Bagenalstown GWB: Summary of Initial Characterisation.

<table>
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<tr>
<th>Hydrometric Area Local Authority</th>
<th>Associated surface water bodies</th>
<th>Associated terrestrial ecosystems</th>
<th>Area (km²)</th>
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**Topography**
The overall topography of this GWB shows higher elevation to the northeast and west. Therefore the drainage is southwards as represented by the River Barrow. To the east rise the Blackstairs Mountains, which can extend to elevations of 800m in places. To the west is the Castlecomer Plateau, which rises to 330m. To the north there are no extensive elevated areas, but the higher topography in this region represents the boundary between the Eastern and Southeastern River Basin Districts.

**Aquifer type(s)**
- **Rk**: Regionally important karstified aquifer. This groundwater body is considered a major aquifer. It comprises water-bearing units of pure limestone and dolomitised limestone and Calp. The dolomitisation is not complete and therefore there may be areas of undolomitized limestone that act as aquitards.
- **BM**: Ballyadams Formation – Pale-grey thick-bedded pure fossiliferous limestone
- **MI**: Milford Formation - Varied limestone succession (partly dolomitised), dominantly coarse-grained, with some finer beds.
- **CL**: Clogrennan Formation - Thinly bedded bluish-grey pure limestones, regularly cherty.
- **RK**: Rickardstown Formation. – Cherty often dolomitised limestone.
- **AW**: Allenwood Formation - Mainly pale grey, pure massive limestone, commonly dolomitised. Dolomite – Various lithologies in the area have been dolomitised - where limestone has been altered by the replacement of calcium carbonate (CaCO₃) by magnesium carbonate (CaMg(CO₃)₂).

**Main aquifer lithologies**
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**Key structures.**
The dolomite aquifer is presumed to be of “replacement” origin and hence may contain some primary permeability. The dominant secondary permeability of the dolomite results from the development of fissures by the solution of bedding planes and joints. In the undolomitised pure limestones only secondary permeability exists.

**Key properties**
The transmissivity of the dolomites can range from 20-200m²/d, with a specific yield less than 2% (storage coefficient 10⁻⁴). Transmissivity is lower on the slopes of the Castlecomer Plateau and increasing down the Barrow Valley.

**Thickness**
Fissuring in the dolomites should extend to over 200m. Fissuring in the pure limestones is common in the upper 20m of the aquifer, but rapidly reducing with depth and probably does not exist below 90m.

**Lithologies**
Sands and gravels overlie significant areas of this groundwater body and are themselves discrete groundwater bodies. The sands and gravels are very coarse and poorly sorted and are similar to those seen in the Nore Basin. Clay layers often separate individual layers of the sands and gravels. In other areas, Till derived from limestone is the dominant overlying material.

**Thickness**
In the Barrow valley the thickness of the gravels is commonly over 10m. This thickness reduces to the south.

**% area aquifer near surface**
[Information will be added at a later date]

**Vulnerability**
[Information will be added at a later date]

**Main recharge mechanisms**
In the Barrow valley the aquifer will mainly recharge along the slopes of the Castlecomer Plateau, because of a thin subsoil covering. As streams cross the shale/limestone area, water frequently enters the aquifer via swallow holes.

**Est. recharge rates**
[Information will be added at a later date]
### Discharge

| Springs and large known abstractions | Emo (200), Portlaoise WS (Ballydavis (4300), Meelick (773), Derrygarron & Darkin Well) (Portlaoise WS), Heath GWS (110), Vicarstown (41), Kyle (350), Orchard (250), Coolenaugh (10), Ballinabrananna (150), Tomard GWS (2), Old Leighlin (10), Leighlinbridge Borehole No 1 (330), Leighlinbridge Borehole No.2 (350), Bagenalston Borehole A (1554), Bagenalston Borehole B (1554), Bagenalston Borehole C (1554), Paulstown (910). |
| Main discharge mechanisms | It is probable that the bulk of the discharge from the aquifer enters the river in the lower section between Milford and Bagenalston where there is a restriction in the cross-sectional area of this aquifer. |
| Hydrochemical Signature | The bedrock strata of this aquifer are Calcareous. [More information will be added at a later date.] |

### Groundwater Paths

There appears to be swallowholes in the west of the Barrow valley along the slopes of the Castlecomer Plateau. The Barrow Valley has been divided into three areas (Daly & Wright 1979): (i) A recharge area along the slopes of the Castlecomer Plateau where the water table is 15 – 30m b.g.l. and there is an annual water level fluctuation of 10-20m. (ii) An intermediate area where the aquifer is covered by extensive till deposits of 10-20m thickness, the water table is usually within 5-15m of the surface with an annual fluctuation of less than 7.5m. Both confined and unconfined conditions exist here, depending on the subsoil. (iii) A discharge zone occurs where the aquifer comes in contact with the Barrow River either directly or though the overlying sands and gravels. Here the water table is within 5m of the surface and fluctuations will be less than 2.5m and mostly controlled by the levels in the river.

### Conceptual model

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### Attachments

- (Figure 1) Map of GW body incl. Aquifers, Monitoring boreholes, public supplies and water quality data
- (Figure 2) Durov plot. – To Follow

### Instrumentation

- **Stream gauge:** 14019, 14007, 14044, 14037, 14011, 14005, 14011, 14005, 14006, 14031, 14030, 14007, 14044, 144020, 14041, 14019, 14045, 14055, 14034, 14022, 14001, 14056, 14013, 14056, 14017, 14052.
- **Borehole Hydrograph:** EPA Monitoring Boreholes: Bagenalstown Railway station (S708614 - #CAR002), Celtic Linnin , Carlow (S724768 - #CAR011), Carlow Sugar Factory (S720785 - #CAR013), Landfill Site Carlow & Kilkenny (S712742 - #CAR014), Tully (N730118 - #KID078) (N736110 - #KID077), Vickerstown (N614002 - #LAO030), Ballygormill (S526931 - #LAO056), Timahoe (N537902 - #LAO055), Tomachavin (S587901 - #LAO054), Ballylinan (S643886 - #LAO061), Kilmore (S681885 - #LAO062),
- **EPA Representative Monitoring boreholes:**
  - Carlow: Oakpark (#15 - S730800), Carlow Sugar Factory (#13 - S720785), Celtic Linen, Carlow (#11 - S724768), Mortarstown GWS (#14 - S712742), Leighlin Bridge (#9 - S708675), Orchard Springs (#16 - S707677), Rathduff GWS (#17 - S715638), Bagenalston (#1 - S713620), (#2 - S708619), (#3 - S710620), Aghnhy Springs (#10 - S70619). Corcoran’s Carlow Town (#12 - S717766).
  - Kildare: Pollardstown Fen (#23 - N772154), Hybla (N642125), Hare Park (Carragh Camp (#42 - N770115)),
  - Osbourne Lodge (#74 - N755146), McDonagh Pump Stn (#50 - N78817, Monasterevin (#14 & 15 - N642125),

### Information Sources


### Disclaimer

Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae.