

## Water Framework Directive Groundwater Monitoring Programme

### Site Information

### Galdonagh



Galdonagh (BH-1) is a 60m deep borehole situated in Precambrian Marbles and is used as a public water supply. The abstraction rate was 170m<sup>3</sup>/day. The borehole is included in the surveillance chemical network. A GSI source report has been completed for this sit



Donegal

**August 2011**

SITE INFORMATION					
Site Name:	Galdonagh		County:	Donegal	
RBD:	NWIRBD		EU Reporting Code:	IE_NW_G_052_05_002	
Easting:	227650		GWB Name:	Manor Cunningham	
Northing:	409978		GWB Code:	IE_NW_G_052	
Site Use:	Drinking Water (PWS)		Drinking Water Code:	0600PRI3037	
Hydrometric Area:	39		Water Level Monitoring Network:	Level	Flow
Townland:	GALDONAGH			N	N
Ownership:	Donegal County Council				
Water Quality Monitoring Network:	Surveillance		Operational (Point)		Operational (Diffuse)
	Y		N		N
Site Comments:	---				

SITE DIRECTIONS	
Location and Access Information:	Located approximately 4 km southeast of Manor Cunningham and 10 km east-southeast of Letterkenny Town. BH1 is some 250 m east of the Galdonagh crossroads, located on the west-facing side of a ridge and BH2 is situated at the crossroads.
Additional Comments:	---

WELL INFORMATION					
Monitoring Point Type:	BH	Abstraction Rate (m³/d):	n/a	Ground Elevation (m OD):	100
Borehole Log Available:	---	Total Drilled Depth (m bgl):	60	Depth to Bedrock (m bgl):	0.5
Top of Casing (m agl):	---	Upper Casing Diameter (mm):	200	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:	---		
Specific Capacity (m³/d/m):	40				
Static Water Level (m bgl):	87.5				
Scheme Name:	Maheabeg/Veagh	Number of Abstraction Points in the Scheme:	2	Source Report Available	Y
Source Report Info:	Source report prepared by GSI in 2005.				
Scheme Summary:	The scheme comprised two boreholes which were pumped together. The scheme has been decommissioned since 2008				

HYDROGEOLOGY								
GEOLOGY	Soil:	shallow, lithosolic or podzolic type soils potentially with peaty topsoil (AminSRPT)					Subsoil Permeability:	n/a
	Subsoil:	Tills (diamictos) (TmP)						
	Bedrock:	Precambrian Marbles						
HYDROGEOLOGY	Aquifer Category:	LI	Vulnerability at Monitoring site:	Extreme		Flow Regime:	Poorly productive	
ZONE OF CONTRIBUTION	Estimated ZOC Size (km²):	0.6	ZOC Delineated By:	GSI		Recharge Estimate (mm/yr):	485	
	ZOC Delineation Comments:	The GSI has delineated a ZOC of based mainly on hydrogeological mapping and analytical modelling and abstraction, recharge and topography. See the source report for details.						
Groundwater Vulnerability within ZOC (% area):	Extreme (X)	Extreme (E)	High	Moderate	Low	High to Low	Unclassified	
	9.64	67.64	20.25	2.47	0	0	0	
HYDROCHEMISTRY								
Hydrochemical Signature:	Ca-HCO3		Additional Water Chemistry Information:	During the monitoring period: The average nitrate concentration was 11 mg/l NO3 and the maximum nitrate concentration was 14 mg/l NO3. The average ammonium concentration was 0.021 mg/l N and the maximum ammonium concentration was 0.08 mg/l N. The average molybdate reductive phosphorus (MRP) concentration was 0.015 mg/l P and the maximum MRP concentration was 0.133 mg/l P. The average chloride concentration was 29.9 mg/l Cl and the maximum chloride concentration was 45 mg/l Cl.				
Alkalinity (mg/l HCO3):	Average:	Range:						
	267	39-596						
Hardness (mg/l CaCO3):	Average:	Range:						
	277	12-372						
Conductivity (uS/cm):	Average:	Range:						
	549	191-645						
Monitoring Record Period:	From:	To:						
	2002	2009						
RISK ASSESSMENT								
Pressure (e.g., Nitrates, Phosphates, Abstractions):	Diffuse		Typical Contaminants:	Nitrate				
Risk Category:	At risk, high confidence		GWB Status:	Good				
Impact Potential within ZOC (% area):	Extreme:	High:	Moderate:	Low:	Negligible:			
	0.00	29.74	9.13	0.04	61.10			
OTHER INFORMATION								
---								



Site



Well Cover



Well Head

## 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 N03)

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  $\mu$ S/cm) / Drinking Water Test (1,875  $\mu$ S/cm)

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

### General Downgradient Distances

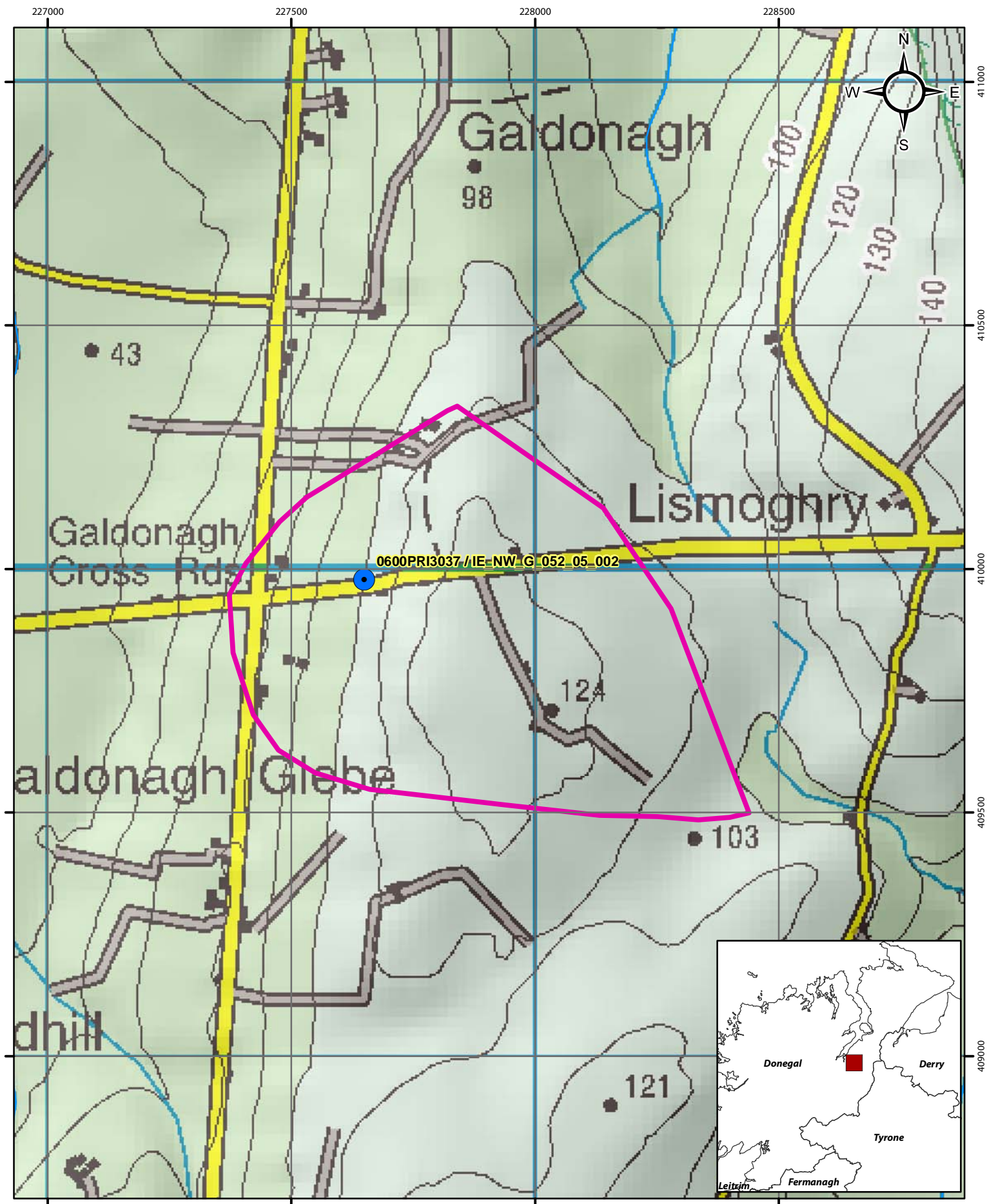
General Downgradient Distances (XL) applied to boreholes sourced in bedrock aquifers are constrained to estimate approximate limits based on data at the GSI. In some cases they may be higher or lower depending on local conditions.

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	GSI	Date:	
Version 1:	Prepared by	OCM (DC)	Date:	Feb 2011
Version 2:	Prepared by		Date:	
Version 3:	Prepared by		Date:	
Version 4:	Prepared by		Date:	

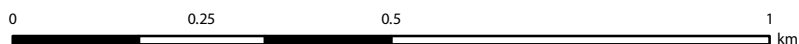


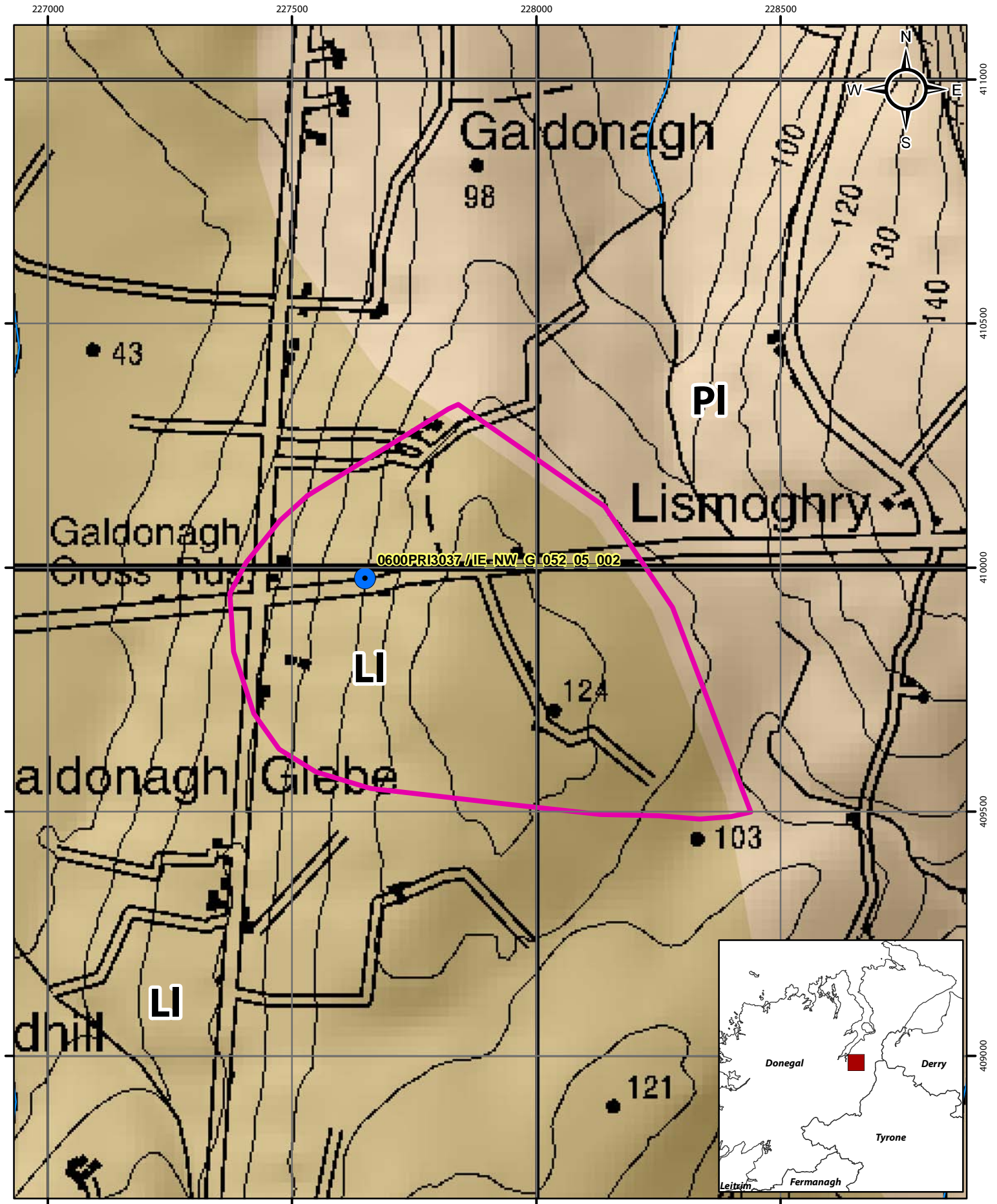


## Location Map for Goldonagh






- Abstractions
- River
- Zone of Contribution

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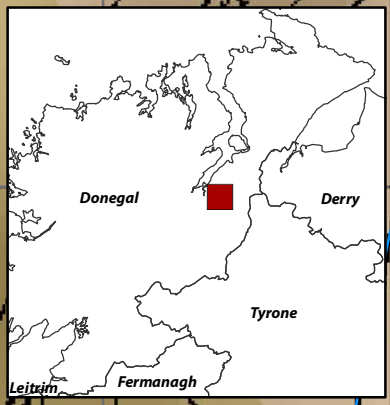
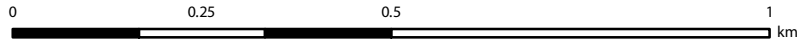




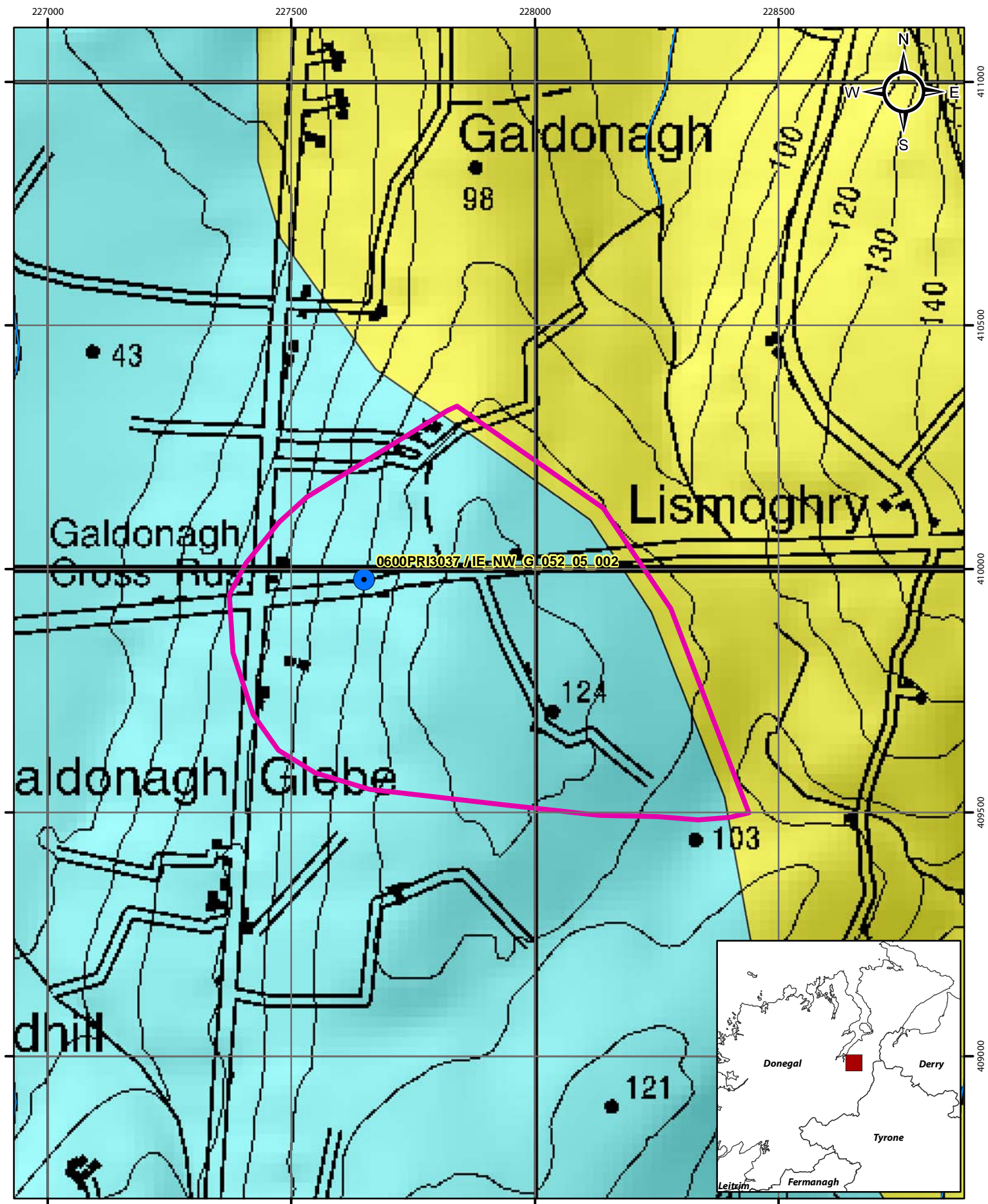
# Aquifer Category Map for Goldonagh

-  Abstractions
-  River
-  Zone of Contribution
-  LI
-  PI






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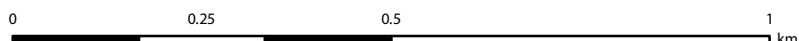




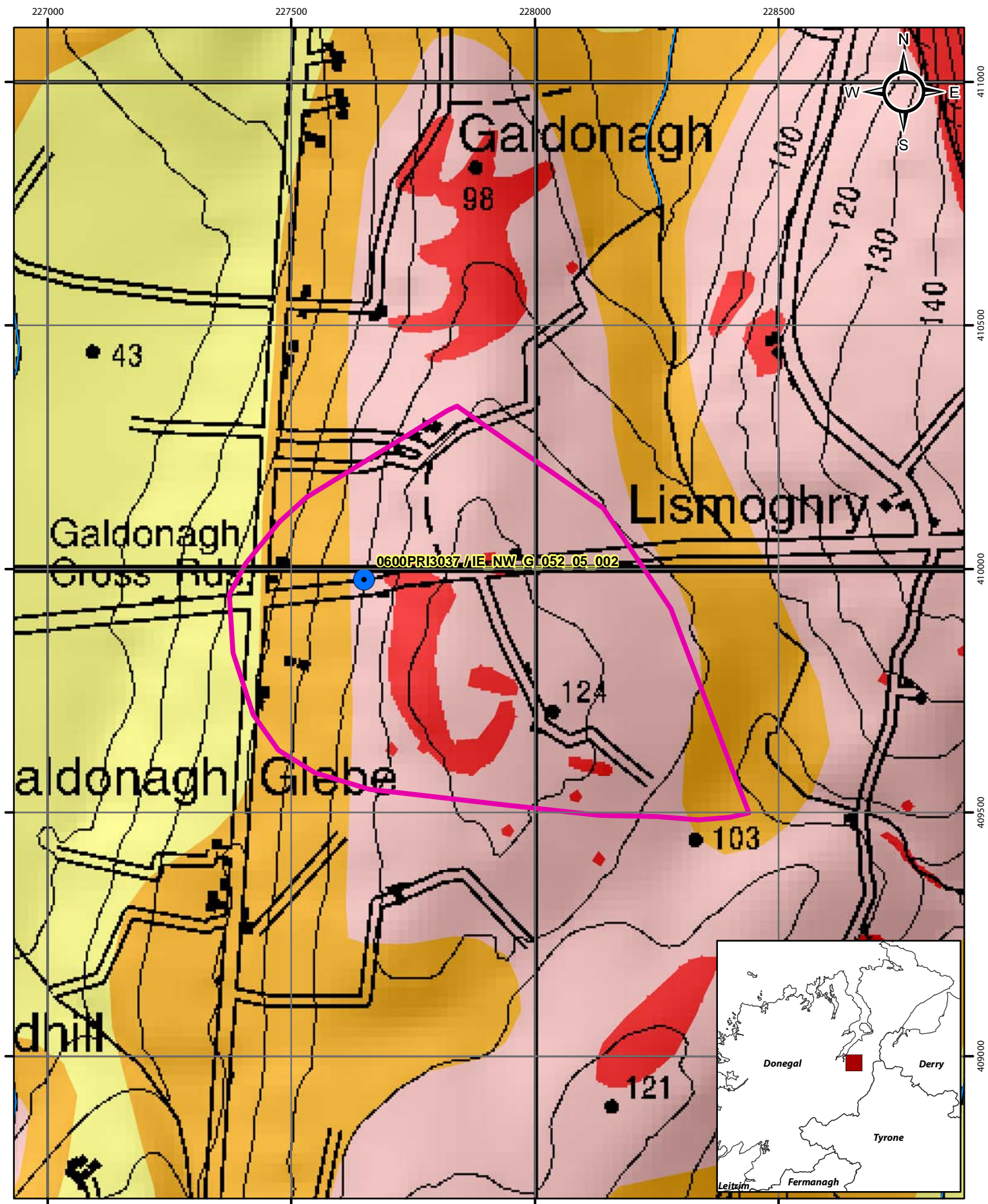
## Bedrock Map for Goldonagh

-  Abstractions
-  Precambrian Marbles
-  River
-  Precambrian Quartzites, Gneisses & Schists
-  Zone of Contribution

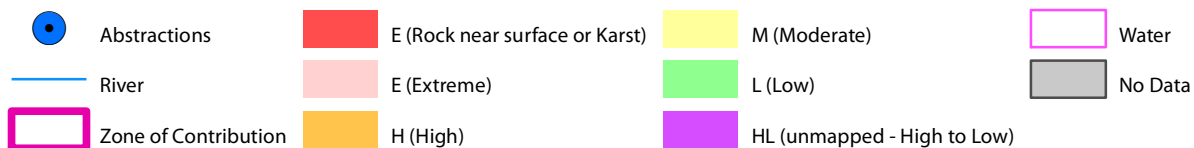
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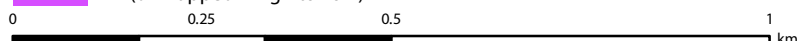




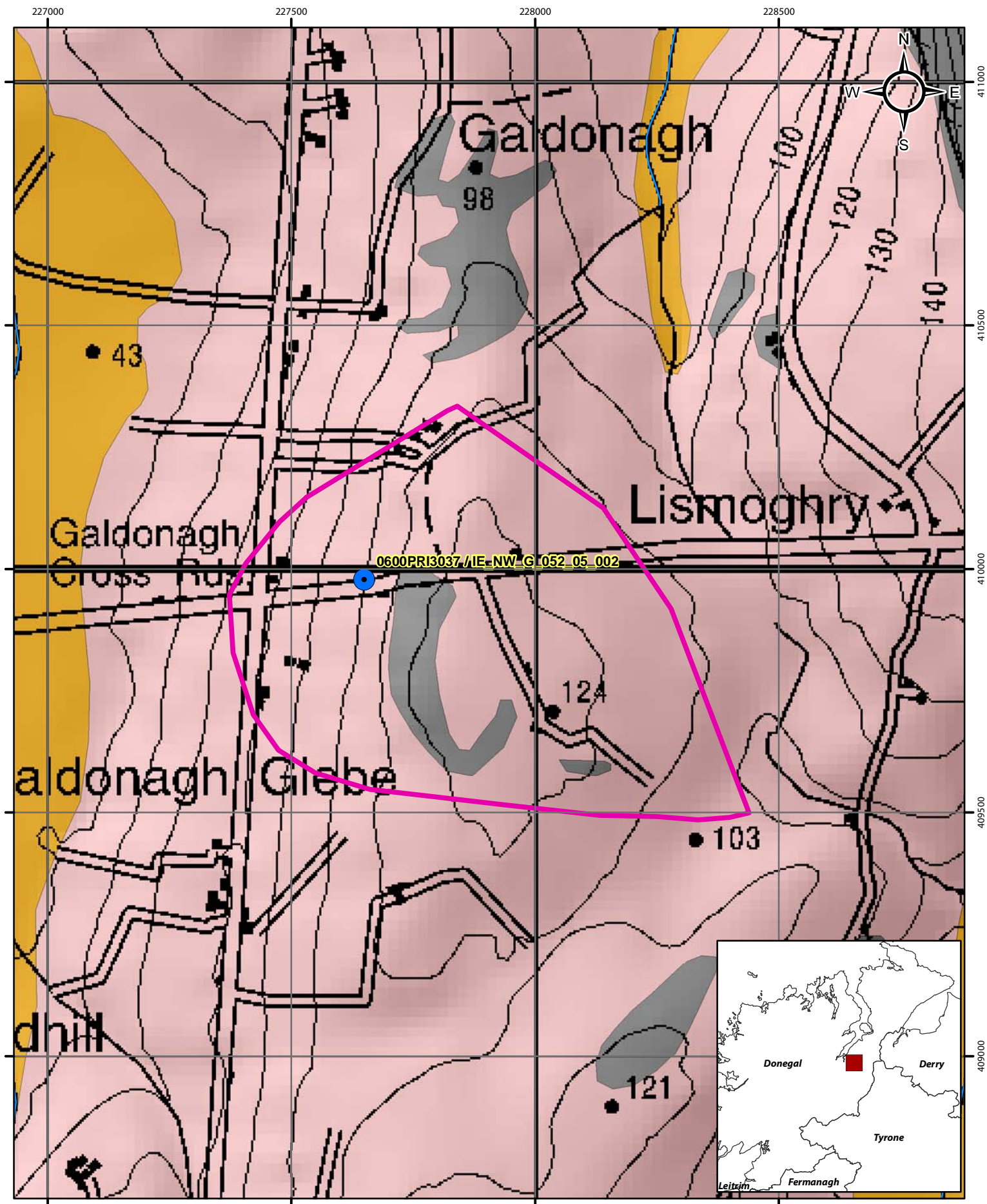
## Groundwater Vulnerability Map for Goldonagh



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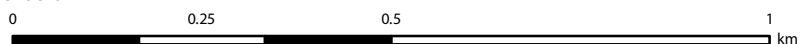




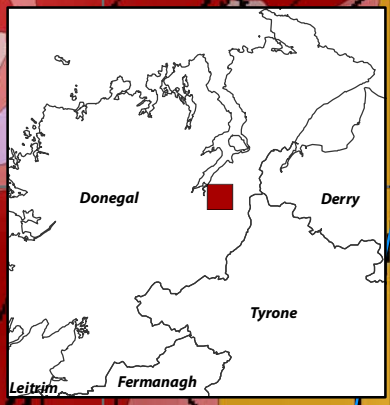
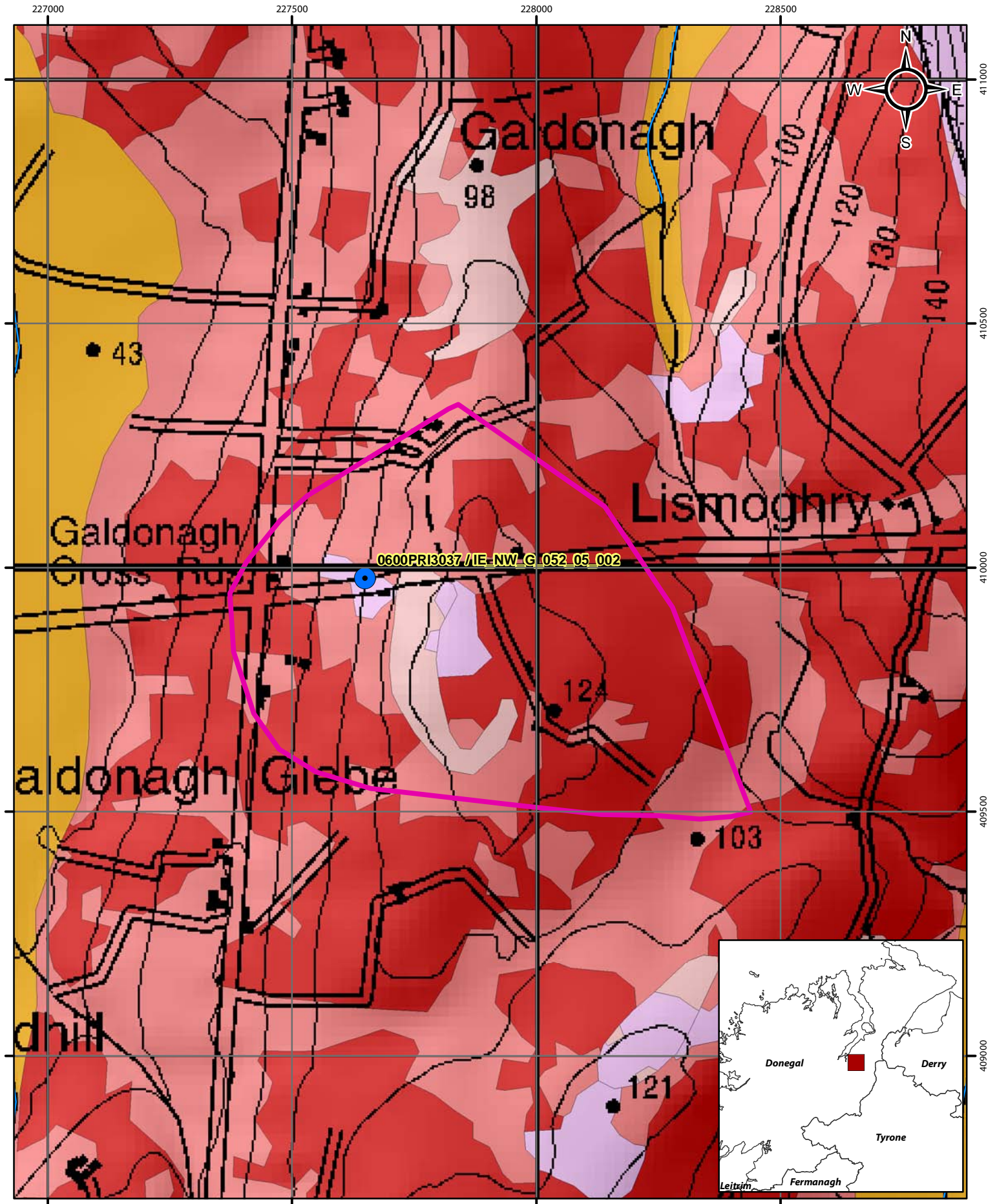
## Subsoils Map for Goldonagh

- |  |                      |   |                                     |
|--|----------------------|---|-------------------------------------|
|  | Abstractions         |  | Alluvium                            |
|  | River                |  | Bedrock outcrop or subcrop          |
|  | Zone of Contribution |  | Till derived from metamorphic rocks |









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# Soils Map for Goldonagh

- |   |   |  |
|---|---|--|
|  Abstractions         |  Acid Deep Well Drained Mineral    |  Acid Shallow/Rocky/Peaty Mineral |
|  River                |  Acid Deep Poorly Drained Mineral  |  Mineral Alluvium                 |
|  Zone of Contribution |  Acid Shallow Well Drained Mineral |  |