.

Local Planning Authority: Cherwell District Council

National Grid reference: SP540248

Area: 63.59 ha

Ordnance Survey Sheet: 1:50,000: 164

1:10,000: SP 52 NW, SP 52 SW

Notification date: 19 January 2010

Reasons for notification:

Ardley Trackways SSSI is a nationally important site containing a rock horizon close to the top of the Shipton Member of the White Limestone Formation which, in the immediate vicinity of the SSSI, has revealed the presence of an array of fossilised trackways. These trackways were formed by the passage of a herd of sauropod dinosaurs, and several theropod dinosaurs, along a shoreline in what is now north-eastern Oxfordshire, during the Middle Jurassic (approximately 165 million years ago). Such extensive and relatively complete assemblages of trackways are otherwise unknown in England and are rare in the Middle Jurassic worldwide. The rarity of these trackways and their geological and environmental context for future research, mean that Ardley Trackways SSSI can be regarded as being of international importance. Based on the orientation of the trackways studied to date, the SSSI has been identified as containing a finite buried reserve of the trackway bed, which is accessible for scientific study.

General description:

Ardley Trackways SSSI consists of a series of working quarries lying either side of the railway line from Bicester to Banbury, to the south of the village of Ardley, about 4 km northwest of Bicester in Oxfordshire. The bedding-plane in which the trackways lie is near the top of the Shipton Member of the White Limestone Formation. The general trend of the trackways is on a bearing north-north-east to south-south-west, although a few trend north-east to south-west. The Shipton Member of the White Limestone Formation is of Bathonian age (Middle Jurassic – approximately 165 million years ago) and was deposited within a belt of near-shore lagoons on the north-western margin of the London Platform (a land mass extending over part of the area now consisting of south-eastern England, the southern North Sea and Belgium).

In locations where it has previously been exposed immediately adjacent to the SSSI, the bedding-plane surface has so far revealed the presence of over 40 more-or-less continuous trackways attributed to two-legged, carnivorous (theropod) dinosaurs and four-legged vegetarian (sauropod) dinosaurs. The trackways yield information relevant to our understanding of dinosaur locomotion, their burial and how they came to be preserved (taphonomy), the implications these trackways have for the classification (systematic taxonomy) of the footprints, the evolutionary relationships of the dinosaurs thought to be represented by the trackways, the taxonomic composition of this particular ecosystem, and insights into the behaviour (ethology) of these animals.

Evidence of a change in the stride (gait transition) associated with a temporary increase in speed on a theropod trackway has important implications for understanding the mechanics of the limb movement and the evolution of the oldest theropods. The interpretation of many of the sauropod tracks as having been formed by members of the Titanosauria (a large group of sauropods characterised by their wide-gauge limb posture), pushes the origins of this group back into the Middle Jurassic. This provides evidence to counter theories that titanosaurs originated in

Gondwana (the continent consisting of Africa, Antarctica, Australia and South America) after the break-up of Pangea (the supercontinent consisting of Gondwana combined with Eurasia and North America) during the late Middle Jurassic. The similar directions of the trackways, combined with the relatively limited time period over which the tracks could have been formed, may suggest that the sauropods were moving in a mixed herd. It has also been speculated that the theropods were following the sauropod herds and that additional evidence from the site might provide insights into pack behaviour in large theropod dinosaurs.

Annex 2

Views about Management

This is a legal document on which you have a right to make objections or representations, as explained in part 3 of this notification document.



Views About Management

*Wildlife and Countryside Act 1981 Section 28(4) as inserted by
Schedule 9 to the Countryside and Rights of Way Act 2000*

A statement of Natural England's views about the management of Ardley Trackways Site of Special Scientific Interest (SSSI).

This statement represents Natural England's views about the management of the SSSI for nature conservation. This statement sets out, in principle, our views on how the site's special conservation interest can be conserved and enhanced. Natural England has a duty to notify the owners and occupiers of the SSSI of its views about the management of the land.

Not all of the management principles will be equally appropriate to all parts of the SSSI. Also, there may be other management activities, additional to our current views, which can be beneficial to the conservation and enhancement of the features of interest.

This Statement does not constitute consent for any of the 'operations requiring Natural England's consent'. The written consent of Natural England is required before carrying out any of those operations. Natural England welcomes consultation with owners, occupiers and users of the SSSI to ensure that the management of this site conserves and enhances the features of interest, and to ensure that all necessary prior consents are obtained.

Management Principles

Whilst the current setting of Ardley Trackways SSSI is that of a series of actively worked quarries, the location and nature of the interest features is such that they should remain buried. These features are highly susceptible to weathering, and would be rapidly destroyed if permanently exposed. The quarrying activities on this site will lower the ground level so that the footprint bed will become easily accessible through shallow, but temporary excavations.

The geological interest features at this site are finite and irreplaceable. The main management principles are to conserve the resource *in situ*, whilst permitting scientific usage, which may involve excavation and temporary exposure of the trackways. Balancing these two principles is the key to long-term positive management.

Judgment of how much excavation is appropriate, whilst sustaining the resource, will need to be made through developing a better understanding of how the interest features are distributed through the site. This means that some excavation will be inevitable in order to inform the management of the site. Such excavations, whether for the purpose of informing the management of the site or for scientific research, will be temporary and backfilled after study and recording.

Sites with a unique or finite geological resource are particularly sensitive because they are often small and the important interest features may be restricted in distribution. Any activity which permanently conceals, disturbs or requires removal of part or all of the geological interest features, can cause irreparable damage or destruction.

Vegetation management, to prevent the establishment of trees and scrub, may be required to maintain the integrity of the geological interest features.

Date Notified: 19 January 2010

Annex 3

List of operations requiring Natural England's consent

This is a legal document on which you have a right to make objections or representations, as explained in part 3 of this notification document.

Operations requiring Natural England's consent

Wildlife and Countryside Act 1981 Section 28 (4)(b) substituted by Schedule 9 to the Countryside and Rights of Way Act 2000

The operations listed below may damage the features of interest of Ardley Trackways SSSI. Before any of these operations are undertaken you must consult Natural England, and may require our consent.

It is usually possible to carry out some of these operations in certain ways, or at specific times of year, or on certain parts of the SSSI, without damaging the features of interest. If you wish to carry out any of these activities please contact your Natural England Area Team who will give you advice and where appropriate issue a consent. Please help us by using the 'notice form' (provided at notification and available on request) to ask us for consent to carry out these operations.

In certain circumstances it will not be possible to consent these operations, because they would damage the features of interest. Where possible the Area Team will suggest alternative ways in which you may proceed, which would enable a consent to be issued. To proceed without Natural England's consent may constitute an offence. If consent is refused, or conditions attached to it, which are not acceptable to you, you will be provided with details of how you may appeal to the Secretary of State.

Standard reference number	Type of operation
1.	Cultivation, including ploughing, rotovating, harrowing and re-seeding.
7.	Dumping, spreading or discharging of any materials.
12.	Tree and/or woodland management and alterations to tree and/or woodland management (including, planting, felling, pruning and tree surgery, thinning, coppicing, changes in species composition, removal of fallen timber).
13.a.	Draining (including, the use of mole, tile, tunnel or other artificial drains).
13.b.	Modification to the structure of water courses (rivers, streams, springs, ditches, dykes, drains), including their banks and beds, as by re-alignment, regrading, damming or dredging.
14.	Alterations to water levels and tables and water utilisation (including irrigation, storage and abstraction from existing water bodies and through boreholes). Also the modification of current drainage operations.
15.	Infilling or digging of ditches, dykes, drains, ponds, pools, marshes or pits.
20.	Extraction of minerals including hard rock, sand and gravel, topsoil, subsoil, shells and spoil.
21.	Destruction, construction, removal, rerouting, or regrading of roads, tracks, walls, fences, hardstands, banks, ditches or other earthworks, including soil and soft rock exposures or the laying, maintenance or removal of pipelines and cables, above or below ground.
22.	Storage of materials.
23.	Erection of permanent or temporary structures or the undertaking of engineering works, including drilling.
24.a.	Modification of natural or man-made features and clearance of boulders, large stones or loose rock.

Standard reference number	Type of operation
24.b.	Battering, buttressing or grading of geological exposures and cuttings (rock and soil) and infilling of pits and quarries.
25.	Removal of geological specimens, specifically dinosaur footprints and trackways.

Notes

- i. This is a list of operations appearing to Natural England to be likely to damage the special features of the SSSI, as required under section 28 (4) (b) of the Wildlife and Countryside Act 1981 substituted by Schedule 9 to the Countryside and Rights of Way Act 2000.
- ii. Where an operation has been granted a consent, licence or permission from another authority, separate consent will not be required from Natural England. However, other authorities are required to consult Natural England before such consents, licences or permissions are issued.
- iii. Any reference to 'animal' in this list, shall be taken to include any mammal, reptile, amphibian, bird, fish, or invertebrate.

Date notified: 19 January 2010

National Grid reference: SP540248

Annex 4

Map showing the land notified

This is a legal document on which you have a legal right to make objections or representations, as explained in part 3 of this notification document.

Insert notification map here