Williamstown Gravel GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km^2)
06 Louth Co. Co.	**Rivers:** Dee, Glyde, unnamed streams **Lakes:** two small, unnamed lakes	None.	5.7

Topography		This GWB is situated south of Kilsaran and Castlebellingham. The main sand/gravel deposit is about 3.5 km in an EW direction and 2 km north-south; there are small 'satellite' pods of sands/gravels associated with the main body. The deposits lie at elevations between <20 and >40 m OAD, in a generally very flat, low-lying area between the Rivers Dee and Glyde. In the west of the deposit, topographic variation is small, whereas in the east of the deposit, topographic relief is greater. There is a low glacial till ridge southwest of the GWB between the sands/gravels and the River Dee. Drainage is good in the east of the GWB, but poorer in the east of the GWB, where some boggy areas occur. Surface drainage features are sparse in the east of the GWB, but small streams drain southeast from the edge of the deposits to the River Dee.
Geology and Aquifers	**Aquifer categories**	The sand/gravel deposit is between 1 and 10 km^2, and the saturated thickness is generally unknown. Accordingly, the deposits are classified as **Locally Important Sand and Gravel Aquifers (Lg)** (DELG/EPA/GSI (1999). The gravels overlie a bedrock aquifer that Generally Unproductive except for Local Zones (Pl).
	Main aquifer lithologies	The sand/gravel deposits derive from Lower Palaeozoic sandstones and shales (GLPSsS) (Meehan, 2004). The NERDO (1981) report notes that these (morainic) deposits often contain lenses of silt and boulder clay.
	Key structures	N/A
	Key properties	Sand/gravel aquifers generally consist of unconsolidated coarse grained material, usually containing less than 8% fines (O'Suilleabháin, 2000). Typically transmissivity can range from 200 – 1500 m^2/d in sand/gravel aquifers. In similar deposits at Ardtully, in the east of the Cooley Peninsula, a transmissivity of about 1000 m^2/d and a specific yield of 0.1 are reported (NERDO, 1981). In the lowest (<20 mAO), flat-lying areas, water levels are probably close to the ground surface. Groundwater levels are probably considerably deeper under the higher (>30 mAOD) ground in the east of the GWB. Groundwater is likely to be unconfined in the east of the GWB; it may be confined by low permeability subsoils in the west of the GWB. The data are inadequate to calculate groundwater gradients.
	Thickness	Two boreholes in the NE and SW of the deposit reached bedrock at depths of 49 and 52 m.
Overlying Strata	**Lithologies**	Cut peat (Cut) and a small area of undifferentiated lacustrine (L) sediments (Meehan, 2004). Kilsaran town is defined as Made Ground. Areas of undifferentiated alluvium (A) occur around the sand/gravel body.
	Thickness	The thickness of cutover peat and lacustrine deposits are unknown but probably 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. Due to the high permeability of sand/gravel, a high proportion of the available recharge will percolate down to the water table. In the lowest-lying areas, recharge may be inhibited by low permeability subsoils and/or a high water table.
	Est. recharge rates	*[Information to be added to and checked]*
Discharge	**Large springs and large known abstractions (m^3/d)**	*[Information to be added to and checked]*
	Main discharge mechanisms	Groundwater discharges to streams that flow away from the deposits. Groundwater is also likely to discharge via alluvial deposits to the Rivers Dee and Glyde.
	Hydrochemical Signature	There are no data readily available to assess the hydrochemistry of these deposits.
Groundwater Flow Paths		Groundwater flow path length depends on the size and dimensions of the sand/gravel deposit, and also upon the spacing of internal groundwater divides and the distance between streams. Due to the geometry and topography of the deposit, flow path lengths are generally less than about 1000 m, and will typically be ≤500 m. Overall, groundwater flows outwards from the deposit, but topographic variations within the sands/gravels cause groundwater flow directions to vary locally. Generally the drainage density is low in the east. However, in the west of the GWB drainage can be poor where the water table is close to the surface and/or where low permeability sediments overlie the sands/gravels.
Groundwater & Surface water interactions		Groundwater discharges to streams/rivers and may support lake waters. In the west of the GWB, surface-groundwater interaction may be inhibited by fine-grained low permeability subsoils overlying the sands/gravels.

Conceptual model	• The GWB consists of sand/gravel deposits located south of Kilsaran and Castlebellingham. • The deposits are located in a relatively low-lying flat area between two east-flowing rivers. The deposits are situated between <20 to >40 mOAD. Topographic variation is more pronounced in the eastern part of the GWB. Surface water drains radially outwards from the GWB. • The aquifer comprises sands/gravels deposited by glacial action. • Transmissivity is expected to range from 200 to 1000 m^2/d. Storativity is expected to be about 0.1 (10%). • The sand/gravel aquifer reaches known thicknesses of about 50 m. • The data are inadequate to calculate groundwater gradients, but these are expected to be generally greater than 0.001. • Diffuse recharge occurs via rainfall percolating through the unsaturated sand/gravel. In the west of the GWB, recharge may be inhibited due to high water table conditions and/or low permeability overlying subsoils. • Groundwater discharges to streams that flow away from the deposits. Groundwater is also likely to discharge to the Rivers Glyde and Dee via alluvial deposits that neighbour the sands/gravels. • Overall, groundwater flows outwards from the deposit, but topographic variations within the sands/gravels cause groundwater flow directions to vary locally. Due to the geometry and topography of the deposit, flow path lengths are generally less than about 1000 m, and will typically be ≤500 m.
Attachments	Figure 1.
Instrumentation	None.
Information Sources	An Foras Forbartha & Geological Survey Office (1981) Groundwater Resources in the NE (RDO) Region. DELG/EPA/GSI (1999) *Groundwater Protection Schemes.* Department of the Environment and Local Government, Environmental Protection Agency and Geological Survey of Ireland. Meehan, R.T., (2004) *Subsoils Map for County Louth*. Map produced as part of EPA Soil and Subsoil Mapping Project (formerly FIPS-IFS). Teagasc, Kinsealy. 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 calculations 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 Williamstown Gravel GWB