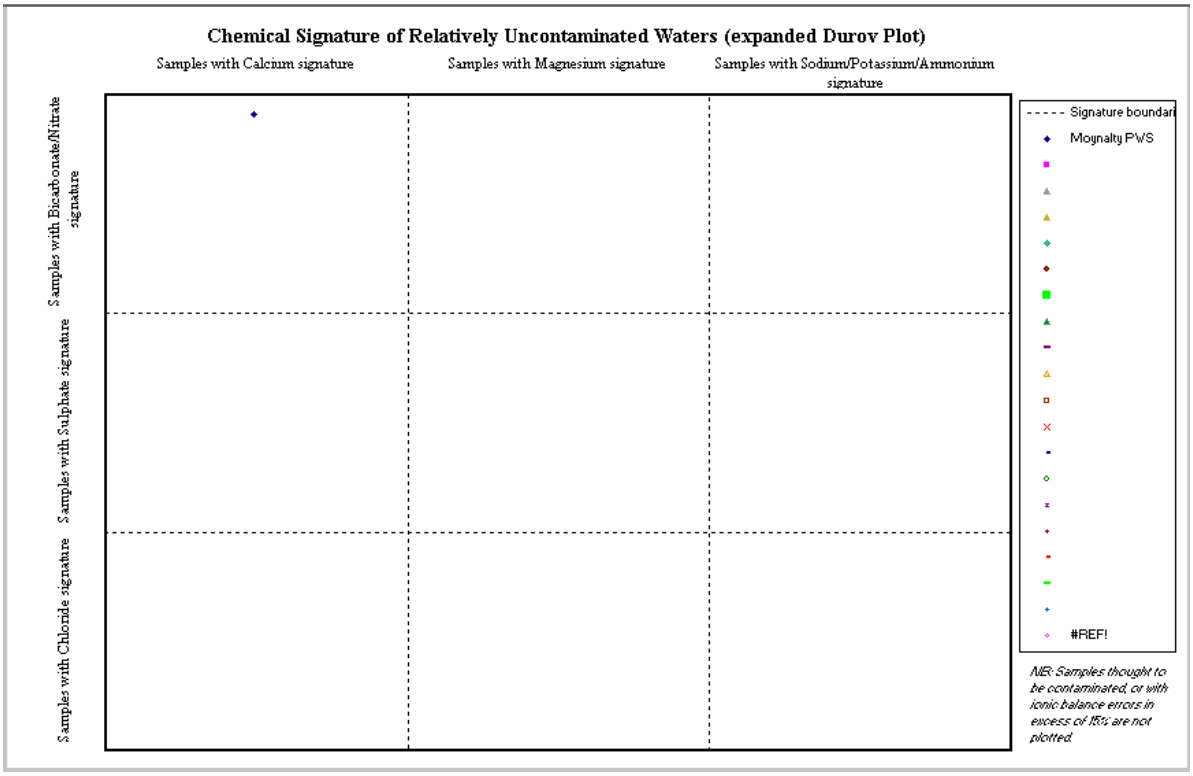
Moynalty GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water bodies	Associated terrestrial ecosystems	Area (km^2)
Meath Co. Co. Hydrometric Area 07	Moynalty, Blackwater	None	79

Topography		This GWB located in northwest Meath. The topography varies from hilly in the northwest to a low-lying area in the southeast. The hills in the northwest are elongated in a northwest to southeast direction, are typically 25m high, and the highest elevation present is around 100m OD. In the low-lying area to the southeast the land surface is at 50m OD.
Geology and Aquifers	Aquifer type(s)	**Ll:** Locally important aquifer, moderately productive only in local zones **Lm:** Locally important aquifer, generally moderately productive (10%)
	Main aquifer lithologies	Dinantian Upper Impure Limestones Dinantian Lower Impure Limestones Dinantian early Sandstones, Shales and Limestones. Dinantian Sandstones - sandstone units deposited in the Carboniferous period, during the Dinantian. It is termed the Rockfield Sandstone Member of the Meath Formation in County Meath. The rock units in the Dinantian Sandstones Rock Unit Group are predominantly sandstones and conglomerates with limited shale content.
	Key structures.	Rock units located near the core of synclines may have developed a significant fracture system in response to the stresses of folding. This may result in greater fissure permeability in some local areas.
	Key properties	There are very limited data available for these rocks. Coarse-grained rocks such as the Dinantian sandstones and conglomerates tend to deform by rupturing or brittle fracture resulting in more frequent fractures and joints. These rocks will therefore tend to have higher fissure permeabilities than surrounding limestones and shales. The limited amount of shaly fine grained material in the Dinantian Sandstones means that faults and fractures, where they occur, will be more likely to remain open, allowing groundwater flow. Drilling around Moynalty has shown that the Dinantian Lower Impure Limestones east of the village have little groundwater potential whereas the Dinantian (Early) Sandstones, Shales and Limestones can produce excellent yields with small drawdowns (Cullen 1984).
	Thickness	Thickness of these units is variable with many of the deltaic sandstones thinning southwards. Fissure permeability is generally more developed in the top 20 to 30 metres of fractured weathered rock and close to fault zones. Fractures are wider at shallow depths; the weight of burial decreases fracture apertures. During the drilling of the borehole at Moynalty major inflows of water were recorded only in the top 10m of the rock, which would indicate the bedrock, was impermeable below this depth. Standing water level data in the area suggests that the water table is located less than 10m from the surface.
Overlying Strata	Lithologies	The subsoil lithologies overlying this GWB are highly varied. In the northwest the subsoil is till derived from Lower Paleozoic Rocks. There are some extensive gravel deposits to the west and in some smaller areas to the east. East of Carlanstown the dominant lithology appears to be limestone-derived till, which may be more permeable than the till to the west.
	Thickness	High variable in the northwest, with thin areas at the tops of the hills and thicker areas between hills. Thicker subsoils area present in the southeast where the land is more low-lying.
	% Area aquifer near surface	Very Low
	Vulnerability	Vulnerability in this GWB is highly variable. In general the vulnerability in the southeast is Low with increasing areas of Extreme to the northwest. The influence of the topography can be seen in the northwest, where the vulnerability increases as subsoil thickness reduces at the tops of the many hills traversing the GWB.
Recharge	Main recharge mechanisms	Diffuse recharge will occur via rainfall percolating through the subsoil. The proportion of the effective rainfall that recharges the aquifer is largely determined by the thickness and permeability of the soil and subsoil, and by the slope. Due to the generally low permeability of the aquifers within this GWB, a high proportion of the recharge will then discharge rapidly to surface watercourses via the upper layers of the aquifer, effectively reducing further the available groundwater resource in the aquifer. It is expected that there will be more recharge in the northwest as subsoil layers are thinner in this area.
	Est. recharge rates	*[Information to be added at a later date]*
Discharge	Springs and large known abstractions	Moynalty ($100m^3/d$), Clooney Raffin GWS ($\sim 5m^3/d$)
	Main discharge mechanisms	Discharge from this aquifer will be to the numerous streams which overly the GWB. In areas where the riverbed is in hydraulic connection with the aquifer and the water table is above the stages of the river the aquifer will contribute to the baseflow of the rivers. The GWB is surrounded by lower permeability rocks any transition of groundwater between the two is most likely negligible.
	Hydrochemical Signature	Data from the Moynalty source shows the water to be Very Hard with electrical conductivity values of around 550µS/cm and a calcium bicarbonate signature.

Groundwater Flow Paths	Groundwater flow in this aquifer will be concentrated in the upper weathered zone (0-3m) and also in the fractured are of the rock (3-30m). The aquifer is not considered to have sufficient permeability and transmissivity to sustain regional groundwater flow. The direction of groundwater flow will be determined by the local hydraulic gradient, which will be determined by the topographic slopes in the area. The flow direction of groundwater will be from local recharge mounds, i.e. hills where subsoil is thinner and recharge is higher, towards local discharge areas, i.e. the rivers overlying the aquifer. Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. In the Dinantian Sandstones the dominant sandstone lithology and limited shale content will generally result in higher frequency of more open fractures and consequently higher fissure permeability than in the less permeable surrounding rocks.
Groundwater & surface water interactions	The interaction between groundwater and surface water in this aquifer will be on a local scale. Recharge and discharge areas of the aquifer are considered to be in close proximity to each other. The GWB does not support any protected terrestrial ecosystem. Around Moynalty chemical analysis (Cullen 1984) has shown the bedrock aquifer is “fully sealed” from the river and receives no recharge from it. The surface water was significantly less mineralized than the groundwater with a hardness of 96mg/l, compared to 322mg/l in the trial well. Also the groundwater remained at a temperature of 10.5 C during the pumping test while the river water was at 6.5 C during the same period.
Conceptual model	This GWB is located to the southwest of Nobber in Co. Meath. The area is hilly in the northwest and more low-lying in the southeast. The GWB is composed primarily of moderate to low permeability rocks, although localized zones of enhanced permeability do occur. The extent of the body is defined to the north by the catchment boundary of the river Boyne and to the South by the geological contact with the Lower Paleozoic rocks. Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. Recharge and discharge are considered to occur on a local scale with the highest rates of diffuse recharge in areas of thin tills in hilly areas and discharging to the overlying rivers in the area.
Attachments	
Instrumentation	Stream gauge:07025 Borehole Hydrograph: None EPA Representative Monitoring boreholes: None
Information Sources	Cullen K T (1984) Report on the Drilling and Testing of a Trial Water Well at Moynalty, Co. Meath. Report to Meath Co. Co. McConnell B, Philcox M & Geraghty M, 2001. *Geology of Meath: A geological description to accompany the bedrock geology 1:100,000 scale map series, Sheet 13, Meath.* Geological Survey of Ireland. 77 p. Woods L, Meehan R & Wright G R, 1998. *County Meath Groundwater Protection Scheme.* Report to Meath County Council. Geological Survey of Ireland. 54 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



Formation Name	Code	Description	Rock Unit Group	Aquifer Classification
Cruicetown Group (undifferentiated)	CRT	Argillaceous bioclastic limestone	Dinantian Lower Impure Limestones	Ll
Fingal Group (undifferentiated)	FNG	Dark limestone, shale and micrite	Dinantian Upper Impure Limestones	Ll
Navan Group (undifferentiated)	NAV	Limestone, mudstone and sandstone	Dinantian (early) Sandstones, Shales and Limestones	Ll
Sandstone	sd	Rockfield Sdst. Mbr in undif. Navan Gp	Dinantian Sandstones	Lm