

Naas 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		Liffey	None	42
Topography		This GWB is located in an area of open grassland known as the Curragh and extends to the northeast towards Naas. Over the total extend of the GWB the elevations range from 110 to 70 m OD. The general trend is of elevations falling to the north. There is a small hill in the northeast which reaches 110 m OD. On a more regional basis the foothills of the Wicklow Mountains. are located to the southeast.		
Geology and Aquifers	Aquifer type(s)	RK^d : Regionally important karstified aquifer dominated by diffuse flow		
	Main aquifer lithologies	Rickardstown Formation (RK) Dinantian Pure Bedded Limestone. Local dolomitisation is common in these limestones and a more continuous dolomitised zone has been delineated in the Milford Formation at the southernmost tip of Kildare		
	Key structures.	The faults in the area of this GWB are orientated in a northwest to southeast direction. The limestones are dipping to the northwest.		
	Key properties	The well records for the Rickardstown Formation in Co. Kildare indicate fissures and several water entry zones in the borehole logs. The Rickardstown Formation is quite variable even over short distances, for example there are excellent yielding wells in close proximity to poor yielding wells in the Osberstown area with transmissivities of only 1 m ² d ⁻¹ reported for one of the poor yielding wells. In generally the aquifer can be considered to be productive and the presence of dolomite will have a positive effect on the development of permeability in the aquifer.		
	Thickness	The full thickness of this geological formation is not known, but it is probably more than 100 m (McConnell <i>et al</i> 1994). Boreholes usually strike water in this aquifer between 0 and 30m, major inflows beyond that are less common although there are recorded water strikes at depths of 89 m		
Overlying Strata	Lithologies	The Mid-Kildare Gravel Aquifer, including the Curragh, overlies a significant portion of this GWB. The gravels overlie this aquifer from the boundary between the Eastern and Southeastern RBDs to the area west of Naas. To the northeast of this area the GWB is overlain by a variety of alluvium on the flood plains of the Liffey, isolated gravel deposits and undifferentiated till.		
	Thickness	Subsoil thickness is highly variable in this area, but this is also an area of glacial deposition of thick subsoil layers. Borehole information suggests depth to bedrock values of mostly over 10m		
	% area aquifer near surface	There is a very low proportion of the aquifer close to the surface (<1%).		
	Vulnerability	Where the aquifer is over lain by the Mid-Kildare gravel aquifer it vulnerability is regarded as High. Outside if this area the vulnerability of the aquifer is mostly Moderate with some large areas of High vulnerability in the northern area of the aquifer.		
Recharge	Main recharge mechanisms	Diffuse recharge will be the dominant process of water recharging the aquifer. This is possible where surface water can percolate through the subsoil layers and recharge the water table. In as area such as this with thick subsoil covering the amount of recharge will be reduced. Where the aquifer is overlain by significant gravel deposits it is likely that the aquifer is saturated and in hydraulic continuity with the gravel. It is therefore difficult to determine how much recharge enters the rock in this case. Beyond the boundaries of the gravels water level evidence indicates that water table is close to the surface and therefore some proportion of the potential recharge will be rejected.		
	Est. recharge rates	[Information to be added at a later date]		
Discharge	Springs and large known abstractions	No large groundwater abstractions are known from this bedrock aquifer, some supplies are located within the area of the GWB but they extract water from the Curragh.		
	Main discharge mechanisms	This GWB may discharge to the Liffey and other streams which overlie the aquifer. Although it is not known if the river is in hydraulic connection with the bedrock, it is probable that the baseflow of the river is fed by the overlying thick gravels in the area. The drainage density appears to be higher in areas where there are no gravel aquifers, suggesting there is discharge to surface water where the storage contained in the gravels expires. In this hydrogeologically complex area it is difficult to discern whether it is the gravel aquifers or bedrock aquifer, which are the source of such discharges.		
	Hydrochemical Signature	There are no Hydrochemical data available for this GWB. Analogy with other limestones suggests a Calcium-bicarbonate signature and hard waters with high Electrical Conductivity.		
Groundwater Flow Paths		Topographic gradients within the area of the aquifer are very low. It is likely that the hydraulic gradients of the water table are also very flat. In addition to this the gravel deposits in the area increase the storativity for groundwater thus reducing the velocity of groundwater flow. There may be higher groundwater flow velocities along solutionally enlarge fractures and conduits in the limestone. These are typically found deep underground where a preferential flow path has developed from the network of fractures and joints located in the upper 30 m of the rock.		

Groundwater & surface water interactions	The interaction of surface water and groundwater in this aquifer may not be closely linked in areas where there are significant gravel deposits overlying the aquifer. In such areas surface water features (e.g. rivers and streams) and ecosystems will be fed by the over lying gravel aquifers. In other areas, the subsoil is less permeable but is still quite thick, this causes a boundary between the surface and groundwater systems.
Conceptual model	This GWB is located near Naas, Co. Kildare. The extent of the GWB is defined to the southwest by the boundary between the Eastern and Southeastern RBDs and elsewhere by the presence of the Rickardstown formation. The GWB is located in an area of low-lying topography. The GWB is composed of high permeability karstified and dolomitised pure bedded limestone. The bedrock aquifer is in hydraulic continuity with some overlying gravel aquifers, the largest of these being the Mid-Kildare (Curragh) Gravel Aquifer. Recharge to the groundwater body will occur from the overlying gravel aquifers where present. Elsewhere recharge from the overlying thick tills will be less. The aquifers within the GWB are generally unconfined, but may become confined where the subsoil is thicker and/or lower permeability. Due to the low hydraulic gradients and additional storage provided by the gravels groundwater flow velocities will be very slow. Regional groundwater flow appears to be towards the north of the aquifer where the River Liffey will act as a discharge point for the groundwater. There may be groundwater discharge at the boundary between the poorer aquifers surrounding this GWB.
Attachments	
Instrumentation	Stream gauge: 09047, 09042 Borehole Hydrograph: KID070 is located within the area of the GWB but it measures water levels in the Curragh gravel aquifer. Aquifer Representative Monitoring boreholes: None
Information Sources	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. Kelly C & Fitzsimons V. (2002) <i>County Kildare Groundwater Protection Scheme</i> . Report to Kildare County Council. Geological Survey of Ireland 55pp
Disclaimer	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae

Formation Name	Code	Description	Rock Unit Group	Aquifer Classification
Allenwood Formation	AW	Thick-bedded limestone, locally peloidal	Dinantian Pure Bedded Limestones	Rkd
Rickardstown Formation	RK	Cherty often dolomitised limestone	Dinantian Pure Bedded Limestones	Rkd

