Shannon (Lower) Southern Gravel GWB Group: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km^2)
25 Offaly, Tipperary, Limerick Co. Co.'s	**Rivers**: Killmastulla, Newport and Annagh **Lakes**:	Lower River Shannon SAC (O' Riain**,** 2004)	29

Topography	Three sand/gravel deposits are grouped together and described as the Southern Gravel GWB Group, shown in Figure 1. The deposits are located in the vicinity of Silvermines, Birdhill, Newport and Bridgetown (Glenomra River sand/gravel aquifer). They are considered together as one group because they have a similar configuration, i.e., similar morphology, located along relatively flat valley floors between steep sided slopes, and have similar land use patterns. The Glenomra deposit situated between Broadford and Bridgetown straddles the Fergus and Shannon Lower subcatchments. Thus the eastern portion of deposit is considered in this GWB. The majority of the Glenomra deposit is located in the Fergus subcatchment and is described separately. The deposits are situated between 40 to 100 m OAD.	
Geology and Aquifers	**Aquifer categories**	The sand/gravel deposits in the subcatchment are classified as potentially **Locally Important Sand and Gravel Aquifers (Lg)** (Hunter-Williams, *et al,* 2002; Deakin, *et al,* 1998) as they satisfied GSI criteria for sand/gravel aquifer classification: greater than 1 km^2, a thickness of 5-15 m, thus are likely to have greater than 5 m of saturated sand/gravel (DELG/EPA/GSI (1999). For the purposes of the WFD only sand/gravel aquifers greater than 4 km^2 are considered as GWB's.
	Main aquifer lithologies	Glaciofluvial limestone sand/gravel deposits and alluvial sand/gravel deposits. (Meehan, 2004)
	Key structures	N/A
	Key properties	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^2/d. Storativity is expected to be high (10%). Groundwater is likely to be unconfined. The data are inadequate to calculate groundwater gradients, but these are expected to be greater than 0.001 and are expected to be similar to the gradient along the rivers. The sand/gravel deposits in this GWB group are situated within river valleys and the water levels are expected to be close to ground level, thus saturated thickness is expected to be greater than 5 m. Water levels are close to ground level in the eastern end of the Silvermines-Birdhill deposit, indicating that there is up to 25 m of saturated sand/gravel in places. Generally, water levels do not fluctuate more than 2-3 m annually.
	Thickness	The thickness of the Glenomra sand/gravel deposit is 5-15 m. Over 20 m of subsoil have been recorded in the sand/gravel deposit Silvermines-Birdhill. One borehole record indicates a thickness of 28 m in the Newport sand/gravel deposit.
Overlying Strata	**Lithologies**	Alluvium, cutover peat and lacustrine deposits are often associated with the sand/gravel deposits. Generally, alluvium is present in narrow strips along streams and rivers. Alluvium is extensive along the Kilmastulla River which flows through the Silvermines-Birdhill deposit and clean glaciofluvial sand/gravel is not exposed at the surface. Cutover peat and lacustrine deposits occur in the lowest lying regions often at the edges of the sand/gravel deposits. The deposit at Newport is covered by cutover peat.
	Thickness	The thickness of alluvium, cutover peat and lacustrine deposits are generally less than 3 m.
	% area aquifer near surface	*[Further Information to be added at a later date]*
	Vulnerability	*[Further Information to be added at a later date]*
Recharge	**Main recharge mechanisms**	Diffuse recharge occurs via rainfall percolating through the unsaturated sand/gravel, from runoff from the hills on either side, and possibly from the rivers flowing through the aquifers. Due to the high permeability of sand/gravel, a high proportion of the available recharge will percolate down to the water table.
	Est. recharge rates	*[Information to be added to and checked]*
Discharge	**Large springs and large known abstractions (m^3/d)**	None
	Main discharge mechanisms	Groundwater discharges to rivers/streams that flow through the deposits.
	Hydrochemical Signature	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.

Groundwater Flow Paths	In general, locally important sand/gravel aquifers are expected to have relatively short flow paths, i.e., up to several hundreds of metres. The deposits in the GWB are generally long linear deposits parallel to a river, thus flow paths are expected to be relatively short. Sand/gravel has an intergranular porosity, thus groundwater flow is diffuse. Groundwater flow directions are subparallel to the streams and main river valleys.
Groundwater & Surface water interactions	In general groundwater from sand/gravel deposits located in river valleys discharges to the streams/rivers flowing through the valley. Hydraulic connection between the groundwater in the aquifer and the stream is expected to be high, thus water will be able move into and out of the aquifer depending on the river stage.
Conceptual model	• Three sand/gravel deposits are grouped together and described as the Southern Gravel GWB Group. The deposits are located around Silvermines-Birdhill, Newport and Bridgetown. They are considered together because they have a similar configuration, i.e., similar morphology, located in low-lying areas between steep sided slopes with similar land use patterns and are categorised as limestone sand/gravel deposits. • The deposits are situated between 40 to 100 m OAD. • 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. • The sand/gravel deposits in this GWB group are all situated within river valleys and the water levels are expected to be close to ground level, thus saturated thickness is expected to be greater than 5 m. • Diffuse recharge occurs via rainfall percolating through the unsaturated sand/gravel, from runoff from the hills on either side, and possibly from the rivers flowing through the aquifers. • Groundwater discharges to rivers/streams that flow through the deposits. • Flow path lengths are expected to be relatively short, up to several hundred metres.
Attachments	Figure 1.
Instrumentation	**Stream gauges:** 25044 **EPA Water Level Monitoring boreholes:** none **EPA Representative Monitoring points:** none
Information Sources	DELG/EPA/GSI (1999) *Groundwater Protection Schemes.* Department of the Environment and Local Government, Environmental Protection Agency and Geological Survey of Ireland. Deakin, J., Daly, D., Coxon, C., (1998). County Limerick Groundwater Protection Scheme. Geological Survey of Ireland, 61pp. Hunter-Williams, T., Motherway, K., Wright, G., (2002). North County Tipperary Groundwater Protection Scheme. Geological Survey of Ireland, 53pp. Meehan, R.T., (2004) *Subsoils Map for counties Tipperary and Offaly*. Map produced as part of EPA Soil and Subsoil Mapping Project (formerly FIPS-IFS). Teagasc, Kinsealy. O' Riain, G., (2004). *Water Dependent Ecosystems and Subtypes Draft Report.* WFD Support Projects. Compass Informatics in association with National Wildlife and Parks Service (DEHLG) O'Suilleabháin, C., (2000). *Assessing the boundary between high and moderately permeable subsoils*. Unpublished MSc., University of Dublin. Department of Civil, Structural and Environmental Engineering, Trinity College Dublin.
Disclaimer	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 extent of Southern Gravel GWB Group