

Old Kilcullen GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority		Associated surface water bodies	Associated terrestrial ecosystems	Area (km ²)
Kildare Co. Co. Hydrometric Area 09		Kilcullen Stream	None	7.8
Topography		This GWB is located around the southeast of Old Kilcullen in eastern Co. Kildare. The GWB lies between two hills, to the northwest and southeast, which reach heights of around 180 m OD. The western half of the body comprises a broad floodplain of the Kilcullen Stream with the land surface sloping down from the east.		
Geology and Aquifers	Aquifer type(s) Main aquifer lithologies	Lg: Locally Important Sand and Gravel Aquifer Sand and Gravel		
	Key structures.	N/A		
	Key properties	Though permeability testing data are limited, productivity, borehole logging and quarry data indicate that coarse material predominates and that permeability and storativity in the aquifer are high.		
	Thickness	By definition (DELG/EPA/GSI, 1999) this gravel deposit must be at least 10m thick.		
Overlying Strata	Lithologies	None		
	Thickness	N/A		
	% Area aquifer near surface	High		
	Vulnerability	High		
Recharge	Main recharge mechanisms	This GWB is recharged from rainwater percolating through the topsoil and unsaturated sand and gravel deposits. Surface runoff from such gravel aquifers is considered to be low, not more than 20% of effective rainfall. The presence of less permeable layers in the deposit, even if thin, can create perched water tables and prevent recharge of the true water table. Where the water table lies below the local river network it is likely that some stream water may pass into the aquifer. This will be most likely in the higher elevations where a river flows onto the aquifer from where it has previously been flowing over impermeable subsoil or bedrock.		
	Est. recharge rates	<i>[Information to be added at a later date]</i>		
Discharge	Springs and large known abstractions	There are no recorded large abstractions from this GWB.		
	Main discharge mechanisms	Groundwater will leave this aquifer where the water table is above river stage and a permeable riverbed exists. There is also likely to be groundwater seepage from the extremities of the gravel body at the lower elevations, which may appear as springs, seeps or a rise in baseflow to a river. Water may also come to the surface where there is a boundary to groundwater flow i.e. an impermeable layer of till within the gravel deposit.		
	Hydrochemical Signature	There is no information on the hydrochemical nature of the groundwater.		
Groundwater Flow Paths		Although the aquifer is permeable, groundwater velocity is slow because storativity in the aquifer is high and water table elevations are generally subdued. This also means that discharge to rivers will not be flashy and will be sustained through drier periods of the year.		
Groundwater & surface water interactions		The interaction between surface water and groundwater throughout this aquifer is complex and will depend on the position of the water table. The nature of this interaction will not be uniform over the area of the body. During flooding, when the river stage is above the water table in the gravel aquifer, river water will seep into the gravel aquifer. The aquifer provides storage for this rainwater and it is not until the river stage has reduced and the hydraulic gradient is reversed that the water is released into the river. This phenomenon is known as bank storage and is indicative of a high interactive surface water groundwater system. It also accounts for the fact that such rivers bounded by gravel aquifers have a less 'flashy' flooding and higher baseflow and dry weather flow.		
Conceptual model	This GWB is located around the southeast of Old Kilcullen in eastern Co. Kildare. The GWB lies between two hills, to the northwest and southeast. The extent of the body is defined by the presence of gravel deposits in excess of 10 m thick and in the west by the presence of the boundary between the Eastern and South Eastern RBDs. In the Kildare GWPS this aquifer is called the Narraghmore Gravel Aquifer and extends many kilometres south of the RBD boundary. The GWB is composed of permeable sand and gravel deposits, which will also have a high storativity. Recharge occurs diffusely through the overlying topsoil. The aquifer is generally unconfined, but may become locally confined where lower permeability deposits overlie the gravels. The water table within gravel aquifers is usually flat and therefore the depth to water will depend on the topography of the area. The flow paths within the aquifer are constrained by the extent of the deposit and therefore will not develop to a regional scale. Groundwater discharge will occur via springs and seeps along the lowest boundary of the body and also along river courses. There may also be discharge to rivers as baseflow where the water table lies above the river stage.			
Attachments				
Instrumentation		Stream gauge: None Borehole Hydrograph: None EPA Representative Monitoring boreholes: None		

Information Sources	DELG/EPA/GSI (1999) <i>Groundwater Protection Schemes</i> . Department of Environment & Local Government, Environmental Protection Agency and Geological Survey of Ireland, joint publication. Kelly C, Fitzsimons V (2002) <i>County Kildare Groundwater Protection Scheme</i> . Report to Kildare County Council. Geological Survey of Ireland 55pp McConnell B, Philcox M, Sleeman A G, Stanley G, Flegg A M, Daly E P, Warren W P (1994) <i>A Geological description to accompany the Bedrock Geology 1:100,000 Scale Map Series, Sheet 16, Kildare-Wicklow</i> . Geological Survey of Ireland, 70 pp.
Disclaimer	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae

