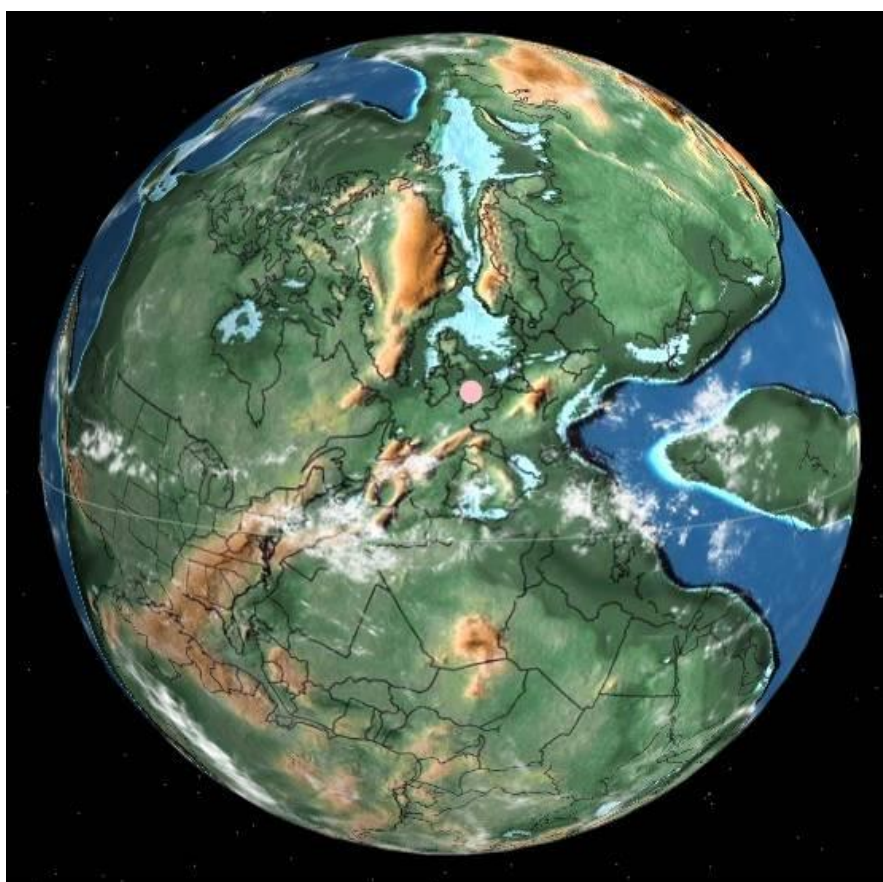


GEOMORPHOLOGY – ROCKS AND SOILS

Geomorphology is the study and description of the origin and evolution of topographic features created by physical, chemical or biological processes operating at or near the Earth's surface.

The underlying geology of Manor Woods Valley consists of layers of mudstone and halite-stone of the Mercia Mudstone Group (formerly known as Keuper Marl). This is sedimentary bedrock formed approximately 201 to 252 million years ago, in the Triassic Period; a period dominated by hot deserts, with shallow inland seas that were prone to evaporation and even drying-up. At that time the British Isles were located north of the equator, on the edge of the single massive landmass, Pangaea, having drifted there from south of the equator during the preceding 150 million years.



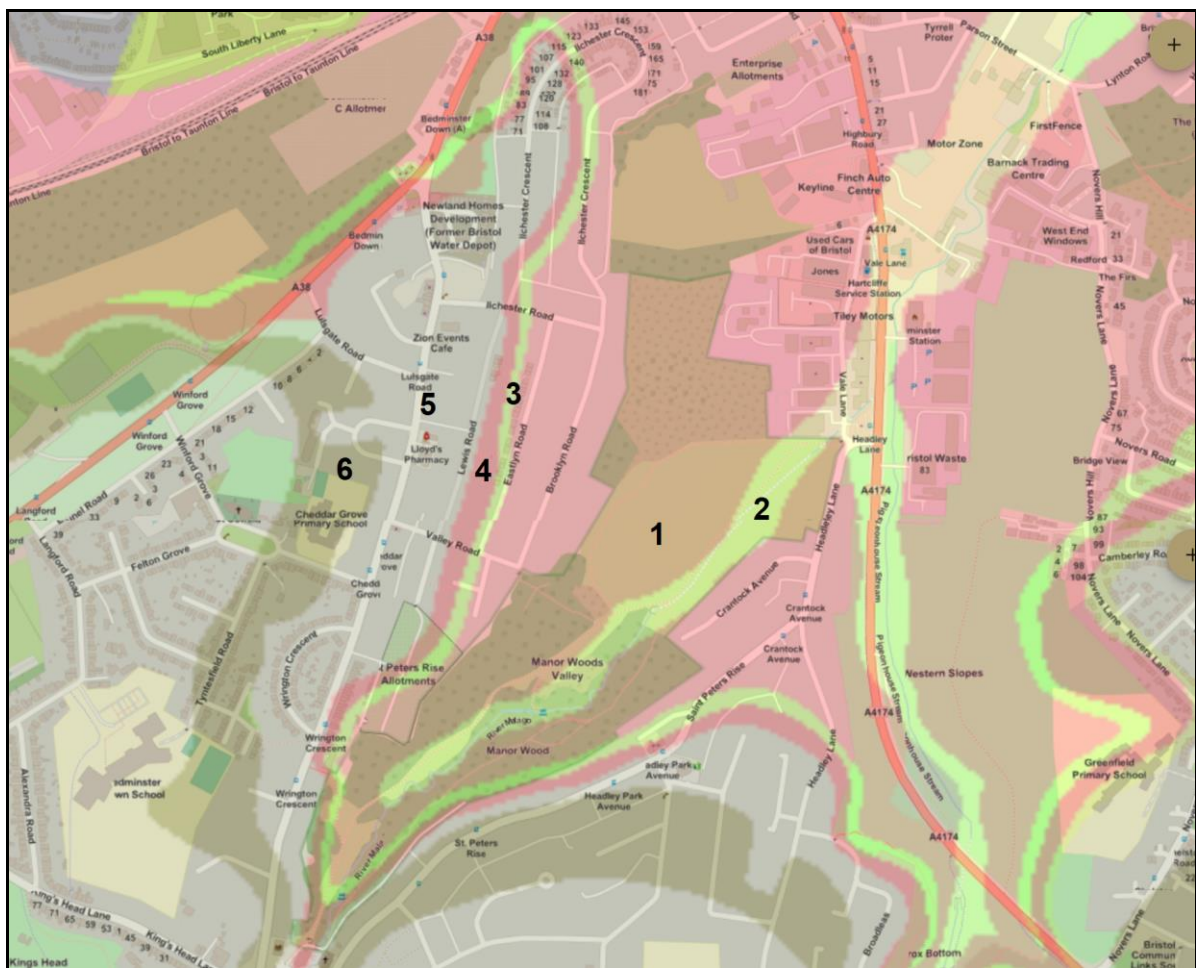
Pangaea with the British Isles just above the centre

The Triassic rocks of Manor Woods Valley and the surrounding area formed in fluvial (running water), lacustrine (still water) and/or marine environments. They were deposited in lagoons or shallow seas, where a hot, arid climate also leads to the precipitation of beds of evaporates (salt or mineral deposit left after the evaporation of a body of water). The rocks are predominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite(salt)-bearing units in some basin areas. Thin beds of gypsum/anhydrite are widespread, and sandstones are also present.

Any younger deposits that might have been formed over the top of the Triassic layers, have long since been lost to massive erosive powers of plate tectonics, wind, water and glacial

action. Fossil rich, younger limestone and shale deposits laid down in shallow seas at the boundary of the Triassic and Jurassic periods, form the ridges on which Bedminster Down and Headley Park to the west and south of Manor Woods Valley.

Over time the Malago has eroded down through the Triassic Mudstone layers with the latter being replaced in part with alluvial deposits of clay, silt, sand and /or gravel. These superficial deposits were formed up to two million years ago, in the Quaternary Period. These types of deposits are found where the local environment was previously dominated by rivers. They are detrital (particles of rock derived from pre-existing rock through processes of weathering and erosion), ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains, and levees of a river.



Geological map covering Manor Woods Valley

- 1 - Mercia Mudstone Group - Mudstone and halite-stone. Sedimentary bedrock formed between 252.2 and 201.3 million years ago during the Triassic period.
- 2 - Alluvium - Clay, silt, sand and gravel. Sedimentary superficial deposit formed between 11.8 thousand years ago and the present during the Quaternary period.
- 3 - Blue Anchor Formation - Mudstone. Sedimentary bedrock formed between 228.4 and 201.3 million years ago during the Triassic period.
- 4 - Westbury Formation and Cotham Member - Mudstone and limestone, interbedded. Sedimentary bedrock formed between 209.5 and 201.3 million years ago during the Triassic period.
- 5 - Wilmcote Limestone Member - Limestone and mudstone, interbedded. Sedimentary bedrock formed between 209.5 and 199.3 million years ago during the Triassic and Jurassic periods.
- 6 - Saltford Shale Member - Mudstone. Sedimentary bedrock formed between 209.5 and 199.3 million years ago during the Triassic and Jurassic periods.

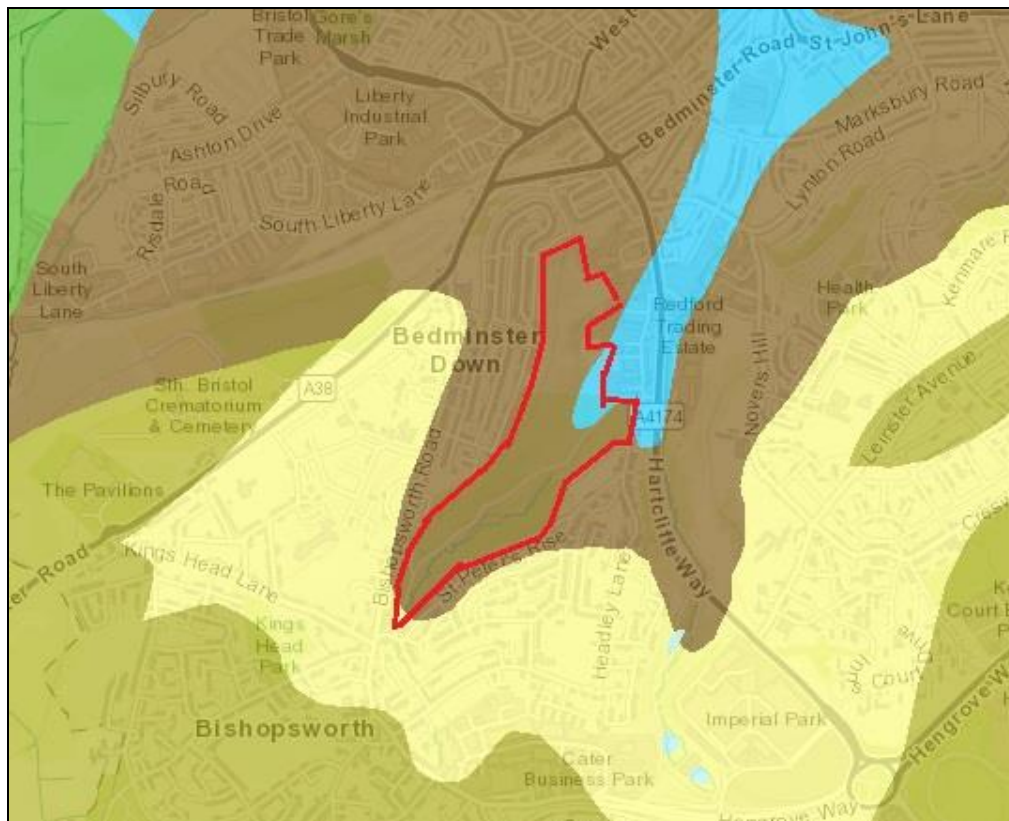


What Manor Woods Valley looked like during the Triassic

In Manor Woods Valley, the sub-surface geology is largely buried by soil; however, the site's geology is exposed at several places along the banks and bed of the Malago. In the case of the bed deposits, much of the loose rock in the stream is derived from man-made features such as collapsed walls and dumped aggregates.

Soil is a product of several factors: namely climate, relief (elevation, orientation, and slope of terrain), organisms, and the soil's parent materials (original minerals) interacting over time. It continually undergoes development by way of numerous physical, chemical and biological processes, which include weathering and erosion. Little of the soil of planet Earth is older than the Pleistocene. Most of the mineral based soil in the UK is derived from the action of glaciers grinding-up the underlying rocks during this period; from 2.58 million to 11,650 years before present.

There are loamy, freely draining, shallow lime-rich soils, composed mostly of sand, silt, and a smaller amount of clay, occur at the very extreme southwest end of Manor Woods Valley. Naturally, the vast majority of the site is covered by deep, medium to heavy, slightly acid loamy and clayey soils with impeded drainage. The extreme northeast part of the pre-1970's course of the Malago, within the site, consists of loamy and clayey floodplain soil with a naturally high groundwater. The latter stretch down the Malago valley and into the Avon basin.



Soil map: yellow = loamy, freely draining, shallow lime-rich soils, brown = deep, medium to heavy, slightly acid loamy and clayey soils, blue = loamy and clayey floodplain soil

In places, namely The Wildflower Meadow, the Lower Park, and Manor Woods Orchard the native soil has been buried or, in the latter case, quarried out. The predominant top-soil type in the former two areas is still described as loamy-sand; indicating that at least a thin cap of probably locally sourced top soil was applied over the regraded ground.