Gorey GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water bodies	Associated terrestrial ecosystems	Area (km^2)
11- Coastal Area Wexford Co Co	Banoge, Brackan, Owenavorragh	Courtown Dunes and Glen	81

Topography	This body extends southwest from Tara Hill to Carrigroe Hill, enclosing the town of Gorey. The highest points are also Tara Hill at 253m OD and Carrigroe Hill at 231m. Slopes decrease from the north and west of the body towards the Banoge, Bracken, and Owenavorragh rivers. There is a topographic high just east of the Bracken and Owenavorragh rivers, which separates their drainage areas from the coast. There are a variety of drainage types around the area; drainage appears to improve to the west, which may be determined by the overlying strata.	
Geology and Aquifers	Aquifer type(s) Main aquifer lithologies	**Rf**: Regionally Important fissured aquifer. There are also small areas of dolerite, which is a poor aquifer (Pl). The aquifer may be confined in the west: this is determined by the overlying strata. Campile formation (CA) Rhyolitic volcanics, grey & brown slates. This rock contains areas of felsic volcanic rock which are believed to be the main water bearing components.
	Key structures.	Highly fractured and broken due to folding and faulting by the Caledonian Orogeny which formed the Campile Syncline. Superimposed upon this are a series of minor folds giving rise to pronounced cleavage. The crystalline volcanic rocks will have ruptured under the mountain building forces that affected the whole area.
	Key properties	Transmissivity – 20-300m^2/d (KTC)
	Thickness	The effective thickness of this aquifer could be quite large. Well logging data from Kilkenny shows large fractures open at depths of 50m.
Overlying Strata	Lithologies	Towards the coast the Macamore Marl / Irish Sea Till is dominant. This is a clay based, lime rich till containing small pebbles and shells. Occasionally local lenses of sand and gravel are reported. To the west the Clogga till is more common. The Clogga till is a stone clay sand based till containing large angular cobbles and boulders chiefly of shale and granite.
	Thickness	Less than 5 to over 30m.
	% area aquifer near surface	*[Information will be added at a later date]*
	Vulnerability	*[Information will be added at a later date]*
Recharge	Main recharge mechanisms	Most rainfall recharge will occur in the east where overlying strata are thinner in the uplands and the rainfall is higher.
	Est. recharge rates	*[Information will be added at a later date]*
Discharge	Springs and large known abstractions (m^3/d)	Barnadown (2900), Essex Bridge(1700) Banoge (500). Plans exist to increase pumping in the future to (11,000) EPA (Tara Hill, Ballyoughir NS, Clough (3000), Barnadown)
	Main discharge mechanisms	The main discharge is to the Owenavorragh river. There is also a considerable discharge to the boreholes at Barnadown, which is planned to increase in the future. Some discharge will occur at the coast although there is a limited area of contact.
	Hydrochemical Signature	Magnesium Bicarbonate Signature. A study of regional rainfall chemical data (Burdon & Cullen 1980) indicates that groundwater chemistry is influenced by rainfall chemistry in this area. The volcanic rocks are mostly insoluble and the water does not become mineralized by from ion exchange with the rock itself. This should be taken into consideration when drawing conclusions on the nature of groundwater flow from the chemical signature. Low hardness level due to the volcanic (low mineralizing) nature of the aquifer. Domestic and farm wastes have affected the natural chemistry of the groundwater, as reflected in the elevated levels of bacteriological contamination. The bedrock strata of this aquifer are **Siliceous**.
Groundwater Flow Paths		These rocks are devoid of intergranular permeability, therefore groundwater flow must occur in fractures caused by deformation. Water table controlled by the Owenavorragh River: an annual fluctuation of 2-4m is observed in the natural water table. Cone of depression exists, with a drawdown of 1 m extending 1.5 km from the Barnadown boreholes. There appears to be a regional groundwater flow regime present: groundwater can move from the uplands in the west to the east coast. Groundwater flow paths would be considerably longer than in the surrounding aquitards.
Groundwater & Surface water interactions		The Owenavorragh is the main discharge area for the volcanic aquifer. There is unlikely to be saltwater intrusion because there are no major abstractions near the coast.

Conceptual model	The area of this groundwater body is defined to the north and south by the extent of the Campile Formation. To the east it is bounded by the coast and to the west by the elevated topography around Carrigroe Hill. Regional flow through the aquifer is predominantly eastwards but also towards the surface water bodies. Greater flow in this aquifer is likely along fractures/faults, in areas of volcanic rocs and near the surface in the weathered zone.
Attachments	(Figure 1) Durov plot.
Instrumentation	Stream gauge: 11001 Borehole Hydrograph: The Wexford Co Co monitors 5 trial wells in the Barnadown area since 1983, although hydrographs are not available at present. EPA Representative Monitoring boreholes: Clough (#13 - T121560), Barnadown (#41 - T135557)
Information Sources	Gorey Regional Water Supply Scheme EIS (KTC). Report on the Drilling and Testing of Trial and Production water wells at Clough, Co Wexford (KTC). Preliminary report on the Hydrogeology of North County Wexford (KTC). Burdon, D. J. & Cullen K. T (1980) The Hydrochemistry of Caradocian volcanics In southeast Ireland and the effect of precipitation on the composition of the groundwater chemistry. (Minerex Ltd) Gardiner, M.J., & Ryan, P. (1964) Soils of County Wexford. National Soil Survey of Ireland. An Foras Taluntais, 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