

Hydrogeology of Wales: Quaternary aquifers - Afon Teifi

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This page is part of a category of pages that provides an updated review of the occurrence of groundwater throughout Wales.

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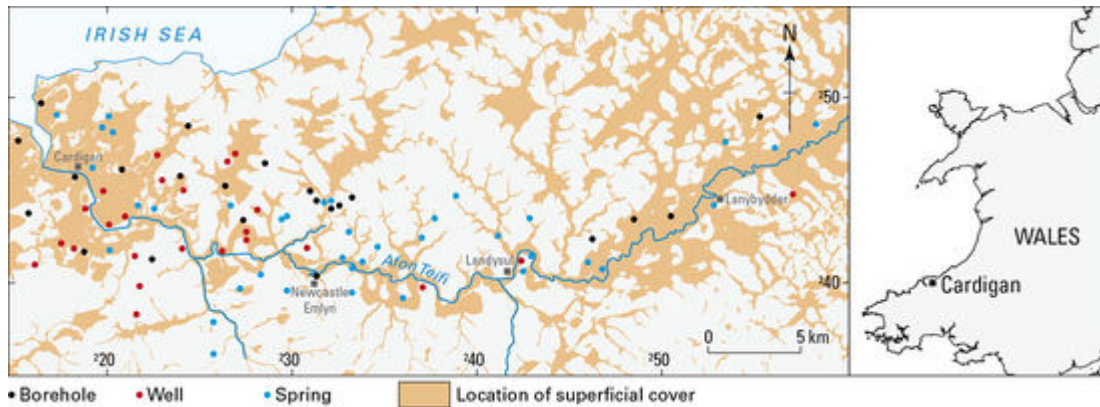
The superficial deposits in the western part of the Afon Teifi catchment, which derive from the Irish Sea Ice Sheet, offer little potential for groundwater abstraction. The deposits are clay rich, and there are a number of springs which issue from bedrock at the perimeter of the drift. The hydrogeological role of the sandier drift deposits, which are known to underlie the clay-rich deposits in some places, is uncertain.

Dŵr Cymru operate a borehole at Olwen, near Lampeter [SN 582 496] which is 26.8 m deep and draws water from fluvioglacial deposits in the valley floor of the Afon Dulas, a tributary of the Afon Teifi. The borehole lithological log indicates that water is supplied from two sand and gravel aquifers, separated by a clay layer which confines the lower gravels. The borehole is licensed to abstract 395 m³/d, and generally takes close to the full licensed amount.

A constant rate pumping test on the Olwen borehole indicated an aquifer transmissivity of 210 m²/d from the early drawdown data ([Howard Humphreys, 1984](#)). The specific yield of the aquifer is assumed to be 10 per cent and the saturated aquifer thickness 18 m. These values may not be representative of the whole aquifer due to its heterogenous nature.

The superficial deposits in the Afon Teifi catchment which have some groundwater potential are those which typically contain a high proportion of clast-supported, granular materials preserving a high level of primary porosity, principally sands and gravels. Both nonaquifer and weakly permeable superficial deposits may intervene at depth between these near surface horizons and bedrock. The more permeable deposits, of which sand and/or gravel grade material dominate, include glaciofluvial deposits, undifferentiated melt-out deposits, head deposits and blown sand.

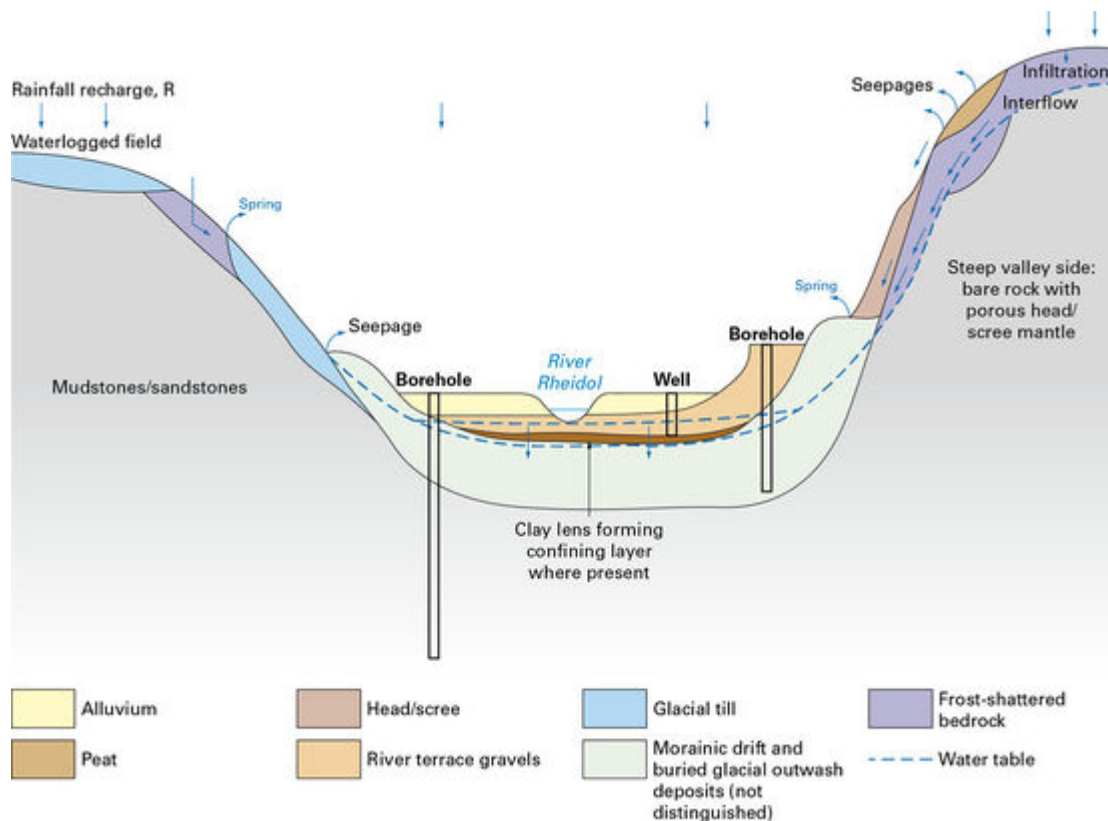
The permeable deposits occur throughout the Afon Teifi catchment and are potentially the most useful of the local minor aquifers. They are particularly widespread and at their thickest in the western reaches of the Teifi catchment notably around Penparc, Ferwig, Gwbart and west of St Dogmaels; and, in the east, within the main Teifi valley between Llanfihangle-ar-arth and Lampeter (**Figure P859280**). Extensive spreads of superficial deposits also occur in the upper reaches of the Ceri valley, around Rhyd Lewis. Sequences of these aquifer deposits are known locally to exceed 50 m in thickness. However, the superficial materials included in this group are characterised by rapid lateral variations in thickness. Subordinate low permeability horizons and irregular masses of clay-rich materials are also a feature of some of the minor aquifer deposits. These lower permeability horizons inhibit the local movement and extractability of groundwater at some sites and their occurrence underlines the need for site specific investigations.



Distribution of superficial deposits in Afon Teifi showing borehole well and spring locations (after Robins et al., 2000). P859280.

There are a variety of estuarine alluvial deposits which occupy the tidal reaches of the lower Afon Teifi. These include tidal river, salt marsh, marine shoreface and beach deposits which have a collective potential as brackish groundwater aquifers. The most widespread and thickest developments of these various alluvial aquifers are associated with the modern courses of the Afon Teifi and its largest tributaries including the Afon Cych, Afon Ceri, Afon Tyweli, Nant Cledlyn and Afon Grannell. However, in contrast with other river systems in the region, such as the Afon Rheidol, the alluvial sequences of the Afon Teifi and its tributaries are relatively thin. The highest river terraces may be underlain by several metres of gravel dominated material, but in many areas the present day floodplains of the catchment may be underlain by alluvial deposits more or less equal in thickness to the bank height of the present river or its tributaries. These attenuated alluvial sequences reflect the net prevalence, since late glacial times, of incision over deposition throughout this river system. Moreover, thick sequences of clay-rich, glaciolacustrine deposits, are likely to underlie much of the alluvial belts in the valley, further limiting their potential for large volume groundwater abstraction.

The various low permeability superficial deposits which occur in Afon Teifi are typically clay-rich materials principally till and glaciolacustrine deposits. The distribution of these weakly permeable deposits has an important bearing on the geometry of associated drift aquifers and on the movement of groundwater into and within adjacent solid and drift aquifers (Robins et al., 2000). It is particularly significant as a factor in determining the vulnerability of the catchment bedrock aquifers to pollution. Low permeability drift deposits commonly overlie surface drift aquifers and surface runoff from these materials represents an important means of groundwater recharge for both solid and drift aquifers. **Figure P859281** shows both solid and drift aquifers, and distinguishes those areas in which drift aquifers and low permeability drift deposits occur in close association, within which vertical groundwater movement is restricted.



Schematic section of the central part of the Lower Afon Teifi showing the main flow components (after Robins et al., 2000). P859281.

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