

Water Framework Directive Groundwater Monitoring Programme

Site Information

Bohola



Bohola is a spring that is used for the Bohola group water scheme. It has an average abstraction rate of 700 m³/day.



Mayo

August 2011

SITE INFORMATION					
Site Name:	Bohola		County:	Mayo	
RBD:	WRBD		EU Reporting Code:	IE_WE_G_0033_16_004	
Easting:	133470		GWB Name:	Swinford	
Northing:	295183		GWB Code:	IE_WE_G_0033	
Site Use:	Drinking Water (GWS)		Drinking Water Code:	2200PRI2019	
Hydrometric Area:	34		Water Level Monitoring Network:	Level	Flow
Townland:	CARROWMORE (ED Meelick)			Y	Y
Ownership:	Bohola Group Water Scheme				
Water Quality Monitoring Network:	Surveillance		Operational (Point)		Operational (Diffuse)
	Y		N		Y
Site Comments:	---				
SITE DIRECTIONS					
Location and Access Information:	Located 2.7km east of Bohola, off a minor road approximately 1km south of the N5. The spring is enclosed in a fence. The sample is taken from inside this enclosure. A key is available from the caretaker to gain access to the enclosure.				
Additional Comments:	---				
WELL INFORMATION					
Monitoring Point Type:	Spring	Abstraction Rate (m³/d):	700	Ground Elevation (m OD):	---
Borehole Log Available:	---	Total Drilled Depth (m bgl):	n/a	Depth to Bedrock (m bgl):	---
Top of Casing (m agl):	---	Upper Casing Diameter (mm):	---	Lower Casing Diameter (mm):	---
Final Borehole Depth (m):	---	Upper Casing Bottom Depth (m bgl) :	---	Lower Casing Bottom Depth (m bgl):	---
Screen Interval (m bgl):	---	Screen Type (PVC,Steel,other):	---	Screen Slot Size (mm):	---
Grout Type (cement,bentonite):	---	Grouted above (m bgl):	---	Grout Volume Injected (m³):	---
Gravel Pack Interval (m bgl):	---	Gravel Pack Volume (m³):	---	Open Hole Interval (m bgl):	---
Potential Yield (m³/day):	---	Comments on Monitoring Site:	Spring known on six inch sheets as Toberalee. The spring source may be replaced in 2010/ 2011 by a lake source. The spring is karstic and responds rapidly to rainfall events.		
Specific Capacity (m³/d/m):	---				
Static Water Level (m bgl):	---				
Scheme Name:	Bohola GWS	Number of Abstraction Points in the Scheme:	1	Source Report Available	N
Source Report Info:	---				
Scheme Summary:	The Bohola GWS consists of a single spring which serves about 700 houses.				

HYDROGEOLOGY								
GEOLOGY	Soil:	Deep poorly drained mineral (BminPD)					Subsoil Permeability:	Moderate
	Subsoil:	Tills (diamictos) (TLs)						
	Bedrock:	Dinantian Pure Bedded Limestones						
HYDROGEOLOGY	Aquifer Category:	Rkc	Vulnerability at Monitoring site:	High to Low		Flow Regime:	Karstified	
ZONE OF CONTRIBUTION	Estimated ZOC Size (km ²):	3.56	ZOC Delineated By:	Tobin (CK)		Recharge Estimate (mm/yr):	345	
	ZOC Delineation Comments:	No long term mean discharge data available; spot records report very high discharge rates (300-400litres/sec). The ZOC is based on an discharge of approximately 2000m ³ /day. Groundwater flow direction unknown taken to be from the southeast. A ZOC delineated based on topographically higher areas that may contribute to the spring. The nearby stream may be a losing stream and may be contributing to the overflow indirectly, thus the ZOC extends south and north of 2 streams flowing passed the spring. Downgradient distance is extended to 50m as the contours are steep all around the spring and the 50m is an additional precaution.						
Groundwater Vulnerability within ZOC (% area):	Extreme (X)	Extreme (E)	High	Moderate	Low	High to Low	Unclassified	
	0.2	2.47	0	0	0	97.33	0	
HYDROCHEMISTRY								
Hydrochemical Signature:	Ca-HCO ₃		Additional Water Chemistry Information:	During the monitoring period: The average nitrate concentration was 3 mg/l NO ₃ and the maximum nitrate concentration was 8 mg/l NO ₃ . The average ammonium concentration was 0.052 mg/l N and the maximum ammonium concentration was 0.2 mg/l N. The average molybdate reductive phosphorus (MRP) concentration was 0.006 mg/l P and the maximum MRP concentration was 0.013 mg/l P. The average chloride concentration was 18.5 mg/l Cl and the maximum chloride concentration was 23 mg/l Cl.				
Alkalinity (mg/l HCO ₃):	Average:	Range:						
	226	138-320						
Hardness (mg/l CaCO ₃):	Average:	Range:						
	234	135-391						
Conductivity (uS/cm):	Average:	Range:						
	457	234-612						
Monitoring Record Period:	From:	To:						
	2007	2010						
RISK ASSESSMENT								
Pressure (e.g., Nitrates, Phosphates, Abstractions):	Diffuse		Typical Contaminants:		Phosphate, ammonium			
Risk Category:	At risk, high confidence		GWB Status:		Poor			
Impact Potential within ZOC (% area):	Extreme:	High:	Moderate:		Low:	Negligible:		
	0.00	0.00	46.19		29.39	24.42		
OTHER INFORMATION								



Spring



Spring



Water Level

Data Summary Sheet - July 2011

Disclaimer: The data in this document are based on the best available information and understanding at time of writing. Neither the Environmental Protection Agency, nor the individual bodies supplying data for this document and accompanying maps will be responsible for any loss or damage from the use or interpretation of these data.

Rock Unit Geology Map: GSI, 2009

Aquifer Type Map: GSI, 2009

Groundwater Vulnerability Map: GSI, 2009

Soils & Subsoils Type: Teagasc, 2007

Recharge Map: GSI, 2009

Impact Potential Map: EPA, 2009

Risk Assessment Map: EPA WFD Risk Assessment, 2006

Groundwater Body Status: EPA WFD Status Assessment, 2008

Water Quality Data: EPA WFD Monitoring, 2008

Groundwater Threshold Values

Groundwater threshold values for selected parameters:

Nitrate - General Chemical Test/ Drinking Water Test (37.5 mg/l NO₃)

Ammonium - Drinking Water Test (0.175 mg/l N) / Surface Water Test (0.065 mg/l N)

Molybdate Reactive Phosphorus (MRP) - Surface Water Test (0.035 mg/l P)

Chloride -Saline/Intrusive Test (24 mg/l) / Drinking Water Test (175 mg/l Cl)

Electrical Conductivity -Saline/Intrusive Test (800 µS/cm) / Drinking Water Test (1,875 µS/cm)

Further information on groundwater threshold values is contained in the Groundwater Regulations (S.I. No.9 of 2010).

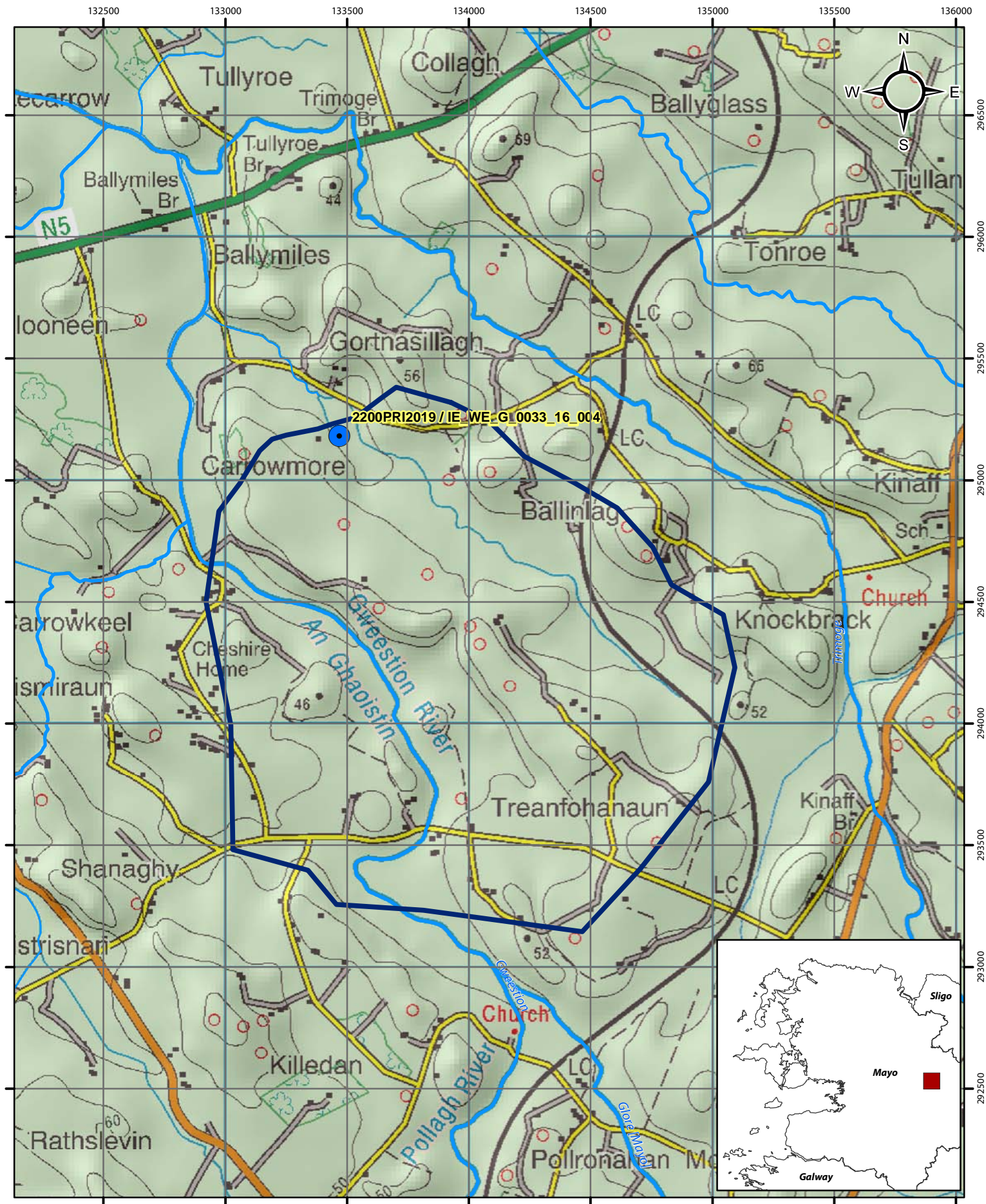
General Downgradient Distances

General Downgradient Distances (XL) applied to boreholes sourced in bedrock aquifers are constrained to estimate approximate limits based on data at the GSI. In some cases they may be higher or lower depending on local conditions.

Rk, Rkd, Lk	225 m
Lm	150 m
LI, PI	60 m

It is assumed that groundwater downgradient of a spring cannot flow back up to the spring, however a precautionary 30m buffer is generally applied which allows for instances where pumping under dry weather periods may induce a drawdown or where the ground may be sloping toward the spring from the downgradient side.

Version 0:	Prepared by		Date:	
Version 1:	Prepared by	Tobin (CK)	Date:	Feb 2011
Version 2:	Prepared by		Date:	
Version 3:	Prepared by		Date:	
Version 4:	Prepared by		Date:	

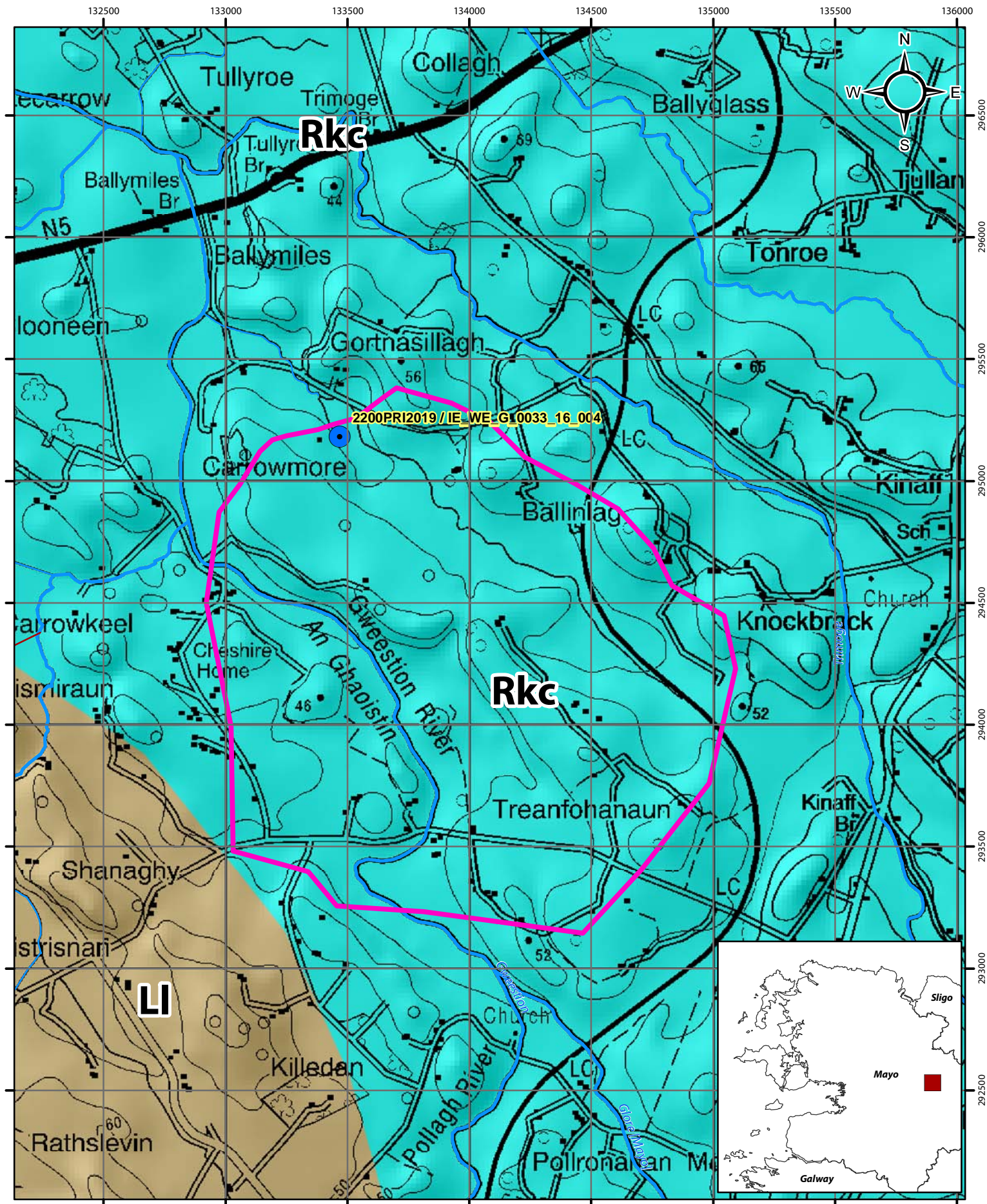


Location Map for Bohola

- Abstractions
- Zone of Contribution
- River

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0 0.25 0.5 1 km

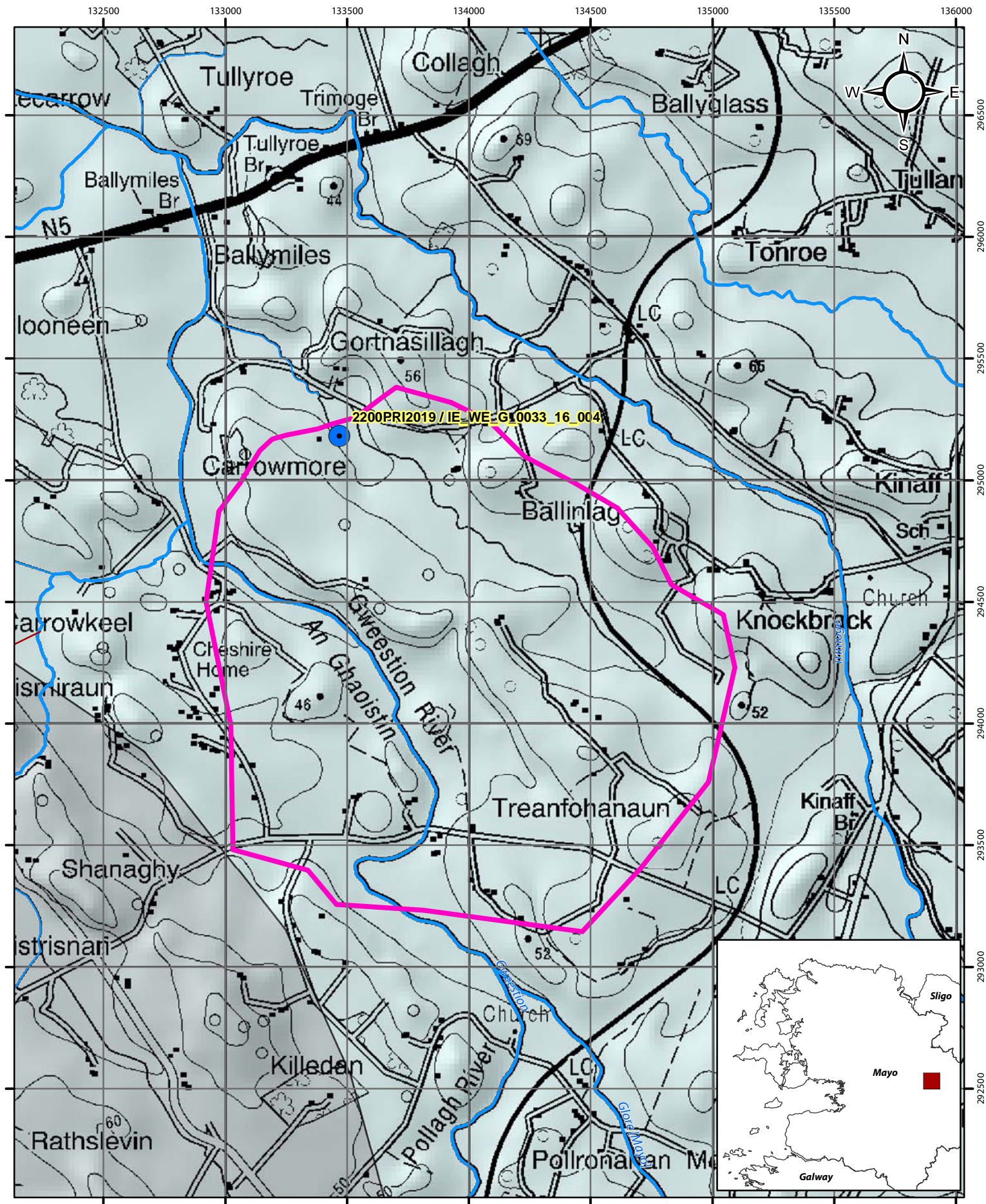


Aquifer Category Map for Bohola

- Abstractions
- LI
- Zone of Contribution
- Rkc
- River
- Fault

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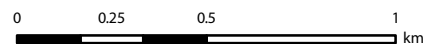
0 0.25 0.5 1 km

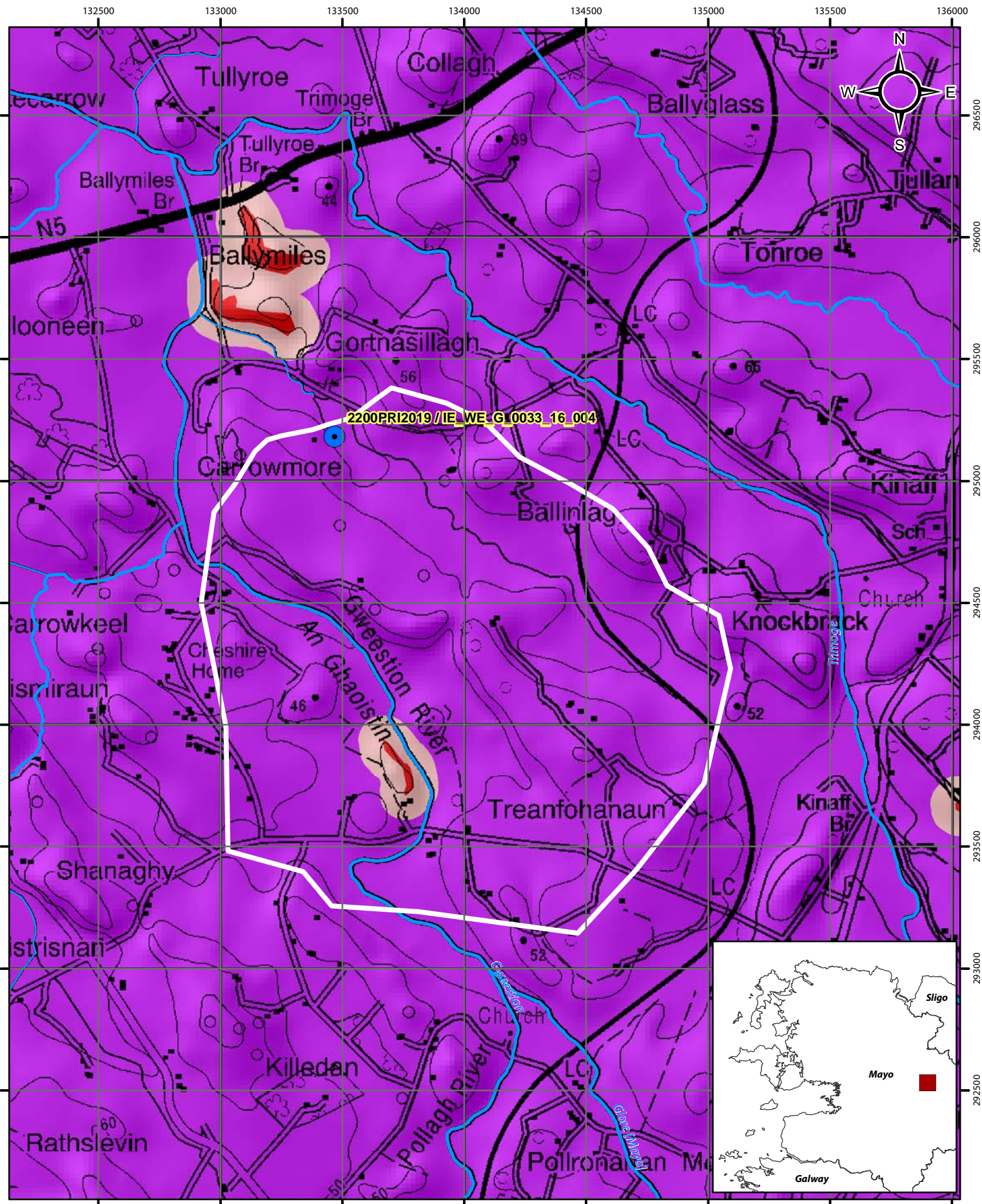


Bedrock Map for Bohola

- Abstractions
- Dinantian Pure Bedded Limestones
- Dinantian Upper Impure Limestones
- Zone of Contribution
- River
- Fault

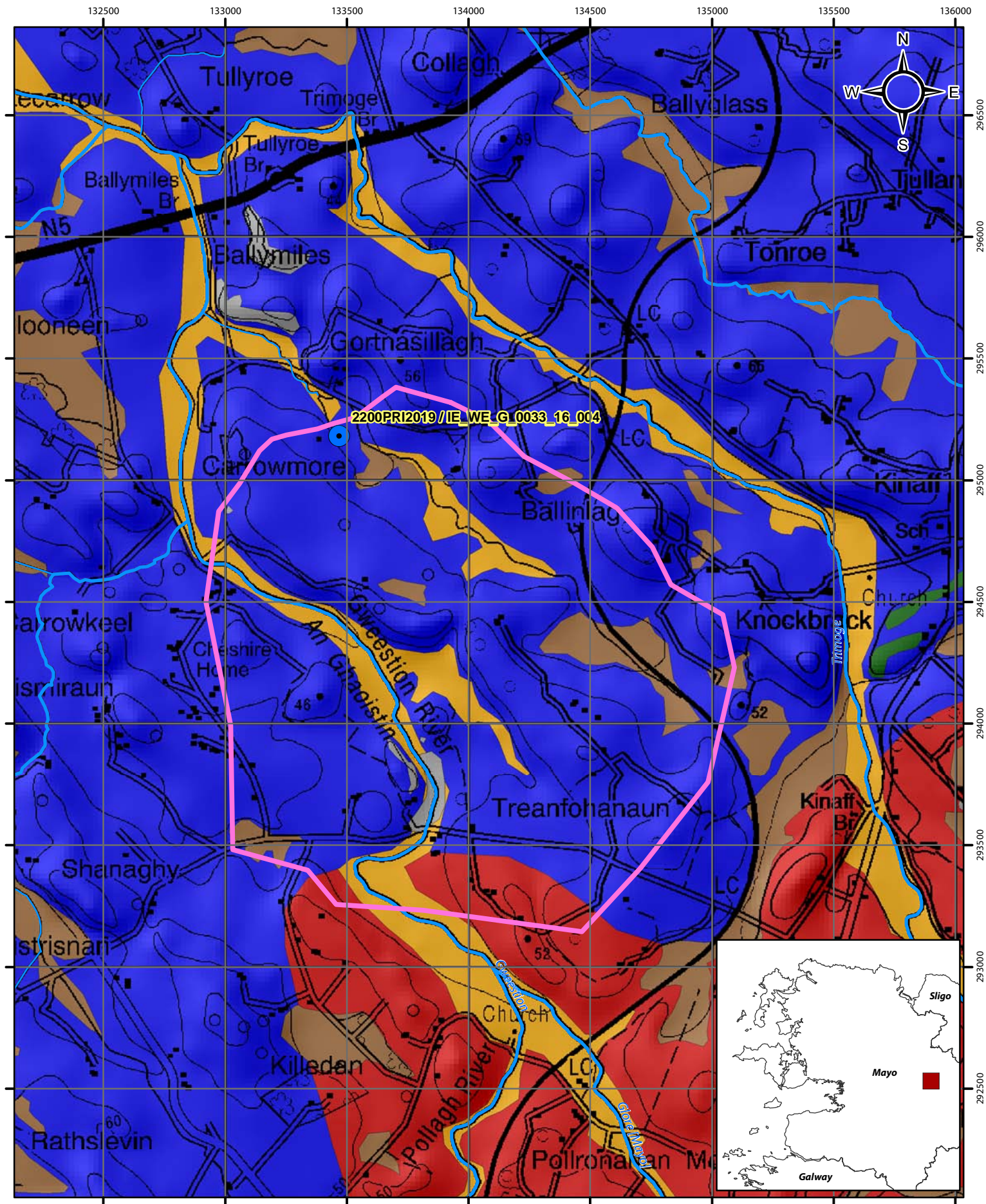
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Groundwater Vulnerability Map for Bohola

- Abstractions
- E (Rock near surface or Karst)
- M (Moderate)
- H (High)
- L (Low)
- HL (unmapped - High to Low)
- River
- Zone of Contribution
- Water
- No Data



Subsoils Map for Bohola

- Abstractions
- Zone of Contribution
- River
- Alluvium
- Cutover raised peat
- Esker comprised of gravels of basic reaction
- Karstified bedrock outcrop or subcrop
- Till derived from Devonian and Carboniferous sandstones
- Till derived from limestones

