

### Castlebridge B GWB: Summary of Initial Characterisation.

| Hydrometric Area<br>Local Authority | Associated surface water<br>bodies                       | Associated terrestrial ecosystems  | Area (km <sup>2</sup> ) |
|-------------------------------------|--|--|-------------------------|
| 12 – Slaney<br>Wexford Co Co        | Sow  | Wexford Slobs and Harbour, Screen Hills.   | 35.5                    |
| <b>Topography</b>                   |  | This groundwater body is located to the north of Wexford Harbour. The topography in this are is quite variable. To the east in the area of the Screen Hills the landscape is dominated by hummocky hills and an erratic drainage pattern. To the west the topography has a more gradual descent towards the coast with elevations falling from around 30mOD to sea level at the coast.   |                         |
| <b>Geology and Aquifers</b>         | Aquifer type(s)  | <b>Rf:</b> Regionally important fissured aquifer<br><b>Ll:</b> Locally important aquifer which is moderately productive only in local zones<br>The classification of some rocks in this area is uncertain.   |                         |
|                                     | Main aquifer lithologies                                 | Dinantian Lower Impure Limestone<br>Dinantian Pure Bedded Limestone<br>Dinantian (early) Sandstone, Shale and limestone  |                         |
|                                     | Key structures.  |  |                         |
|                                     | Key properties   | There is no information available on the hydrogeological properties of this groundwater body.  |                         |
|                                     | Thickness  |  |                         |
| <b>Overlying Strata</b>             | Lithologies  | There are a variety of subsoil types in this groundwater body. In the west is the Clogga Till, which is of inland origin and was deposited first among the subsoils. Above this to the east is the Macamore Marl, which is of Irish Sea origin and was deposited as the Irish Sea glacier retreated. Finally on top of these to the extreme east are the Screen Gravels, which are marine in origin and are considered as a separate groundwater body. There are also significant sand and gravel deposits along the course of the Slaney.   |                         |
|                                     | Thickness  | Thickness increases from <5m in the north to generally over 10m in the south especially over the Cambrian rocks, except for at the higher elevations of Forth Mountain. There is some speculation that the bedrock surface may not be a direct reflection of the surface topography and that underground valleys exist which are oriented in a different direction to the current surface water drainage pattern.  |                         |
|                                     | % area aquifer near surface                              | [Information will be added at a later date]  |                         |
|                                     | Vulnerability  | [Information will be added at a later date]  |                         |
| <b>Recharge</b>                     | Main recharge mechanisms                                 | Most recharge is likely to occur in the sandier parts of the Clogga Till to the west. The Macamore Marl seals the bedrock from direct recharge over most of the body. Over the area of the Screen Gravels there is likely to be limited recharge to the bedrock because the Macamore Marl underlies much of these deposits. Recharge may also enter the body from the fractured aquifers to the north via water flowing south in fractures that cross both groundwater bodies. It is likely there is also some recharge on Forth Mountain where the subsoil thickness is lower at high elevations. |                         |
|                                     | Est. recharge rates                                      | [Information will be added at a later date]  |                         |
| <b>Discharge</b>                    | Springs and large known abstractions (m <sup>3</sup> /d) | SOW RWSS   |                         |
|                                     | Main discharge mechanisms                                | Discharge from this groundwater body will be focused towards the Slaney River and Wexford Harbour. There are areas of sand and gravel deposits along the Slaney River, which may allow for a better hydraulic connection between the bedrock and the river. There may also be discharge along the River Sow where the steep valleys cut through the thick Irish Sea Till.  |                         |
|                                     | Hydrochemical Signature                                  | EPA Monitoring data at Ballina indicates the water has Electrical Conductivity of 487uS/cm and a hardness of 217 mg/l.<br><i>The Durov plot shows some indication of ion exchange and the water has magnesium bicarbonate signature. This may imply the water is not freshly recharging and there may be the possibility that water confined below the almost impermeable marl is not able to discharge to the overlying rivers as soon as would be expected.</i>  |                         |
| <b>Groundwater Flow Paths</b>       |  | There is a degree of uncertainty involved in the interpretation of this groundwater body. Poor aquifers typically have short flow paths, recharging and discharging within small areas. The chemical analyses indicate there may be ion exchange occurring, which may indicate older groundwater. Groundwater may be recharging from the sandier parts of the marl, from outcrop or from the aquifer to the north along fractures and then become trapped under the thicker areas of the Irish Sea Till.   |                         |

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| <b>Groundwater &amp; surface water interactions</b> | The interaction between groundwater and surface water is uncertain due to the thickness and lithologies of the subsoils. If there is a large thickness of impermeable subsoil there will be little or no interaction between the two systems. If the river cuts through the overlying subsoil to the bedrock there will be discharge from the groundwater body to the river, this will provide baseflow in the winter. The sandy alluvium mapped along the Slaney (Cullen 1980) may allow groundwater to discharge at these locations.  |
| <b>Conceptual model</b>                             | This groundwater body is located to the north of Wexford Harbour. The topography in this area is quite variable with the hummocky Screen Hills to the east and a more lowlying area to the west. The GWB boundary is defined to the north by the extent the limestones in this area and to the south by the coast. The limestones are of variable permeability and classification of these aquifers is uncertain. Recharge occurs diffusely through the subsoils and via outcrops. The aquifers within the GWB are generally unconfined, but may become locally confined where the subsoil is thicker and/or lower permeability. Most flow in this aquifer will occur near the surface. In general, the effective thickness of this aquifer is likely to be about 10 m, comprising a weathered zone of a few metres and a connected fractured zone below this. However, deep water strikes in more isolated faults/ fractures can be encountered at 50-70 mbg. Groundwater flow direction is expected to be towards the coast and flow path lengths are unlikely to develop to the order of kilometres. Discharge from the aquifer will be directly to the coast and any overlying surface features in the aquifer. |
| <b>Attachments</b>                                  | Table 1 - List of Formations  |
| <b>Instrumentation</b>                              | Stream gauge: None<br>Borehole Hydrograph: none<br>EPA Representative Monitoring boreholes: WEX036  |
| <b>Information Sources</b>                          | van Putten, F.A.M. (1978) The Blackwater Screen Project. Free University, Amsterdam, M.Sc thesis.<br>Cullen, K.T. (1980) Distribution of unconsolidated deposits in Co Wexford (Map). Wexford Co Co, Sanitary Services Dept.  |
| <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  |

| <b>Formation Name</b>  | <b>Code</b> | <b>Description</b>                       | <b>Rock Unit Group</b>                              | <b>Aquifer Category</b> |
|------------------------|-------------|--|---|-------------------------|
| Ballymartin Formation  | BT          | Limestones & dark grey calcareous shales | Dinantian Lower Impure Limestones                   | ??                      |
| Ballysteen Formation   | BA          | Fossiliferous dark-grey muddy limestone  | Dinantian Lower Impure Limestones                   | Rf                      |
| Porters Gate Formation | PG          | Sandstones, shales & thin limestones     | Dinantian (early) Sandstones, Shales and Limestones | Ll                      |
| Wexford Formation      | WX          | Pale grey limestones, often dolomitised  | Dinantian Pure Bedded Limestones                    | Rf                      |