

**Fardystown GWB: Summary of Initial Characterisation.**

Hydrometric Area Local Authority		Associated surface water bodies	Associated terrestrial ecosystems	Area (km <sup>2</sup> )
13-Coastal / 12 Slaney Wexford Co Co		R. Bridgetown	Wexford Slobs and Harbor, Ballyteige Burrow.	77
<b>Topography</b>		<p>This area is located in southeast Co. Wexford. It is a strip of land extending from the southern half of Wexford Harbour southwest to just south of Duncormick at Ballyteige Bay.</p> <p>The land surface is very flat, rising only to about 20m above sea level. There is a slightly elevated area through the centre of this strip, dividing the catchment of the Bridgetown River from the catchment area of Wexford Harbour.</p> <p>The drainage is better to the east where the soils are underlain by sand and gravel deposits, there are also some free draining areas in the east where the soil cover is thin.</p>		
<b>Geology and Aquifers</b>	Aquifer type(s)	<b>Rk<sup>d</sup></b> : Regionally important karstified aquifer dominated by diffuse flow		
	Main aquifer lithologies	The main lithology is the Wexford Formation, a pale grey limestone, with some dolomitised areas. North of this lies the Ballysteen Limestone, which is largely dolomitised. This is typically a local aquifer but dolomitisation can improve its water bearing abilities.		
	Key structures.	There are a series of north-south trending faults, which will enhance the development of karst structures.		
	Key properties	Transmissivity values are in the range of 50 to 200m <sup>2</sup> /d. Confined storativity ranges from 3 to 8 x 10 <sup>-4</sup> and unconfined storativity is approx. 5 x 10 <sup>-3</sup> .		
Thickness	Thickness of the beds has been shown to vary greatly but it seems likely that the effective water bearing thickness of these beds may be greater than 200m.			
<b>Overlying Strata</b>	Lithologies	The area is mostly overlain by marl (Macamore Member) which was deposited by the Irish Sea ice. This is an almost impermeable subsoil and may act as a confining layer to the limestone aquifer. In the extreme west there is some boulder clay (Blackhall Member) deposited by ice from the Midlands. To the east there are some deposits of sand and gravel, also deposited by the Irish Sea ice, which in places overly marl.		
	Thickness	The thickness of the subsoil is determined by the undulations in the rock surface because the ground surface is very flat. The undulating bedrock surface represents buried valleys, whose direction is determined by the Lower Carboniferous/Rosslare Complex fault. The depth of subsoil can be up to 20m.		
	% area aquifer near surface	<i>[Information will be added at a later date]</i>		
	Vulnerability	<i>[Information will be added at a later date]</i>		
<b>Recharge</b>	Main recharge mechanisms	<p>The limestone is mainly recharged in the east where it is overlain by the sands and gravels of the Irish Sea deposits.</p> <p>Water levels imply the aquifer is also recharging in the north., where the area is covered by thick clay and loam deposits but streams are in contact with the bedrock. At the geological contact between the Pre-Cambrian rocks and the limestone aquifer there should be a marked reduction in the stream levels.</p>		
	Est. recharge rates	<i>[Information will be added at a later date]</i>		
<b>Discharge</b>	Springs and large known abstractions (m <sup>3</sup> /d)	<p>Fardystown Regional Water supply scheme (Ballyfinogue 1800, Ballykillane 1800 Busherstown 2050, Orristown 680) Total = 6330m<sup>3</sup>/d. Newtown (GWS)</p> <p>GSI: Mulrankin 1675, Busherstown 1505, Fardystown Total 9050, Orristown?, Ballyfinogue 2536, Rathmacknee 576, Ballykillane 1591</p> <p>EPA Sources : Oldhall (BH14), Bridgetown, Mountcross (BH13), Churchtown (BH12), Rathronan (BH11), Mulrankin BH10), Busherstown (BH 8), Harpoonstown (BH9), Fardystown RWSS, Mayglass (BH7), Hardygregan (BH5), Churchlands (BH6), Tagunnan (BH4), Ballycogley (BH 17), Walshestown (BH2), Rathmacknee, Walshestown (BH1), Assaly Little (BH16), Orristown, Ballykelly, Ballkilliane, Baron's Farm, Jacketstown(Spring).</p>		
	Main discharge mechanisms	<p>Where the aquifer becomes unconfined at Drinagh (south of Wexford town) and at Baldwinstown, it discharges to streams leaving these quarried areas. The main discharge areas in the west are at Duncormick – Bridgetown. Although the aquifer is believed to be covered by a thick, almost impermeable layer here, is possible that mounds of the bedrock rising up through the overlying strata could be intersected by the river, allowing water to discharge. In the east the aquifer is discharging through the sand and gravel overburden at Killinick into the main eastward flowing river.</p>		
	Hydrochemical Signature	The chemical signature is calcium bicarbonate to sodium sulphate. This distribution of points indicates a mixing of groundwaters, which could indicate salt-water intrusion. The water is considered to be hard, but of excellent quality. The bedrock strata of this aquifer are <b>Calcareous</b> .		
<b>Groundwater Flow Paths</b>		All of the limestone beds appear to have water-bearing properties, therefore the entire aquifer is in hydraulic connectivity. Geophysical borehole logging (KTC 1978) shows that there is a total absence of major fissuring within this limestone succession. Groundwater flow must occur in narrow vertical fissures.		

<b>Groundwater &amp; surface water interactions</b>	The associated terrestrial ecosystems have a moderate dependence on groundwater. To the north the associated surface water bodies are contributing water to the groundwater system. In the area of Duncormick and Ballyteige groundwater discharge to surface waters.
<b>Conceptual model</b>	The groundwater body is defined by the extent of the Lower Carboniferous limestone formations in SE Wexford. The aquifer is unconfined south of Wexford town where the glacial cover is very thin and has been removed by extensive quarrying. Over the remaining area the aquifer is considered to be confined except where overlain by sands and gravels. Groundwater flow occurs through narrow vertical fissures. Groundwater mainly recharges from the north and flows to the south.
<b>Attachments</b>	(Figure 1) Durov plot.
<b>Instrumentation</b>	Stream gauge: 12063. Borehole Hydrograph: none EPA Representative Monitoring boreholes: Orristown (#46 - T050136), Rathmacknee (#47 - T032139), Ballykelly (#40 - T050155), Ballykilliane (#38 - T045162)
<b>Information Sources</b>	Cullen, K. T. (1978) A Preliminary Hydrogeological Investigation of South County Wexford, Ireland. Unpublished MSc Thesis, University of Birmingham, UK. Cullen, K.T. (1980) Groundwater Development for urban and rural water schemes. IAH (Irish Group). Carnsore Nuclear Project (1977) Report on the investigation to find suitable underground sources of freshwater in south Co Wexford. E.S.B.
<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

Formation Name	Code	Description	Rock Unit Group	Aquifer Category
Ballymartin Formation	BT	Limestones & dark grey calcareous shales	Dinantian Lower Impure Limestones	Rf
Ballysteen Formation	BA	Fossiliferous dark-grey muddy limestone	Dinantian Lower Impure Limestones	Rf
Ballysteen Formation & dolomitization	doBA	Fossiliferous dark-grey muddy limestone	Dinantian Dolomitised Limestones	Rkd
Wexford Formation	WX	Pale grey limestones, often dolomitised	Dinantian Pure Bedded Limestones	Rkd

