

1st Draft Valencia Island GWB Description September 2005

Valencia Island GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km ²)	
22 Kerry Co Co	No lakes Several unnamed streams.	No groundwater dependent terrestrial ecosystems (O'Riain, 2004).	~26	
Topography	Valencia Island is located just off the west Kerry coastline, approximately 500m off the mainland, with a population of approximately 700 (Census 2002). Elevations range from 0-260m AOD, with the highest mountainous ground in the northern end of the island. The southwestern tip of the island is also rugged and steep. The island is bordered by a rocky coastline, which is comprised of cliffs along much of the northern edge of the island. Figure 1 shows the location and boundaries of the GWB. Cahersiveen GWB is nearest GWB. There are several small streams.			
	Geology and Aquifers	Aquifer categories	The main aquifer category is: PI: Poor aquifer, generally unproductive except for local zones.	
		Main aquifer lithologies	Devonian Old Red Sandstones	
		Key structures	The widespread faulting and folding associated with the Variscan Orogeny in the south of Ireland has given rise to zones of enhanced permeability in the mudstones and sandstones. These can occur in the immediate vicinity of faults and near the axes of folds. The mainly fine-grained nature of the rocks however means that such zones are generally local.	
		Key properties	[TAKEN FROM CAHERSIVEEN GWB] Permeability generally decreases rapidly with depth in all aquifers in this GWB. In general, the ORS aquifer transmissivities will range 2-20 m ² /d, with median values occurring towards the lower end of the range. However, 'Excellent' yielding wells (>400 m ³ /d) are known in some of the ORS units in other locations – these yields are usually associated with boreholes being situated on fault zones. Summer yields are sometimes unsustainable. Transmissivities in the small occurrences of other rock types in this GWB will be similarly low. Aquifer storativity will be low in all rock units. Groundwater gradients are likely to be in the range 0.01 to 0.04.	
Thickness		The Devonian ORS can be up to several kilometres thick in this region (Pracht 1996). However, in all aquifers within this GWB, most groundwater flow occurs within the top 15-20 m of the aquifer, in the layer that comprises a weathered zone of a few metres and a connected fractured zone below this. Deeper flows occur along generally isolated faults or significant fractures.		
Overlying Strata	Lithologies	Devonian Sandstone Till (TDSs) is present on the southern half of the island whilst the northern half of the island is predominantly rock close.		
	Thickness	Subsoil is generally less than 3 m thick but up to 10m thick subsoil is present in places.		
	% area aquifer near surface	<i>[Further Information to be added at a later date]</i>		
	Vulnerability	<i>[Further Information to be added at a later date]</i>		
Recharge	Main recharge mechanisms	Diffuse recharge is expected to occur via rainfall percolating through the subsoil and rock outcrops.		
	Est. recharge rates	<i>[Information to be added to and checked]</i>		
Discharge	Large springs and large known abstractions (m³/d)	No data		
	Main discharge mechanisms	Shallow groundwater is likely to discharge mainly to the small lakes, streams or to seeps along the coastline, but the limited bedrock transmissivity means that the baseflow component of the total streamflow will be low.		
	Hydrochemical Signature	The Old Red Sandstone rocks largely contain calcium bicarbonate type water. Groundwater in the Old Red Sandstone rocks ranges from moderately soft to moderately hard water. Conductivities are relatively low, ranging approximately 150-450 µS/cm. High iron (Fe) and manganese (Mn) concentrations can occur, due to the dissolution of Fe and Mn from the sandstone/shale where reducing conditions occur.		
Groundwater Flow Paths	Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. Flow paths are likely to be short (30-300 m) with groundwater discharging rapidly to the lakes, streams or to seeps along the coastline. Groundwater flow directions are expected to follow topography.			
Groundwater & Surface water interactions	Groundwater will discharge locally to the small lakes, small springs and seeps. Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater - surface water interactions occur. Baseflow is likely to be relatively low.			

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Conceptual model	<ul style="list-style-type: none"> Valencia Island is located just off the west Kerry coastline, approximately 500m off the mainland, with a population of approximately 700 (Census 2002). Elevations range from 0-260m AOD, with the highest mountainous ground in the northern end of the island. The southwestern tip of the island is also rugged and steep. The GWB is composed of low transmissivity rocks. Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. Diffuse recharge is expected to occur via rainfall percolating through the subsoil and rock outcrops. Flow paths are likely to be short (30-300 m) with groundwater discharging rapidly to the lakes, streams or to seeps along the coastline. Flow directions are expected to follow topography. Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater - surface water interactions occur.
Attachments	Figure 1.
Instrumentation	Stream gauges: None EPA Water Level Monitoring boreholes: None EPA Representative Monitoring points: None
Information Sources	<p>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).</p> <p>Pracht M (1996) <i>Geology of Dingle Bay: A geological description, to accompany bedrock geology 1:100,000 scale map, Sheet 20, Dingle Bay</i>. Geological Survey of Ireland. 58pp.</p> <p>Wright GR, Conlon V (1998) <i>County Kerry Aquifer Classification</i>. Unpublished GSI report produced for Kerry County Council. Geological Survey of Ireland.</p>
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. Valencia Island GWB.

