

Bennetsbridge GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority		Associated surface water bodies	Associated terrestrial ecosystems	Area (km ²)
15 – Nore Kilkenny Co Co		King's, Desart Stream, Glory, Ennisnag Stream, Nore	Mount Juliet, "Red Bog, Dungarvan"	41
Topography		This groundwater body is situated in the Central Lowlands of Kilkenny. The groundwater body stretches the width of the river basin and therefore the elevations are lowest at the centre of the body beside the Nore River. To the west the highest elevations are not high because they are within the gap between the Slieve Ardagh Hills and the South Kilkenny Uplands.		
Geology and Aquifers	Aquifer type(s)	Rf: Regionally Important Fractured Aquifer. <i>Note that this classification does not apply to all portions where dolomitisation is mapped in the Ballysteen, Aghmacart and Butlersgrove Formations. Where dolomitisation is localised and apparently 'isolated' from the main body of the dolomite aquifer, these portions are classed as 'locally important aquifers which are generally moderately productive (Lm)'.</i>		
	Main aquifer lithologies	Dolomitised Limestone. The aquifer comprises the dolomitised portions of the Waulsortian (WAdo), the Ballysteen (BAdo), the Butlersgrove (BUdo) and the Aghmacart (AGdo) formations.		
	Key structures.	A large number of faults, which are likely to affect on the rate and direction of groundwater flow, cross this aquifer at right angles to the strike.		
	Key properties	Transmissivities range from 50 – 500m ² /d and permeabilities from 0.5 – 10m/d. The storage coefficient is in the order of 10 ⁻³ – 10 ⁻⁴ . The wide range of transmissivity values are due to the variations in rock type, thickness dolomitisation and permeability.		
	Thickness	The effective thickness of the aquifer is very variable and depends on the intensity of dolomitisation in a given area. Dolomitisation is not just a near surface phenomenon, consequently significant permeability has been found at depths greater than 100m. In cross section, it is apparent that the two bands form the ends of a large U-bend structure (part of the central syncline of Kilkenny), which runs underneath Slieve Ardagh and the Castlecomer Plateau at depths of over 300m.		
Overlying Strata	Lithologies	Till is the most widespread subsoil in Kilkenny. It is a diverse material, which is deposited sub-glacially, and it has a wide range of characteristics due to the variety of parent materials and different processes of deposition. The permeability of the till overlying this groundwater body is low.		
	Thickness	The subsoil thickness varies over the groundwater body surface. To the extreme west there is over 10m of subsoil cover; this reduces towards the River Nore, and east of the Nore the thickness is mostly less than 5m.		
	% area aquifer near surface	East of the Nore there are large areas of rock close to surface.		
	Vulnerability	Vulnerability is EXTREME to HIGH east of the Nore and HIGH to LOW west of the Nore.		
Recharge	Main recharge mechanisms	Most recharge will likely occur in the eastern part of this body where there is a thin cover of subsoil and rock close to the surface.		
	Est. recharge rates	[Recharge estimates will be added at a later date]		
Discharge	Springs and large known abstractions	Bennetsbridge PWS (1254), Bausheenmore springs, Cuffesgrange GWS, Ballymack GWS, Kilree-Stoneyford GWS and Ahenure GWS		
	Main discharge mechanisms	In the Callan – Bennetsbridge lowlands the aquifer discharges mainly by a series of large springs close to the Kings River and the Nore. Much of the aquifer east of the Nore discharges through a group of springs called the Bausheenmore wells, in the townland of Woolengrange about 2.5km south of Bennetsbridge, where a major fault along the river brings the aquifer up against the less permeable Aghmacart Formation.		
	Hydrochemical Signature	Dolomite areas in the Nore are indicated by very hard waters with high Mg/Ca ratio and a Calcium/Magnesium Bicarbonate type. The average electrical conductivity measurement is 778(µs/cm). The bedrock strata of this aquifer are Calcareous .		
Groundwater Flow Paths		This is the one aquifer in the Nore River Basin where significant amounts of deep (>200m) groundwater flow may occur. The following are cited as evidence: (1) This aquifer is continuous at depths under the centre of the basin. (2) There is significant permeability at depth. (3) There is a head difference of more than 30m between the discharge levels in the two lowlands, which could provide the hydraulic drive. (4) The large springs at Callan – Bennetsbridge Lowlands. (5) The slightly elevated temperature of some of the discharge waters from this aquifer in the Callan – Bennetsbridge lowlands.		

Groundwater & surface water interactions.	Some karst features such as caves, a turlough, highly permeable zones and surface solution, are found in parts of this aquifer. Where the aquifer is close to the surface, the drainage density is low. This is particularly noticeable in the area between Bennetsbridge and Gowran. Dry weather flows are available for portions of the Kings River between Callan and Annamult, and the Nore River between Mount Juliet and John's Bridge. The dolomites underlie most of these two portions. The specific dry weather flows estimated from the data are relatively high (1 to 2 l/sec/km ²), suggesting that the aquifer is relatively effective at storing water through to the summer months.
Conceptual model	The groundwater body is defined by the extent of the dolomitised limestones in south Kilkenny. The eastern and western boundaries are defined by the catchment boundaries of the Nore River. The dolomitisation of the original limestones has resulted in increased porosity. Subsequently other processes such as faulting, development of joints and karstification enhanced this porosity. The end product is a rock that is quite porous and permeable and which has been reduced in some places to the consistency of sand. Groundwaters in the outcrop areas of this aquifer are unconfined except for a number of small, generally low-lying areas where it is confined by till or peat big.
Attachments	Well Hydrograph at GSI borehole KNY 27/58
Instrumentation	Stream gauge: 15001 GSI Borehole Hydrograph: Rathduff, Kells (KNY 27/58 - S505433) EPA Representative Monitoring boreholes: Springs at Bausheenmore (#39 – S552469)
Information Sources	Buckley, R. & Fitzsimons, V (2002) Kilkenny Co Co Groundwater Protection Scheme. Daly, E. P. (1993) Hydrogeology of the Dolomite Aquifer in the Southeast of Ireland. Geol. Surv. Ire. Unpubl. Rep. Daly, E.P. (1994) Groundwater resources of the Nore River Basin. Geol. Surv. Ire. Unpubl. Rep.
Disclaimer	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae

**Well Hydrograph, KNY 27/58 (2313NEW118), Rathduff, Kells,
Co. Kilkenny, NGR S 505 433; datum = 46.63m O.D
BUdo**

