

*1<sup>st</sup> Draft Inny – L. Ree Gravel GWB Description November 2004*

**Inny/Lough Ree Gravel GWB: Summary of Initial Characterisation.**

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km <sup>2</sup> )
26 Westmeath and Offaly Co. Co.'s	<b>Rivers:</b> <b>Lakes:</b> Lough Ree	Lough Ree SAC, Crosswood Bog SAC (O'Riain, 2004)	31
<b>Topog- raphy</b>	The GWB consists of sand/gravel deposits in the vicinity of Athlone, Moate and Ballycumber, shown in Figure 1. They are considered together because they have a similar configuration, i.e., similar morphology, located in low-lying areas with similar land use patterns in the southern part of the Inny/L.Ree subcatchment. The deposits are generally situated between 40 to 90 m OAD.		
	<b>Geology and Aquifers</b>	<b>Aquifer categories</b>	The sand/gravel deposit in Ballycumber is classified according to the Offaly Groundwater Protection Scheme (Daly, <i>et al</i> , 1998) as a potentially <b>Locally Important Sand and Gravel Aquifer (Lg)</b> . Despite the apparent lateral extent of the Athlone sand/gravel deposit (greater than 10 km <sup>2</sup> ), there is not enough evidence to suggest a Regionally Important Sand/gravel aquifer (Rg) classification (DELG/EPA/GSI (1999). The lateral extent of the sand/gravel deposits are delineated by Teagasc (Meehan, 2004). For the purposes of the WFD only sand/gravel aquifers greater than 4 km <sup>2</sup> are considered as GWB's.
<b>Main aquifer lithologies</b>		Glaciofluvial sand/gravel deposits. They are all categorised as limestone sand/gravel deposits (Meehan, 2004).	
<b>Key structures</b>		N/A	
<b>Key properties</b>		There are no data in this GWB on yields, permeabilities or transmissivities, but these are expected to be high. Sand/gravel aquifers generally consist of unconsolidated coarse grained material, usually containing less than 8% fines (O'Suilleabháin, 2000) resulting in an intergranular porosity and relatively high permeabilities and storativity. Permeability is generally greater than 10 m/d (O'Suilleabháin, 2000). Typically transmissivity ranges from 200 – 1500 m <sup>2</sup> /d. Storativity is expected to be high (10%). Groundwater is likely to be unconfined, except in areas within the deposits covered by fen peat and cutover peat. The data are inadequate to calculate groundwater gradients, but these are expected to be greater than 0.001. Water levels are close to ground level in the eastern end of the Athlone deposit, indicating that there is up to 10 m of saturated sand/gravel in places. In the deposit to the south of Moate, water levels are approximately 3-6 m below ground, indicating that there is approximately 5 m of saturated sand/gravel in places.	
<b>Thickness</b>	The thickness of the sand/gravel deposit around Athlone is 10-20 m. The deposit to the south of Moate is approximately 10 m thick and at Ballycumber it is 10 to 58 m thick.		
<b>Overlying Strata</b>	<b>Lithologies</b>	Alluvium, cutover peat and lacustrine deposits are typically associated with the sand/gravel deposits. Generally, alluvium is present in narrow strips along streams and rivers. Cutover peat and lacustrine deposits occur in the lowest lying regions either at the edges or within the sand/gravel deposit. An area of fen peat is located in the Athlone sand/gravel deposit toward the eastern end.	
	<b>Thickness</b>	The thickness of alluvium, cutover peat and lacustrine deposits are generally less than 3 m.	
	<b>% area aquifer near surface</b>	<i>[Further Information to be added at a later date]</i>	
<b>Vulnerability</b>	<i>[Further Information to be added at a later date]</i>		
<b>Recharge</b>	<b>Main recharge mechanisms</b>	Diffuse recharge occurs via rainfall percolating through the unsaturated sand/gravel. Due to the high permeability of sand/gravel, a high proportion of the available recharge will percolate down to the water table.	
	<b>Est. recharge rates</b>	<i>[Information to be added to and checked]</i>	
<b>Discharge</b>	<b>Large springs and large known abstractions (m<sup>3</sup>/d)</b>	None	
	<b>Main discharge mechanisms</b>	Groundwater discharges to small springs, rivers/streams that flow through the deposits and L. Ree.	
	<b>Hydrochemical Signature</b>	There are no data available, however alkalinity, hardness and conductivity are expected to be high. The groundwater is expected to have a calcium bicarbonate signature.	
<b>Groundwater Flow Paths</b>	The length of flow paths depend on the size of the sand/gravel deposit. In general, locally important sand/gravel aquifers are expected to have relatively short flow paths, i.e., up to several hundreds of metres. Sand/gravel has an intergranular porosity, thus groundwater flow is diffuse. Groundwater flow directions are driven by topography and are generally to the west.		

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<b>Groundwater &amp; Surface water interactions</b>	In general groundwater from sand/gravel deposits discharges to streams/ivers flowing through the deposits. The area of fen peat in the Athlone deposit is dependent largely on groundwater.
<b>Conceptual model</b>	<ul style="list-style-type: none"> <li>• The GWB consists of sand/gravel deposits in Athlone, Moate and Ballycumber. The deposits are generally situated between 40 to 90 m OAD.</li> <li>• Transmissivities expected to be high. Storativity is expected to be high (10%). Groundwater is likely to be unconfined. Gradients are expected to be greater than 0.001.</li> <li>• Diffuse recharge occurs via rainfall percolating through the unsaturated sand/gravel. Due to the high permeability of sand/gravel, a high proportion of the available recharge will percolate down to the water table.</li> <li>• Groundwater discharges to small springs, rivers/streams and L. Ree.</li> <li>• The area of fen peat in the Athlone deposit is dependent largely on groundwater.</li> <li>• Flow path lengths are expected to be relatively short.</li> </ul>
<b>Attachments</b>	Figure 1.
<b>Instrumentation</b>	<b>Stream gauges:</b> none <b>EPA Water Level Monitoring boreholes:</b> none <b>EPA Representative Monitoring points:</b> none
<b>Information Sources</b>	DELG/EPA/GSI (1999) <i>Groundwater Protection Schemes</i> . Department of the Environment and Local Government, Environmental Protection Agency and Geological Survey of Ireland. Daly, D., Cronin, C., Coxon, C., Burns, S.J., (1998). <i>County Offaly Groundwater Protection Scheme</i> . Geological Survey of Ireland. Meehan, R.T., (2004) <i>Subsoils Map for counties Westmeath and Offaly</i> . Map produced as part of EPA Soil and Subsoil Mapping Project (formerly FIPS-IFS). Teagasc, Kinsealy. O' Riain, G., (2004). <i>Water Dependent Ecosystems and Subtypes Draft Report</i> . WFD Support Projects. Compass Informatics in association with National Wildlife and Parks Service (DEHLG). O'Suilleabhain, C., (2000). <i>Assessing the boundary between high and moderately permeable subsoils</i> . Unpublished MSc., University of Dublin. Department of Civil, Structural and Environmental Engineering, Trinity College Dublin.
<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

Figure 1. Location and boundaries of Inny/L.Ree Gravel GWB group

