Site Name: Ardley Trackways SSSI  
County: Oxfordshire

District: Cherwell


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 titanosaurians 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.