OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE

DCO Submission

Environmental Statement

Chapter 11: Ground Conditions
Appendix 11.10: Jurassic Rock Exposure Technical Note

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On behalf of
Oxfordshire Railfreight Limited

Prepared by BWB Consulting Ltd
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OxSRFI: Jurassic Rock Exposure Technical Note
May 2026

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Oxfordshire Railfreight Limited (The Client) are promoting a Strategic Rail Freight Interchange (SRFI) on land east of the former Upper Heyford Air Base, south of the Chiltern Main Line, and southwest of Junction 10 of the M40 motorway.

The Order Limits partially fall within an area designated as a Site of Special Scientific Interest (SSSI) designated due to geological interest for its exposures of Jurassic rocks and has biological interest associated with limestone grassland, scrub, ancient woodland and wetland habitats.

This Technical Note relates to the geological interest of the SSSI unit and not biological interest.

Geological Importance

Jurassic limestones are renowned for their abundant and well-preserved fossils. These include marine creatures like ammonites, belemnites, bivalves, and marine reptiles (ichthyosaurs, plesiosaurs). The nearby Ardley Trackways is also a local SSSI where dinosaur footprints were discovered. SSSIs are designated where these fossil assemblages are particularly rich, diverse, or provide crucial insights into past life, environments, and evolutionary processes. Jurassic limestone rock faces are designated as SSSIs because they represent some of the "best examples" of this geological formation, providing critical insights into Earth's history, and serving as important sites for research and education.

The exposed rock faces often display clear stratigraphic sequences, showing layers of rock laid down over millions of years. This allows geologists to study the sequence of events, changes in sea level, and depositional environments during the Jurassic period. Sites are chosen for their representativeness of particular formations or for exhibiting unique sedimentological features (e.g., ooliths indicating warm, shallow seas).

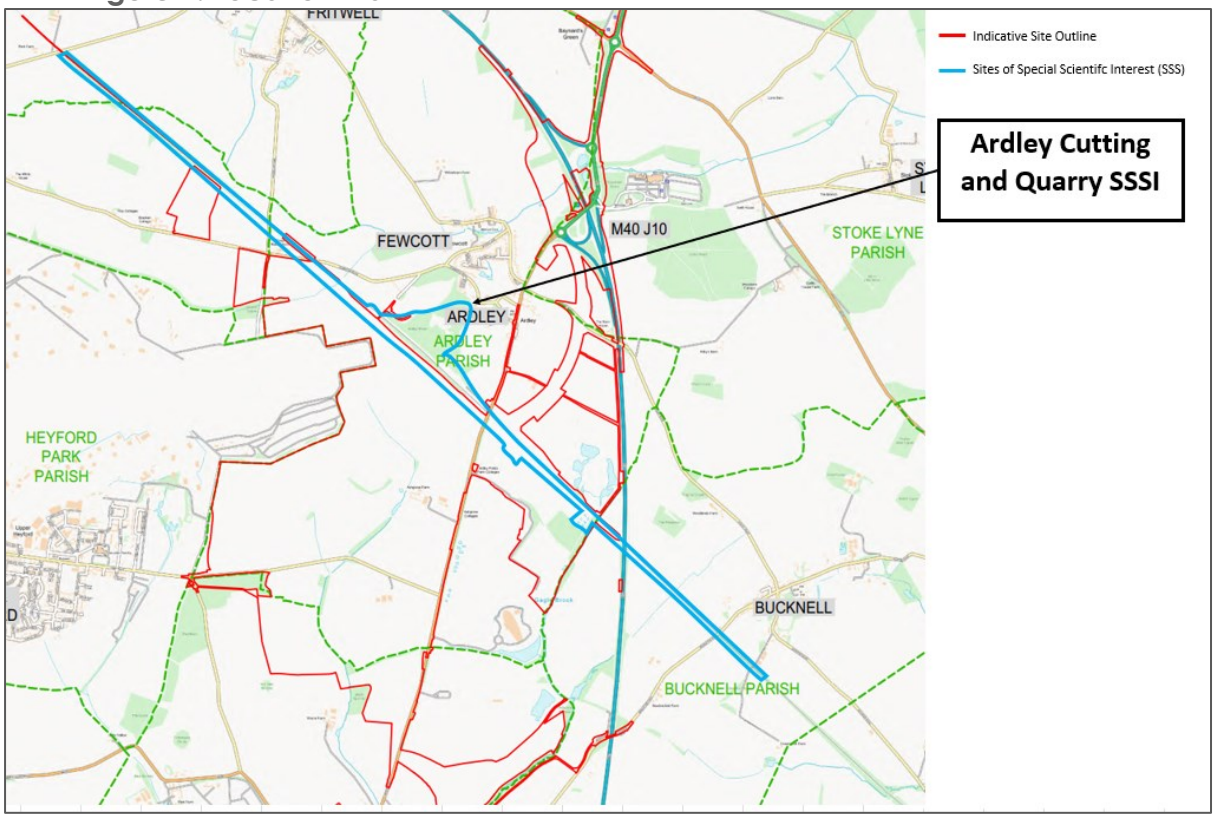
The site is 40.13 ha in area and has been a SSSI since 1988. The Natural England citation with regard to Earth Heritage states:

> *"the railway cutting and southernmost quarry together constitute one of southern England's key sites for Mid Jurassic strata. It has exposures range from the Chipping Norton Formation to the White Limestone Formation and therefore the entire local Bathonian is represented with the exception of the Forest Marble".*

Geological SSSIs can provide invaluable outdoor laboratories for scientific research, allowing geologists, and palaeontologists to study natural processes, collect data, and understand long-term environmental change. These sites may also serve as an excellent educational resource for students and the public, promoting an understanding and appreciation of geology, fossils, and biodiversity.

The location of the above SSSI units is indicated on the below plan.

Figure 1: Location Plan



Ground Conditions

British Geological Survey (BGS) mapping for the site indicates that the site is predominantly underlain by White Limestone Formation (comprising limestone, wackestone, packstone, grainstone and mudstone), with superficial deposits absent. The entire site area is underlain by Sedimentary Bedrock formed during the Jurassic Period. The White Limestone Formation is sub-divided into the Bladon Member, the Ardley Member and the Shipton Member:

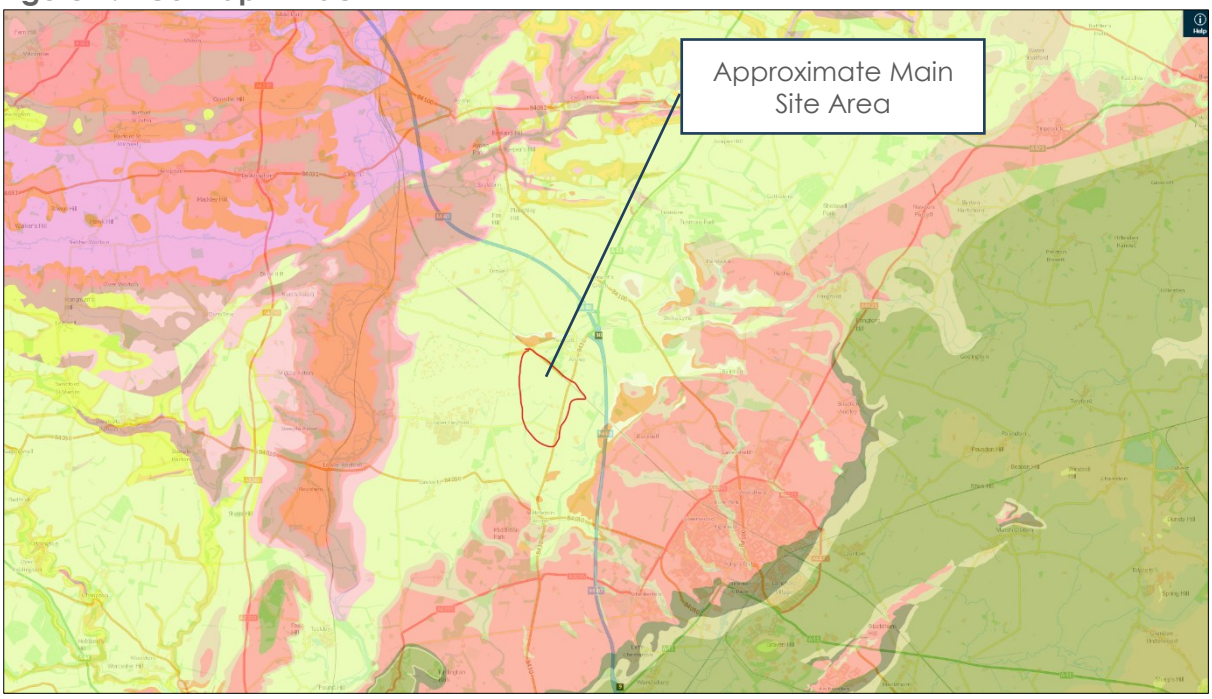
- The Bladon Member: comprises a green and grey clay/mudstone, which is commonly lignitic.
- The Ardley Member: comprising a pale grey to off-white or yellowish limestone, peloidal wackestones and packstones with common ooidal and shell fragmental grainstones, and recrystallised limestone with beds of argillaceous limestone, sandy limestone, marl and mudstone or clay at some levels.
- The Shipton Member: comprising pale grey to off-white or yellowish limestone, peloidal wackestone and packstone with subordinate ooidal and shell fragmental grainstone, and recrystallised limestone with beds of argillaceous limestone, marl and mudstone or clay.

The White Limestone formation was laid down during the Jurassic era between 165 and 168 million years ago and is a sedimentary rock that forms from the accumulation of the remains of marine organisms, such as coral and shells, and the precipitation of calcium carbonate from water. Limestone is known for its fossil content.

The presence of limestone is not rare; indeed, vast areas of the surrounding region are directly underlain by limestone bedrock of the White Limestone Formation. However, there are limited continuously exposed rock faces presenting the whole geological sequence, hence its designation as a SSSI. The pale yellow/green on the below image taken from the BGS mapping viewing portal shows the extents of the White Limestone Formation. As can be seen from the

below image, this formation extends across a much greater area than either the site (roughly outlined in red) or the adjoining SSSI.

Figure 2: BGS Map Extract



Current Condition

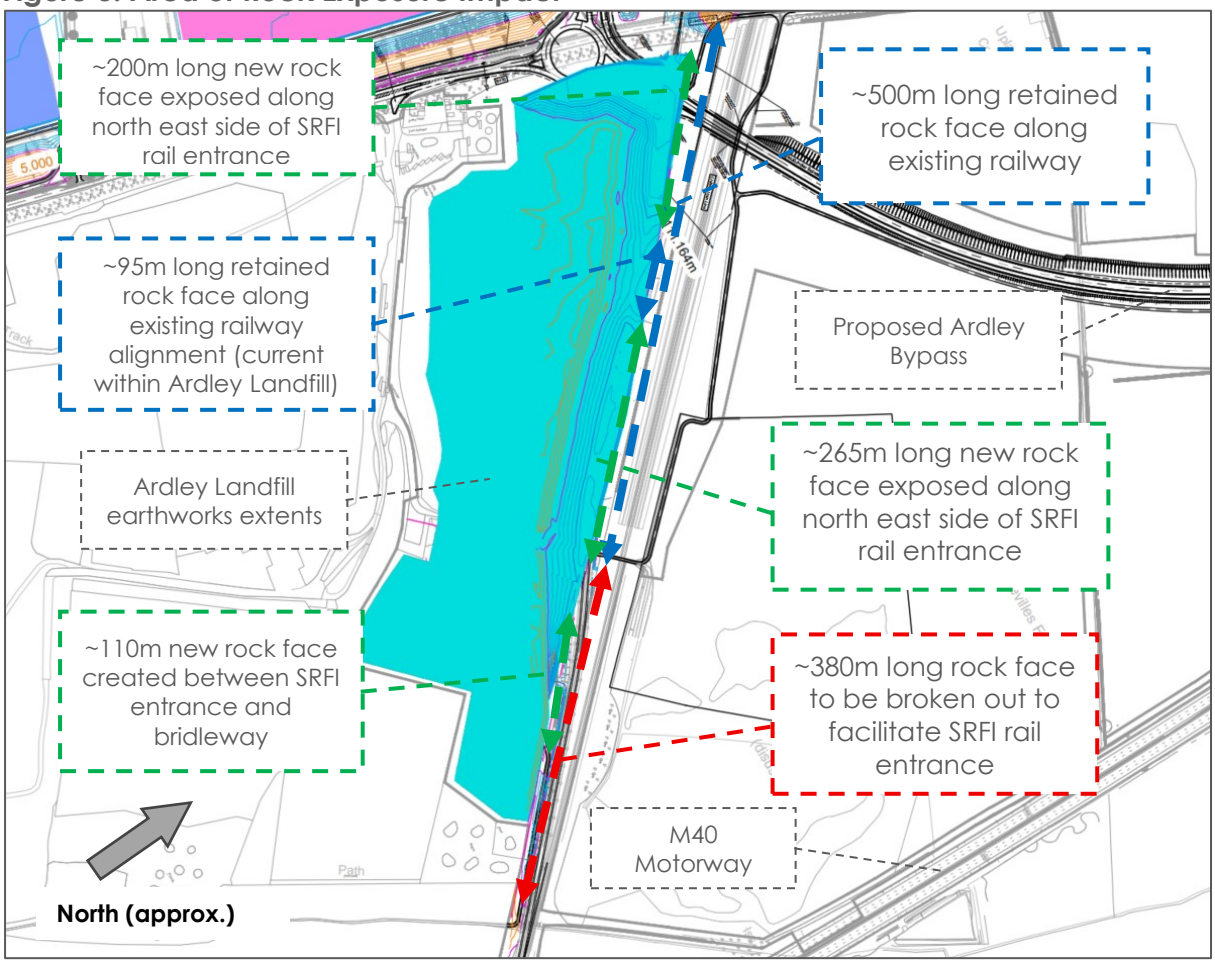
There are two key areas of the Geological SSSI that will be effected by the Proposed Development:

A small south west facing rock face within the northern part of Ardley Landfill, adjacent to Chiltern Railway.		This rock exposure comprises a circa 3m high rock face associated with an area of either signficiant subsidence, or incomplete landfill, at Ardley Landfill. Below the crumbling and partially vegetated rock face was a pond which prevents easy human access to all but the ends of the rock face.
Areas of the north east facing rock face along Chiltern Railway where connections are proposed into and out of the proposed SRFI.		The railway cuttings south east end where it falls within the site is circa 8m deep. The lower section of the embankment is a partially vegetated rock face set at approximately 70 degrees and around 4m high. The upper portion is also approximately 4m, set at approximately 45 degrees and wholly vegetated. Moving north west, the rock face becomes smaller and shllower and is not present north west of the B430. There is no public access to any section of the railway cutting with it being an active railway.

Development Impacts

Any development works north west of the B430 will not impact on the Geological designation of the SSSI as no rock exposures exists in these areas. The areas that will be affected by rock exposure impact, both removal and creation, are presented on **Figure 3** below.

Figure 3: Area of Rock Exposure Impact



In total, the following changes will be made to rock exposures as a result of the Development:

- Approximately 595m of rock face will be retained.
- Approximately 380m of rock face will be lost.
- Approximately 575m of rock face will be created.
- **Net creation of 185m of rock face.**

This demonstrates that overall, the development will have a net benefit in the extent of rock exposures present.