

Geology of the Andover area: Exposed strata - Quaternary

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This page is part of a category of pages providing a summary of the geology of the Andover district (British Geological Survey Sheet 283), which extends over approximately 600 km² of north-west Hampshire and a small part of eastern Wiltshire.

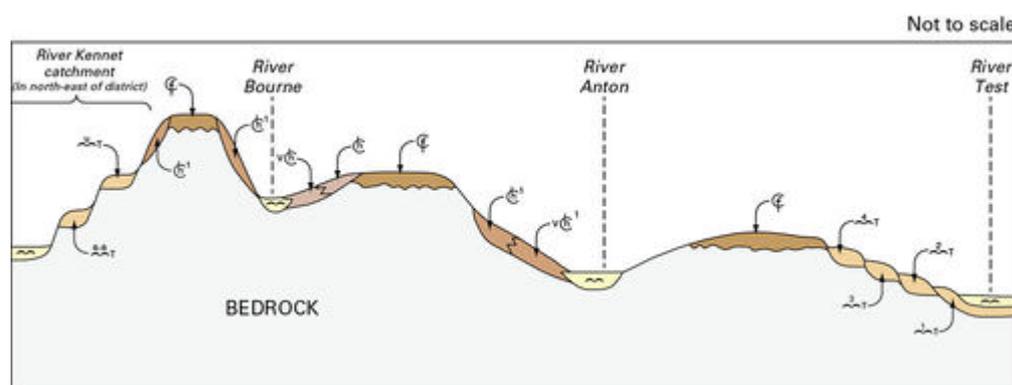
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Authors: J Thompson, K A Lee, P M Hopson, A R Farrant, A J Newell, R J Marks, L B Bateson, M A Woods, I P Wilkinson and N J Smith.

In the Andover district, about 50 million years is estimated to have elapsed between the deposition of the youngest preserved Palaeogene and the oldest Quaternary deposits. During this time younger Palaeogene and Neogene strata were deposited across much of southern Britain, and subsequently were removed following uplift along the Wealden axis (as part of the general inversion of the Wessex Basin). During the Quaternary, a further significant break in deposition occurred after the initial accumulation of the clay-with-flints and before the deposition of the younger Pleistocene deposits.

During the Pleistocene, sea levels rose and fell according to the quantity of water locked up in ice caps. At times of glacial maxima, a periglacial environment was established in this district. There was enhanced erosion both by solifluction and by an extensive river system flowing to much lower base levels (up to 100 m below present sea level in the most extreme glacial episodes). Much of the Andover district is covered by clay-with-flints and its associated slope head solifluction derivative. The district represents a fairly 'immature landscape' in that the local streams have not fully eroded through these 'blanket' deposits.

The following descriptions of the deposits are grouped on the basis of their origin. Mass movement deposits are described first, followed by fluviatile deposits. Their order does not imply relative age. **Figure P807822** schematically indicates the relationships of these deposits in the Andover district.



Schematic section showing the relationship of Quaternary deposits. P807822.

Clay-with-flints (Cf)

The clay-with-flints is primarily a remanié deposit created by the dual actions of the weathering and erosion of the original Palaeogene cover and dissolution of the underlying Chalk. It is typically composed of orange-brown or reddish brown clays and sandy clays containing abundant flint nodules and pebbles. At the base of the deposit the matrix becomes stiff, waxy and fissured, and of a

dark brown colour with relatively fresh nodular flints stained black and/or dark green by manganese compounds and glauconite. In places, particularly to the south-east of the district, and where the original sub-Palaeogene erosion surface is preserved, the clay-with-flints may well disguise limited subcrops of Palaeogene deposits in various stages of remobilisation into solution features developed in the underlying Chalk.

The clay-with-flints is most widespread on the high ground and interfluves underlain by the Seaford Chalk in the centre of the Andover district and towards the north and east of the area. This deposit was mainly mapped on the basis of its characteristic reddish brown sticky clayey soil with nodular, often stained (orange), flints.



Temporary excavation showing clay-with-flints. P780611

Plate P780611 shows an exposure of clay-with-flints overlying Seaford Chalk Formation in a modern pit near Tangley. In general, it forms the flat top to hills and long dip-slope spurs. The deposit is closely associated with Head (Ch1) which is a solifluction deposit derived directly from the clay-with-flints.

Head (Ch1)

Head (variable slope deposit or older head) deposits range from flinty gravels to reddish brown, sandy clays containing abundant flint nodules and pebbles that are generally much more shattered than those in the clay-with-flints from which the unit is directly derived. Several large sheets occur in this district, generally no more than a few metres thick. The deposits are most widespread on north- and east-facing slopes and commonly grade laterally into areas with only a thin flinty veneer or spread down to the valley bottom.

Head gravel (vCh1)

This deposit is very similar lithologically to gravelly head, but occurs on lower valley sides. The deposit is a coarse or very coarse, poor to moderately sorted flint gravel, with an admixture of fluvial rounded to subangular rolled worn flints and rare angular large, often broken nodular and coarse gravel-sized flint set in a greyish brown to orange brown clayey, silty, fine- to coarse-grained sand matrix. Its gravelly nature serves to distinguish it from head and its occurrence on significant slopes distinguishes it from terrace deposits.

Gravelly head (vCh)

Gravelly head is essentially alluvial, and comprises head materials in valley bottoms from which the fine-grained silt and clay material has been flushed by periodic water flow, either during the

depositional process or later by ephemeral stream flow. The resulting deposit is a coarse or very coarse, poor to moderately sorted, clast-supported, subangular to subrounded, flint gravel, with generally little or no fine-grained material. In the Andover district, this deposit occurs in the floor of the River Bourne, west of Ludgershall, at a position in the valley where ephemeral winter run-off flushes finer material out. The valley floor, where this deposit occurs, usually contains a well-defined, often dry, stream channel. Downstream of the perennial springs, the gravel is usually overlain by overbank alluvial deposits of silt, sand and peat.

Head (Ch)

Head is a heterogeneous group of superficial deposits which have accumulated by solifluction, hillwash and hillcreep. In general head comprises pale yellow-brown, silty, sandy clays. The pebble content varies depending on the local bedrock source and is noticeably more pebbly where material is derived from areas with a Palaeogene cover. Similarly, head derived from Seaford Chalk, contains far more fresh large nodular or broken angular flints.

Most of the dry valleys on the Chalk have a head deposit covering the valley floor. This is usually thickest and most prevalent in the lower reaches of the dry valley network, where the gradient lessens markedly, but can be absent where the valley is narrow or steep. In many cases, the lower limit of the head deposits occur at the highest spring-head.

Head is very rarely exposed, and due to the considerable flint content cannot be penetrated with a soil auger. The thickness of most head deposits in the area is therefore unknown. Borehole records suggest that the head is mostly less than 2 m in thickness, but could locally attain 5 m or more. The map user should be aware that large parts of the area shown as bedrock with no overlying superficial deposit do actually carry a thin, extensive, but discontinuous blanket of head.

River terrace deposits (T1-8, uT)

The River Test has a history of terrace development in response to base level changes of the river system. Terrace deposits associated with this river in the Andover district correspond to the 'first' to 'fourth' levels in the scheme of terrace numbering for this catchment. Higher terraces exist outside the district but are not generally geomorphologically distinct.

Higher river terraces of the River Enbourne (whose tributaries are located within the Andover district) are mapped to the north of the district close to Burghclere. River terraces of the River Bourne are also mapped to the west of the district close to Ludgershall.

The term River Terrace Deposits (undifferentiated) is used in the district to identify gravel spreads on the lower valley slopes that show some crude or degraded terrace surface. It is the generally flat surface formed by this deposit that differentiates this deposit from other gravelly slope head deposits but the surface brash may well have the same appearance.

Alluvium ()

The alluvium in the district comprises a complex interdigitation of three distinct lithologies; sandy gravel (in places chalky), peat and fine-grained sandy muds (and muddy sands). In places a fourth unit of chalky, gravelly, sandy, silty clay is regarded as solifluction material derived from the steeper valley sides. This unit, mapped as part of the alluvium, is generally buried by fine-grained overbank deposits along the margins of the alluvial tract in the broader streams. The soils associated with the alluvium are generally pale greyish brown silty clay, and can be very flinty in places. These overbank deposits can be seen to rest on a flint and chalk gravel base, in many ditches and banks along main

streams for example,

The principal outcrop of the alluvium is associated with the River Test and its tributary, the Bourne Rivulet, in the south of the district. Narrower outcrops are associated with the headwaters of the River Enborne in the north-east of the district and with the River Bourne in the west of the district.

A thin tract of very flinty alluvium underlies the Bourne Rivulet valley around St Mary Bourne. The alluvium, here, generally consists of a coarse or very coarse, poor to moderately sorted flint gravel, with an admixture of subangular to subrounded flints, with generally little fine grained material. The flint fragments are locally coated with tufa (a reprecipitated calcareous deposit commonly associated with active springs).

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