

Site name: Raisby Hill Quarry

Unitary Authority: Durham

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981, and subsequently varied under Section 28A of the Wildlife and Countryside Act 1981. Additional land notified under Section 28B of the Wildlife and Countryside Act 1981.

Local Planning Authority: Durham County Council

National Grid reference: NZ350354 **Area:** 51.25 ha

Ordnance Survey Sheet **1:50,000:** 93

Date notified: 23 January 1991 **Date of variation:** 18 October 2019

Date additional land notified: 18 October 2019

Reasons for notification

Raisby Hill Quarry uniquely exposes the complete thickness of the Upper Permian Raisby Formation and provides its 'Type' or 'Reference' section. It is nationally important and forms part of the Durham Province of the Marine Permian network of sites.

General description:

Raisby Hill Quarry exposes the lowermost part of the Upper Permian Magnesian Limestone. Here this includes the Raisby Formation overlain by the lower part of the Ford Formation. This Magnesian Limestone sequence is underlain by the Permian Marl Slate and Yellow Sands which are occasionally exposed on the quarry floor. This site has been identified as of national importance in the Geological Conservation Review.

Uniquely, the complete thickness of the Raisby Formation is present in the northern and eastern quarry faces. As such, Raisby Hill Quarry provides the type section for the Raisby Formation and is a key reference locality for current and future study. Here the Raisby Formation consists of three broad units: a basal brown-buff dolomite in sharp contact with the underlying Marl Slate; a uniformly bedded grey to blue-grey median limestone (a primary, unaltered limestone which is rarely seen in the Magnesian Limestone sequence); and an upper unit of cream-buff dolomite which is conformably overlain by the dolomitic Ford Formation. Fossils, including foraminifera, bryozoan, brachiopod, bivalve and ostracod assemblages, as well as trace fossils, are largely concentrated in the unaltered limestone. Secondary mineralisation is also relatively common including a range of copper, carbonate and dolomite minerals as replacement and cavity fill mineralisation.

The Upper Permian Magnesian Limestone was deposited approximately 255 million years ago in the relatively shallow Zechstein Sea which occupied much of the present-day North Sea Basin. Extensive reefs (seen exposed in the Sunderland area) around the edge of the Zechstein Sea produced high volumes of carbonate which formed the Magnesian Limestone. Periodic evaporation and flooding of the Zechstein Sea in the hot, arid environment of the Upper Permian led to cyclic deposition known as the English Zechstein Cycles (ECZ) – the Raisby Formation represents the lowermost carbonate deposit of the first of these cycles (ECZ 1). The Raisby Formation at Raisby Hill Quarry was deposited on the marginal shelf and adjoining slope of the Zechstein Sea. It complements localities such as Dawson's Plantation, High Moorsley and the Durham Coast SSSIs which more typically represent slope and outer slope depositional environments with extensive debris flows.

The principal significance of Raisby Hill Quarry is the presence of an excellent type section of the Raisby Formation showing its full vertical thickness and lateral variation in the northern and eastern quarry faces. The relationship with the underlying Marl Slate and overlying Ford Formation, presence of unaltered limestone, and a suite of secondary minerals provides an important insight into the depositional environment and post-depositional history of the lowermost English Zechstein Cycle 1.