

### Knock GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water bodies	Associated terrestrial ecosystems	Area (km <sup>2</sup> )
15 – Nore N. Tipperary Co Co	Nore	Nore Valley Bogs, Sheehills Esker.	114
<b>Topography</b>		The topography of this groundwater body reflects the geology. There are elevated peaks to the west and also, to a lesser extent, to the east. This forms an elongated valley with in which we find the source of the River Nore. The river flows to the northeast before turning to the predominant southeastern direction of the entire catchment.	
<b>Geology and Aquifers</b>	Aquifer type(s)	<b>LI:</b> Locally important aquifer which is moderately productive only in local zones	
	Main aquifer lithologies	CW: Cadamstown Formation - Yellow & red sandstone & green mudstone LLS: Lower Limestone Shale - Sandstone mudstone & thin shale	
	Key structures.	There is a syncline located at the centre of this groundwater body in a WSW – ENE direction. Just south of this there is a smaller anticline in a similar direction although more W – E. There are also faults to the east, trending NW – SE, which cut across the northeastern extremities of the body. These large faults may retard the circulation of groundwater at depth by isolating the recharge area from the deeper parts of the aquifer. The steep folds of the extreme south give way to more gentle folds around Slieve Bloom where the effect of the Variscan deformation was less.	
	Key properties	The permeability of these sandstones is generally 0.5-20m/d but can be as high as 80m/d. Calculated transmissivities are 20 – 94m <sup>2</sup> /d. Storage Coefficient 8.0x10 <sup>-4</sup> .	
	Thickness	Drilling results show that significant fractures exist to depths of 100m. Groundwater may be mobile to depths of 200m and possibly 300m.	
<b>Overlying Strata</b>	Lithologies	There is little information available on the subsoils of this area but there is a gravel aquifer located at the northeastern extremity of the groundwater body. The rest of the area is probably glacial till.	
	Thickness	Subsoil thickness is thinnest along the northwestern boundary and also in the area of Black Hill. Thickness increases at lower elevations further down the valley.	
	% area aquifer near surface	There is a large percentage of this aquifer close to surface at the higher elevations	
	Vulnerability	The vulnerability of this groundwater body is Extreme along the northwestern boundary of the Nore Basin where the elevations are highest and also along the other side of the valley in the area of Black Hill. At lower elevations the vulnerability is High to Low.	
<b>Recharge</b>	Main recharge mechanisms	Most recharge is most likely to occur where the subsoil thickness is lowest at Black Hill and also at the northwestern boundary. The slope in this area may effectively reduce the amount of recharge as potential recharge is likely to runoff in a horizontal as interflow.	
	Est. recharge rates	<i>[Recharges rates will be provided at a later date]</i>	
<b>Discharge</b>	Springs and large known abstractions	Glenbeighe (Spring - 15), Roscrea (Spring – 1600), Montore (Centenary Co-Op - 27), Baullabhan GWS (7), Knock GWS.	
	Main discharge mechanisms	Groundwater discharge is most likely at the contact between the Cadamstown Formation and the overlying Lower Limestone Shale via springs or increased baseflow to mountain streams flowing into the upper stretches of the Nore.	
	Hydrochemical Signature	EPA groundwater monitoring shows hard groundwater but waters sampled from the recharging outcrop areas will be much softer. However, the bedrock waters have a high Mg/Ca ratio, which reflects the lower levels of calcium and higher levels of magnesium in the strata in this area. The groundwaters in this aquifer are mainly calcium/magnesium bicarbonate type waters.	
<b>Groundwater Flow Paths</b>		Groundwater flow in this aquifer will be towards the centre of the syncline i.e. the Nore River. The majority of flow is expected to occur in the upper weathered zone with increasingly diminishing flow volumes deeper in the aquifer. Due to the topography and shape of the aquifer regional flow paths are not expected to develop.	
<b>Groundwater and surface water interactions</b>		Groundwater will discharge locally to streams and rivers crossing the aquifer and also to small springs and seeps. Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater - surface water interactions occur. Baseflow to rivers and streams is likely to be relatively low.	
<b>Conceptual model</b>	The groundwater body is located a few Kilometres south of Roscrea at the northeastern extremities of the Nore River basin. The Cadamstown Sandstone is the main rock type. This aquifer is classified as a locally important sandstone. Recharge will occur in the higher area where subsoil thickness is thinner although the high slope may have an influence on actual recharge values. Groundwater flow will occur in the upper part of the aquifer and will take place through a series of open fractures which narrow with depth. The aquifer is not likely to develop regional flow paths and discharge is expected to occur to the over lying streams and also to the adjacent groundwater body.		

<b>Attachments</b>	
<b>Instrumentation</b>	Stream gauge: None Borehole Hydrograph: None EPA Representative Monitoring boreholes: Glenbeighe Dairy, Roscrea (#105 – S123855), Glenbeha (Spring) (#64 S121852), Knock GWS (#84 – S206858)
<b>Information Sources</b>	Daly, E.P. (1988) The Kiltorcan Sandstone Aquifer. <i>Proceedings of Eighth Annual International Association of Hydrogeologists (Irish Branch) Seminar</i> , Portlaoise, 1988. Daly E.P. (1994) Groundwater Resources of the Nore River Basin. Geological Survey of Ireland.
<b>Disclaimer</b>	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae