

Thurles GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water bodies	Associated terrestrial ecosystems	Area (km ²)
16 – Suir S. Tipperary Co Co	Rossestown, Suir, Drish, Clover, Black (Two Mile Borris),	Cabragh Wetlands,	90
Topography	This groundwater body is located northeast of Thurles. The area is exceptionally flat, but with very few rivers. The boundary between the SERBD and ERBD is located at the eastern extremity of this groundwater body. Along this boundary there is slightly higher ground (160m OD) than on the flat area (120m OD). The dominant drainage direction is west.		
Geology and Aquifers	Aquifer type(s)	Rf: Regionally Important fractured aquifer. Lm: Locally Important Aquifer, generally moderately productive.	
	Main aquifer lithologies	CS: Crosspatrick Formation - pale grey cherty crinoidal limestone WAdo: Dolomitised Waulsortian Limestone, frequently friable, weathered to yellow-buff or even black in outcrop. Dolomitisation is a chemical process whereby calcium ions are replaced by magnesium ions in the crystal lattice of dolomite ($\text{CaMg}(\text{CO}_3)_2$).	
	Key structures.	In South Tipperary, Waterford, Cork and Kerry, and in some parts of Limerick, the Waulsortian is a very productive, though also quite variable, aquifer. This appears to be due to the extensive fracturing of the formation produced by the intense stress of the Variscan Orogeny (mountain-building episode). However, the intensity of the Variscan folding decreased northwards, and it appears that in North Tipperary the fracturing of the Waulsortian is much less, and wells are generally less productive except where the Waulsortian is dolomitised. In this particular area there is a syncline which runs SW – NW between the two “arms” of the Crosspatrick Formation. There is also a series of N-S faults further to the north.	
	Key properties	Values calculated for the Tobernaloo spring (Motherway 2002) - Permeability (in upper 10 m) = 10m/d, Porosity = 0.03.	
	Thickness	Effective thickness is difficult to estimate because of the presence of folding, fracturing, karstification and dolomitisation.	
Overlying Strata	Lithologies	Limestone-derived tills are the dominant till type in this area. Limestone tills vary from light-brown/grey to dark brown/black in colour, depending on the parent material and the weathering processes that have occurred. Auger-hole drilling by the GSI determined the subsoils in the immediate vicinity of Tobernaloo spring to be sandy and stony clay.	
	Thickness	Subsoil thickness in the area of this groundwater body is generally greater than 3 metres but with some isolated areas where rock is close to the surface. Areas of deeper subsoil thickness could possibly relate to subsoil in filling of faulted gullies that would have high bedrock permeability. (Motherway 2002)	
	% area aquifer near surface	There is a small percent of the area where rock is close to surface.	
	Vulnerability	Vulnerability is HIGH to LOW with some small areas of extreme.	
Recharge	Main recharge mechanisms	Most recharge is likely where rock is close to surface and also to the east where the ground surface is elevated. Drainage density is extremely low in this area which would imply that a high proportion of effective rainfall infiltrates directly to the aquifer.	
	Est. recharge rates	<i>[Recharge estimates will be added at a later date]</i>	
Discharge	Springs and large known abstractions (m ³ /d)	Creamery Well (Spring - Thurles WS) (1400), Lady's Well (Spring - Thurles WS) (600) Tobernaloo (Spring – Thurles WS) (900), Ballyduff GWS,	
	Main discharge mechanisms	Groundwater flow in this aquifer is likely to be towards the southwest. At the extremities of the water bearing layers the groundwater discharges in a series of large springs detailed above.	
	Hydrochemical Signature	The groundwater samples have a calcium-bicarbonate (Ca – HCO ₃) hydrochemical signature. Groundwater hardness is classed as ‘excessively hard’ (total hardness 373–453 mg/l as CaCO ₃). The bedrock strata of this aquifer are Calcareous .	
Groundwater Flow Paths	The natural hydraulic gradient is estimated to be about 1%. Groundwater flow is likely to be from northeast to southwest. It is possible that the flow of groundwater in this aquifer converges in the southwest trending “arms” of the permeable rocks. This would lead to an increase in the saturation of the aquifer and eventually as the water bearing formations pinch out the water is forced to the surface at springs, which supply the town of Thurles with water.		
Groundwater and surface water interactions	The Tobernaloo Stream reach adjacent to the source dries up in summer as a result of pumping the spring. The extremely low drainage density would imply there is very little interaction between the surface water and ground water of the area.		

Conceptual model	This groundwater body is defined to the east by the boundary between the SERBD and the ERBD. The extent of dolomitised Waulsortian Limestone and Crosspatrick Formation define the area of the groundwater body to the north, west and south. The flow of groundwater is from east to west. Flow is likely to occur through fractures, which have been enlarged by karstification and dolomitisation. Recharge to the aquifer is directly from rainfall and the discharge is via springs in the southwest near Thurles.
Attachments	(Figure 1) Map of GW body incl. Aquifers, Monitoring boreholes, public supplies and water quality data (Figure 2) Durov plot.
Instrumentation	Stream gauge: 16004, <i>16002</i> . Borehole Hydrograph: none EPA Representative Monitoring boreholes: Moyne GWS B (#52- S183673), Moyne GWS C (Borehole) (#54 - S219650)
Information Sources	Kevin Motherway, Natalya Hunter Williams and Geoff Wright (2002) Tobernaloo Water Supply Scheme Groundwater Protection Zones. Geological Survey of Ireland. Natalya Hunter Williams, Kevin Motherway & Geoff Wright (2002) North County Tipperary Groundwater Protection Scheme.
Disclaimer	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae