

Water Framework Directive Groundwater Monitoring Programme

Site Information

Ballygar



Ballygar comprises a spring which provides 600-700 m³/d to the Ballygar public water scheme. A backup well exists but is rarely used due to reported poor water quality.



Galway

August 2011

SITE INFORMATION					
Site Name:	Ballygar		County:	Galway	
RBD:	Shannon IRBD		EU Reporting Code:	IE_SH_G_028_07_002	
Easting:	176526		GWB Name:	Ballygar	
Northing:	252950		GWB Code:	IE_SH_G_028	
Site Use:	Drinking Water (PWS)		Drinking Water Code:	1200PUB1006	
Hydrometric Area:	25		Water Level Monitoring Network:	Level	Flow
Townland:	CLOONLYON			N	N
Ownership:	Galway County Council				
Water Quality Monitoring Network:	Surveillance		Operational (Point)		Operational (Diffuse)
	Y		N		N
Site Comments:	Flat-lying terrain, wet boggy ground. Spring is covered by galvanised steel roof, and surrounded by grassland.				
SITE DIRECTIONS					
Location and Access Information:	From Ballygar village centre, drive west on the N63. Immediately after the post office in Ballygar, turn right onto angled road off the N63. After 1.3 kms, turn right. Source is c. 200 m on the left, at the end of the forest on the left.				
Additional Comments:	---				
WELL INFORMATION					
Monitoring Point Type:	Spring	Abstraction Rate (m³/d):	700	Ground Elevation (m OD):	51
Borehole Log Available:	---	Total Drilled Depth (m bgl):	---	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:	The covered source is located c. 300 NW of pumphouse. There is rarely any overflow from spring. Spring flow is reportedly constant at 600-700 m³/d. Backup well exists behind pumphouse. Back-up borehole is rarely used due to water quality problems - high iron, red coloration of water supply.		
Specific Capacity (m³/d/m):	---				
Static Water Level (m bgl):	---				
Scheme Name:	Ballygar PWS	Number of Abstraction Points in the Scheme:	1	Source Report Available	N
Source Report Info:	---				
Scheme Summary:	Single spring serving Ballygar. Water from spring is gravity fed to small sump by pumphouse, where it is chlorinated and from where it is pumped directly into the distribution system. A backup well exists by pumphouse but is rarely put into operation. A trunk main connects the Mounbellew PWS to the Ballygar scheme, and water is provided from Mountbellew during high demand in dry periods.				

HYDROGEOLOGY								
GEOLOGY	Soil:	Poorly drained mineral soils with peaty topsoil (BminPDPT)					Subsoil Permeability:	Low
	Subsoil:	Tills (diamictos) (TLs)						
	Bedrock:	Dinantian Pure Unbedded Limestones						
HYDROGEOLOGY	Aquifer Category:	LI	Vulnerability at Monitoring site:	High		Flow Regime:	Poorly productive	
ZONE OF CONTRIBUTION	Estimated ZOC Size (km²):	3.6	ZOC Delineated By:	CDM (HM)		Recharge Estimate (mm/yr):	70-80	
	ZOC Delineation Comments:	ZOC delineated on basis of topography and water balance. Reported spring flow is 600-700 m3/d, and the latter was used for delineation purposes. The estimated bulk recharge is approximately 70-80 mm/yr. Low vulnerability setting, low subsoil permeability. Spring discharge is probably a combination of water sourced from underlying limestones as well as subsoils. Esker deposits to N are oriented in direction of overall surface water drainage, but appear to be isolated and are not inferred to influence ZOC boundaries.						
Groundwater Vulnerability within ZOC (% area):	Extreme (X)	Extreme (E)	High	Moderate	Low	High to Low	Unclassified	
	0.57	3.64	6.18	7.6	82.02	0	0	
HYDROCHEMISTRY								
Hydrochemical Signature:	Ca-HCO3		Additional Water Chemistry Information:	During the monitoring period: The average nitrate concentration was 7 mg/l NO3 and the maximum nitrate concentration was 15 mg/l NO3. The average ammonium concentration was 0.068 mg/l N and the maximum ammonium concentration was 0.56 mg/l N. The average molybdate reductive phosphorus (MRP) concentration was 0.024 mg/l P and the maximum MRP concentration was 0.101 mg/l P. The average chloride concentration was 19.5 mg/l Cl and the maximum chloride concentration was 25 mg/l Cl.				
Alkalinity (mg/l HCO3):	Average:	Range:						
	356	187-431						
Hardness (mg/l CaCO3):	Average:	Range:						
	370	106-480						
Conductivity (uS/cm):	Average:	Range:						
	718	586-821						
Monitoring Record Period:	From:	To:						
	1995	2010						
RISK ASSESSMENT								
Pressure (e.g., Nitrates, Phosphates, Abstractions):	Diffuse		Typical Contaminants:		Nitrates			
Risk Category:	Not at risk, low confidence		GWB Status:		Good			
Impact Potential within ZOC (% area):	Extreme:	High:	Moderate:		Low:	Negligible:		
	0.00	3.67	5.48		63.82	27.03		
OTHER INFORMATION								
Backup well is believed to be c. 40 m deep, but not confirmed as details of well construction have not been found. Well casing diameter is 12-inch (300 mm) diameter. No evidence of grouting. Wellhead is located in below ground concrete chamber. Casing stick up above chamber floor is only c. 10-15 cm, and on day of visit, ponded water covered the chamber floor area, but was not entering well directly. However, faint waterline along walls suggests ingress of surface water or ponded water can occur directly into the borehole.								



Site

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).

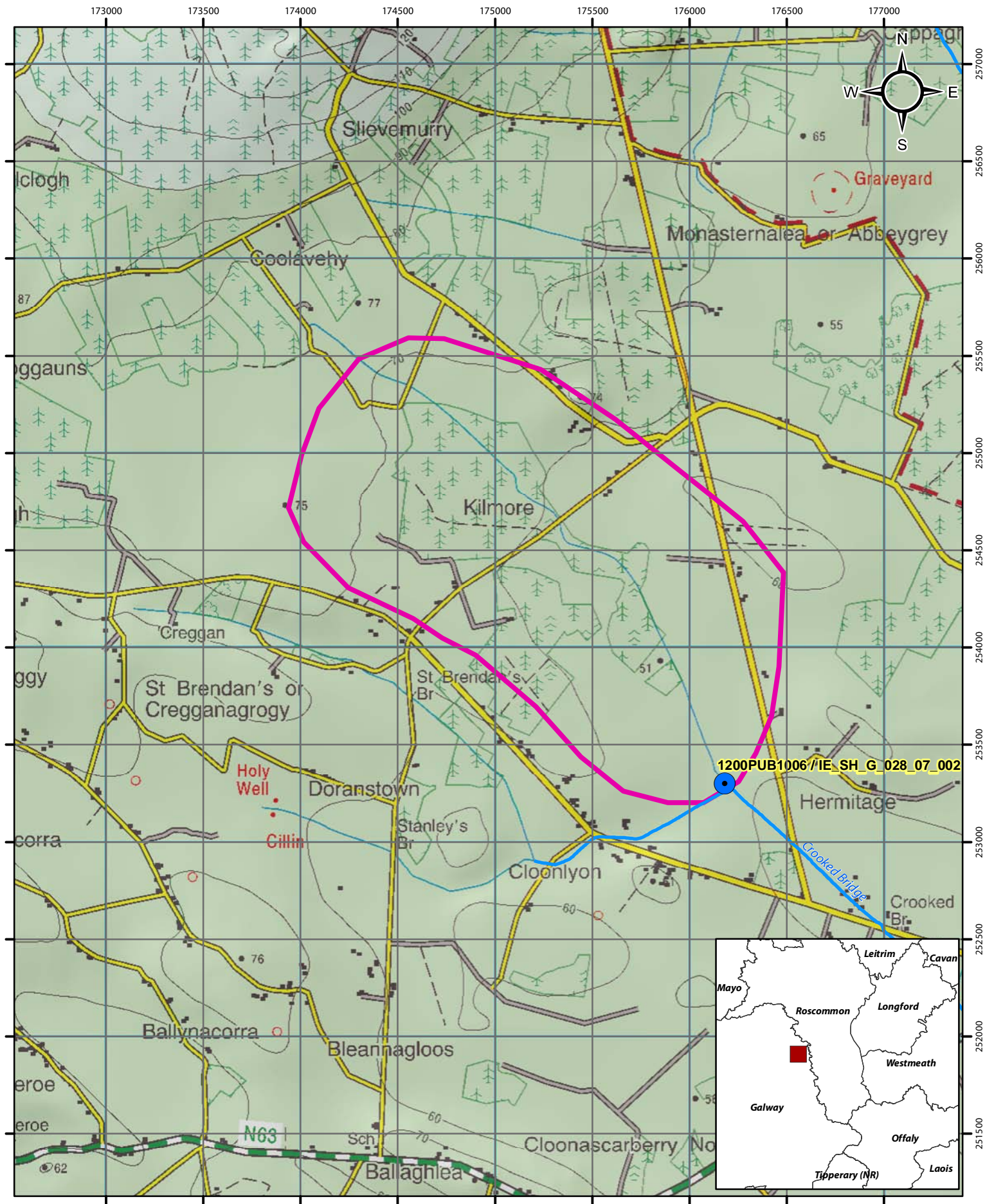
General Downgradient Distances

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.

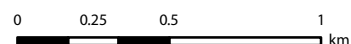
Version 0:	Prepared by		Date:	
Version 1:	Prepared by	CDM (HM)	Date:	Feb 2011
Version 2:	Prepared by		Date:	
Version 3:	Prepared by		Date:	
Version 4:	Prepared by		Date:	

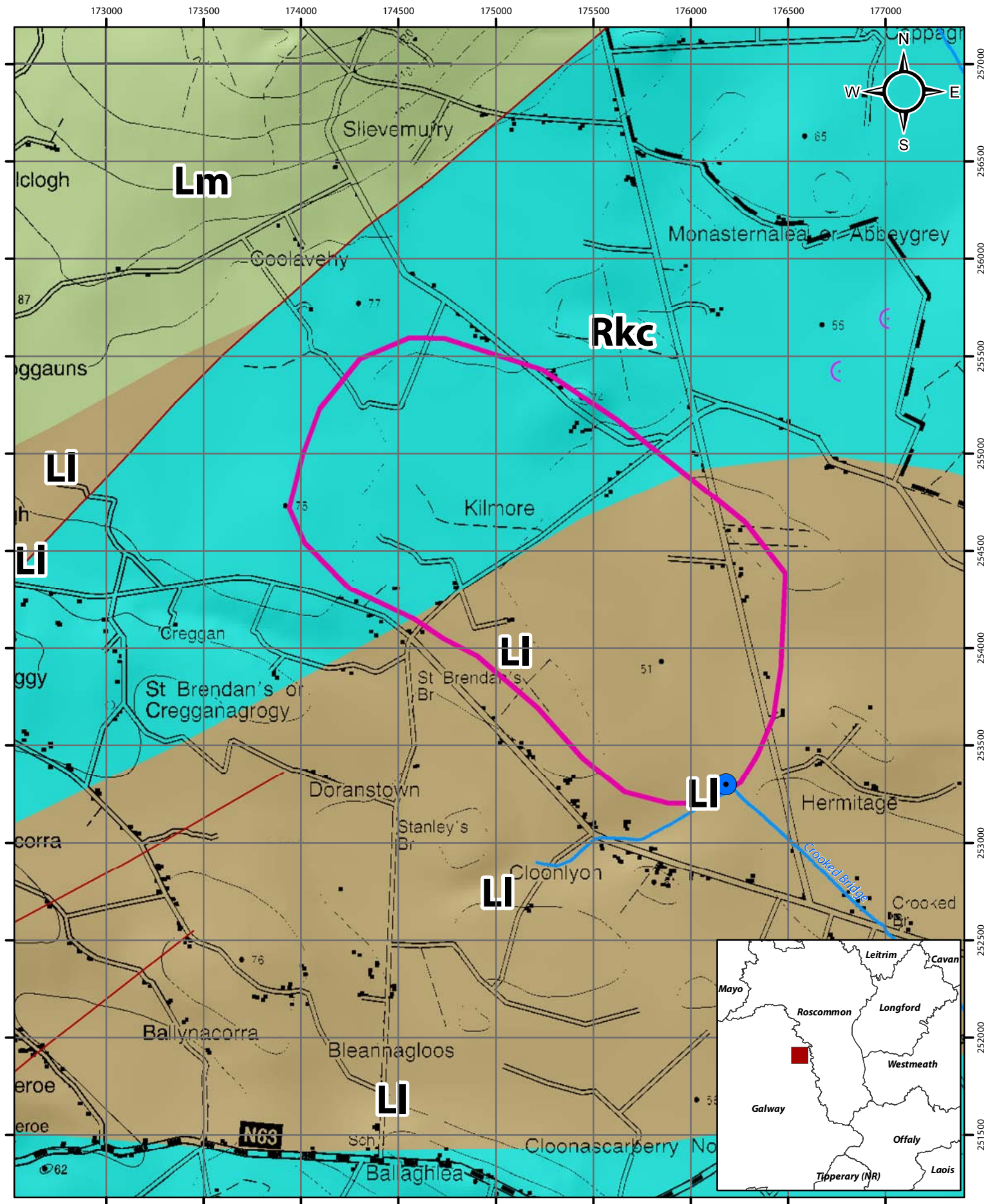


Location Map for Ballygar

-  Abstractions
-  River
-  Zone of Contribution

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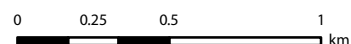


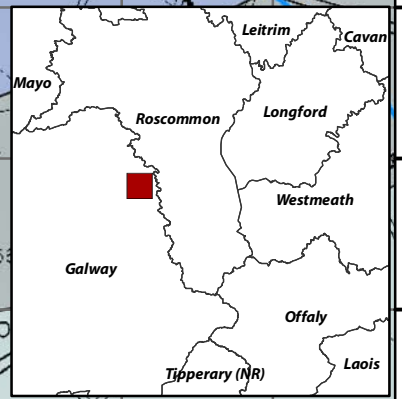
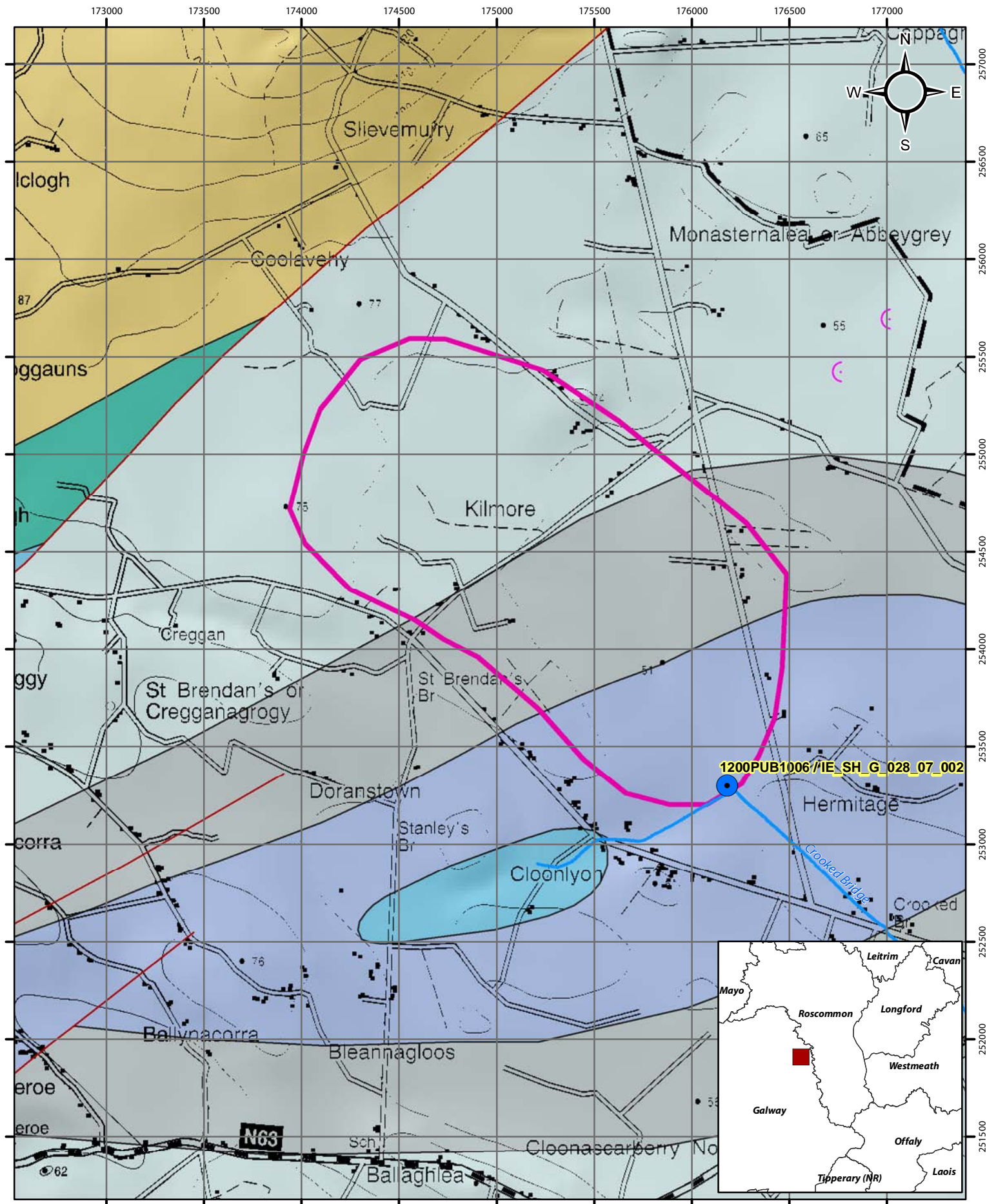


Aquifer Category Map for Ballygar



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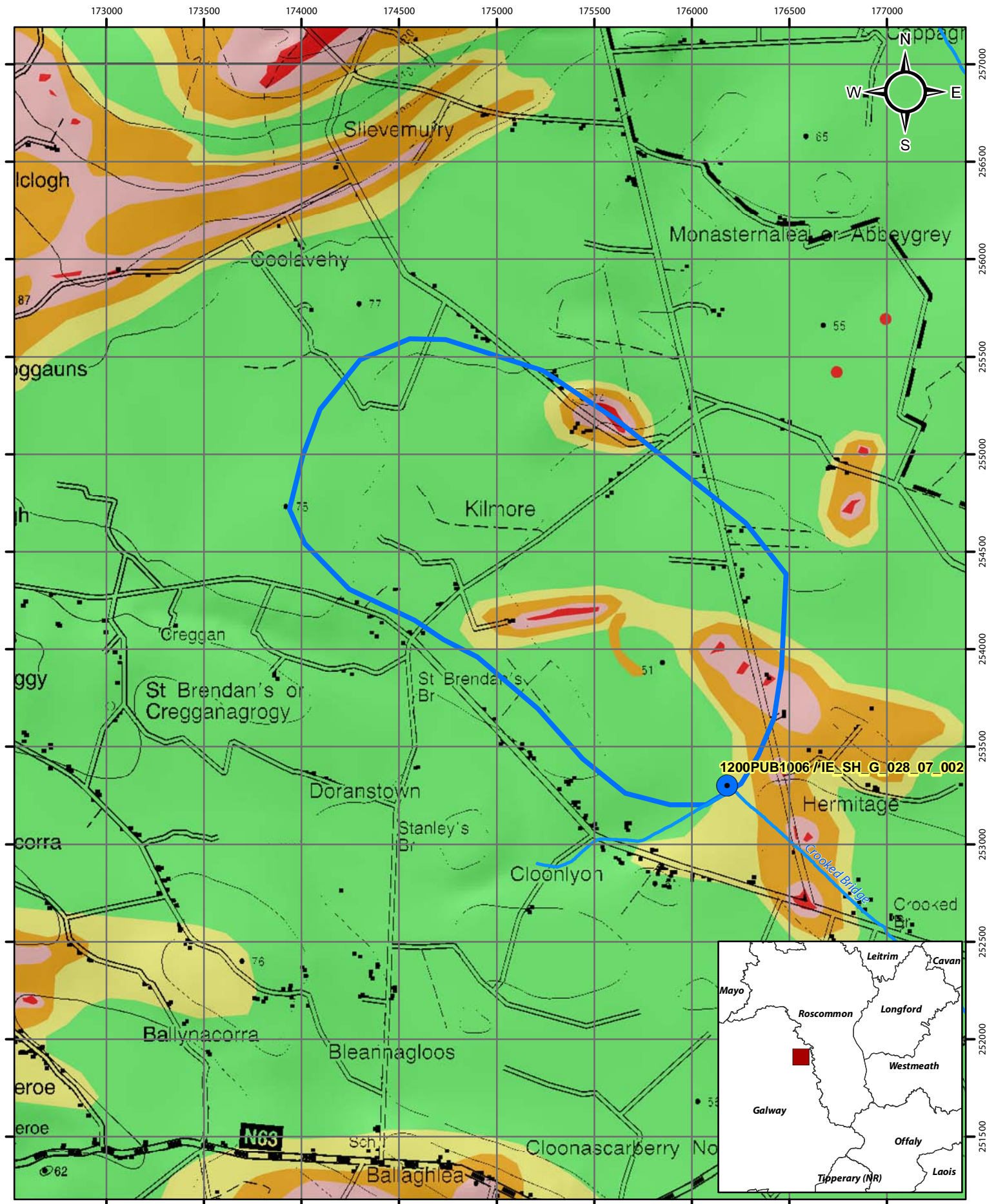


Bedrock Map for Ballygar












- | | | | |
|----------------------|-----------------------------------|---|------------------------------------|
| Abstractions | Swallow Hole | Dinantian (early) Sandstones, Shales and Limestones | Dinantian Pure Unbedded Limestones |
| River | Dinantian Lower Impure Limestones | Dinantian Sandstones | Dinantian Upper Impure Limestones |
| Zone of Contribution | Dinantian Pure Bedded Limestones | | |

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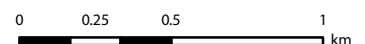
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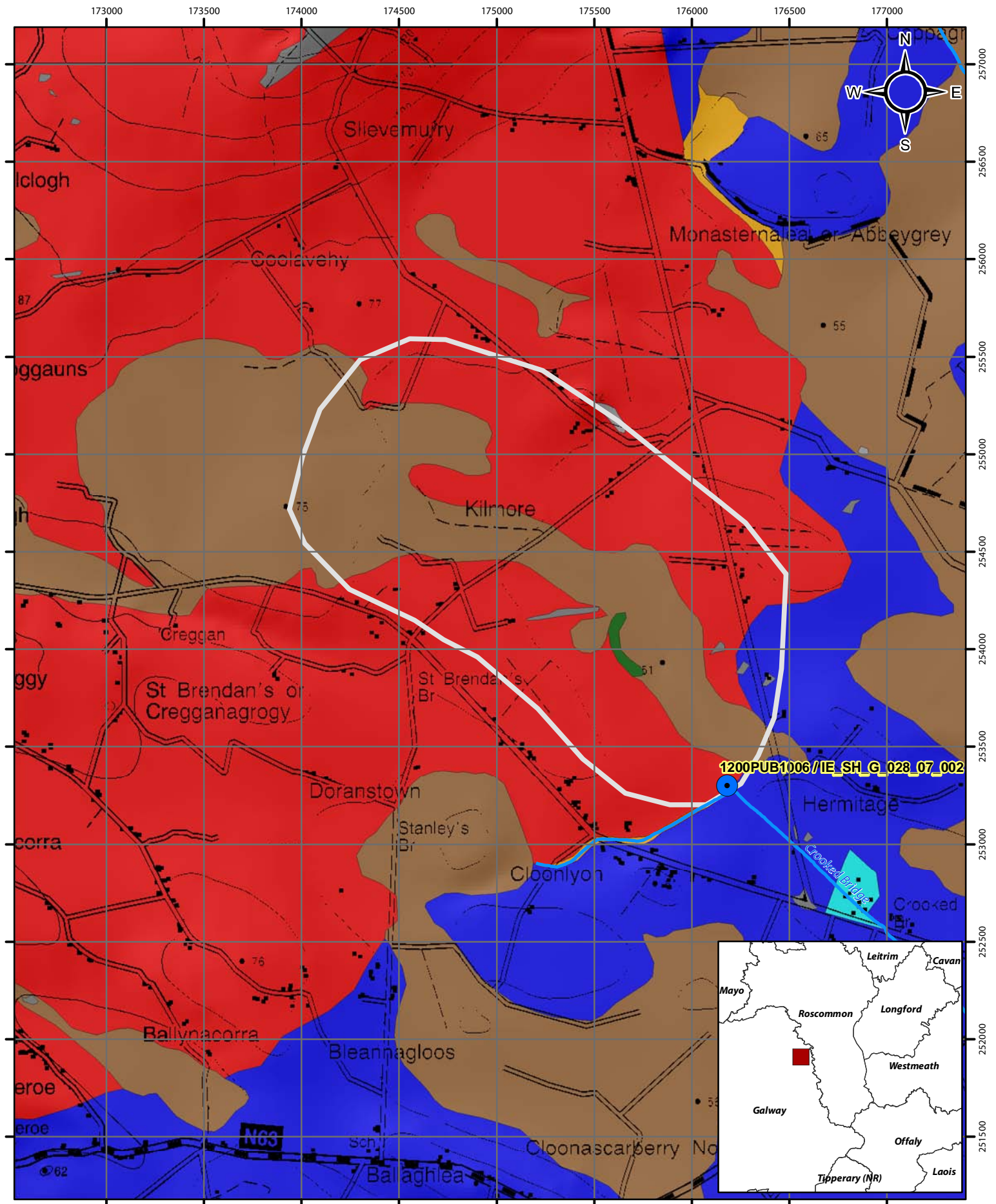


Groundwater Vulnerability Map for Ballygar

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

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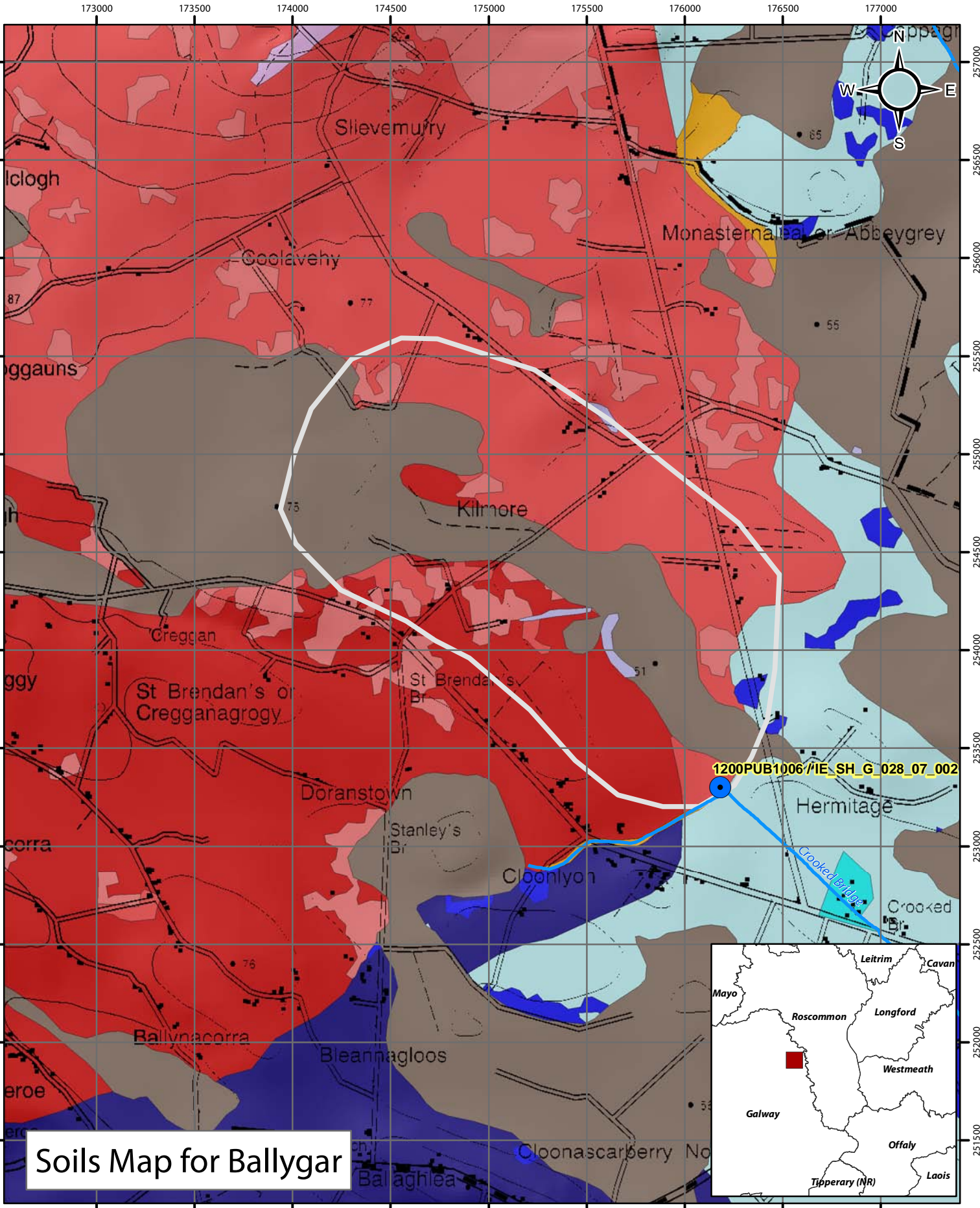


Subsoils Map for Ballygar

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

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0 0.25 0.5 1 km



Soils Map for Ballygar

 Abstractions

 River

 Zone of Contribution

 Acid Deep Well Drained Mineral


 Acid Deep Poorly Drained Mineral

 Acid Poorly Drained Peaty Mineral

 Acid Shallow/Rocky/Peaty Mineral


 Basic Deep Well Drained Mineral

 Basic Deep Poorly Drained Mineral


 Basic Poorly Drained Peaty Mineral

 Basic Shallow Well Drained Mineral

 Basic Shallow/Rocky/Peaty Mineral

 Cutover/Cutaway Peat

 Mineral Alluvium

 Made

0 0.25 0.5 1 km



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