

## Water Framework Directive Groundwater Monitoring Programme

### Site Information **Carrigeen**



Carrigeen PWS is situated in a Regional Karst (Rkd) Diffuse Aquifer. The spring abstraction provides 200 m<sup>3</sup>/day for the Carrigeen Area.

SITE INFORMATION					
Site Name:	Carrigeen		County:	Limerick	
RBD:	Shannon IRBD		EU Reporting Code:	---	
Easting:	140960		GWB Name:	Fedamore	
Northing:	149183		GWB Code:	IE_SH_G_084	
Site Use:	Drinking Water		Drinking Water Code:	1900PUB1100	
Hydrometric Area:	24		Water Level Monitoring Network:	Level	Flow
Townland:	Carrigeen			N	N
Ownership:	Limerick County Council				
Water Quality Monitoring Network:	Surveillance		Operational (Point)		Operational (Diffuse)
	N		N		N
Site Comments:	The exact spring location was not evident at the surface. Spring cover not visible during site visit. No overflow.				

SITE DIRECTIONS	
Location and Access Information:	Carrigeen Spring is located 2 km west of Croom and to the north of Carrigeen graig. The spring and associated treatment works are located on a laneway to Diseart Aonghasa Tower and Church. Water is pumped to Carrigeen Reservoir to the south for distribution throughout the network.
Additional Comments:	---

WELL INFORMATION					
Monitoring Point Type:	Spring	Abstraction Rate (m³/d):	200	Ground Elevation (m OD):	30
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:	No overflow.		
Specific Capacity (m³/d/m):	---				
Static Water Level (m bgl):	---				
Scheme Name:	Carrigeen	Number of Abstraction Points in the Scheme:	1	Source Report Available	N
Source Report Info:	---				
Scheme Summary:	Single spring serving the Carrigeen PWS.				

HYDROGEOLOGY							
GEOLOGY	Soil:	Deep poorly drained mineral (BMinPD)				Subsoil Permeability:	Moderate
	Subsoil:	Tills (diamictons) (TLs)					
	Bedrock:	Dinantian Pure Unbedded Limestones					
HYDROGEOLOGY	Aquifer Category:	Rkd	Vulnerability at Monitoring site:	High	Flow Regime:	Karstified	
ZONE OF CONTRIBUTION	Estimated ZOC Size (km²):	0.80	ZOC Delineated By:	Tobin (JD/CK)	Recharge Estimate (mm/yr):	---	
	ZOC Delineation Comments:	Carrigeen Spring is located in a low lying area within the River Maigue Catchment. It is assumed that the low hills surrounding the spring drive water to the spring. Carrigeen abstracts 200 m³/day from the Rkd Aquifer. The ZOC was delineated based on the area required by the abstraction and topography. Uncertain boundaries and it represents the most likely surface area contributing to the source. It is a conservatively large area. It is assumed the spring occurs close to the boundary with the impure Ballysteen Lsts to the north.					
Groundwater Vulnerability within ZOC (% area):	Extreme (X)	Extreme (E)	High	Moderate	Low	High to Low	Unclassified
	9.52	6.15	0	0	0	84.33	0
HYDROCHEMISTRY							
Hydrochemical Signature:	Ca-HCO3		Additional Water Chemistry Information:	Few data. Nitrates range 14-22mg/l, average of 17mg/l.			
Alkalinity (mg/l HCO3):	Average:	Range:					
	---	---					
Hardness (mg/l CaCO3):	Average:	Range:					
	---	---					
Conductivity (uS/cm):	Average:	Range:					
	655	434-690					
Monitoring Record Period:	From:	To:					
	---	---					
RISK ASSESSMENT							
Pressure (e.g., Nitrates, Phosphates, Abstractions):	Diffuse		Typical Contaminants:	Nitrates			
Risk Category:	At risk, high confidence		GWB Status:	Poor			
Impact Potential within ZOC (% area):	Extreme:	High:	Moderate:	Low:	Negligible:		
	0.00	66.63	33.37	0.00	0.00		
OTHER INFORMATION							
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Water Treatment House



Suction Pump

## 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

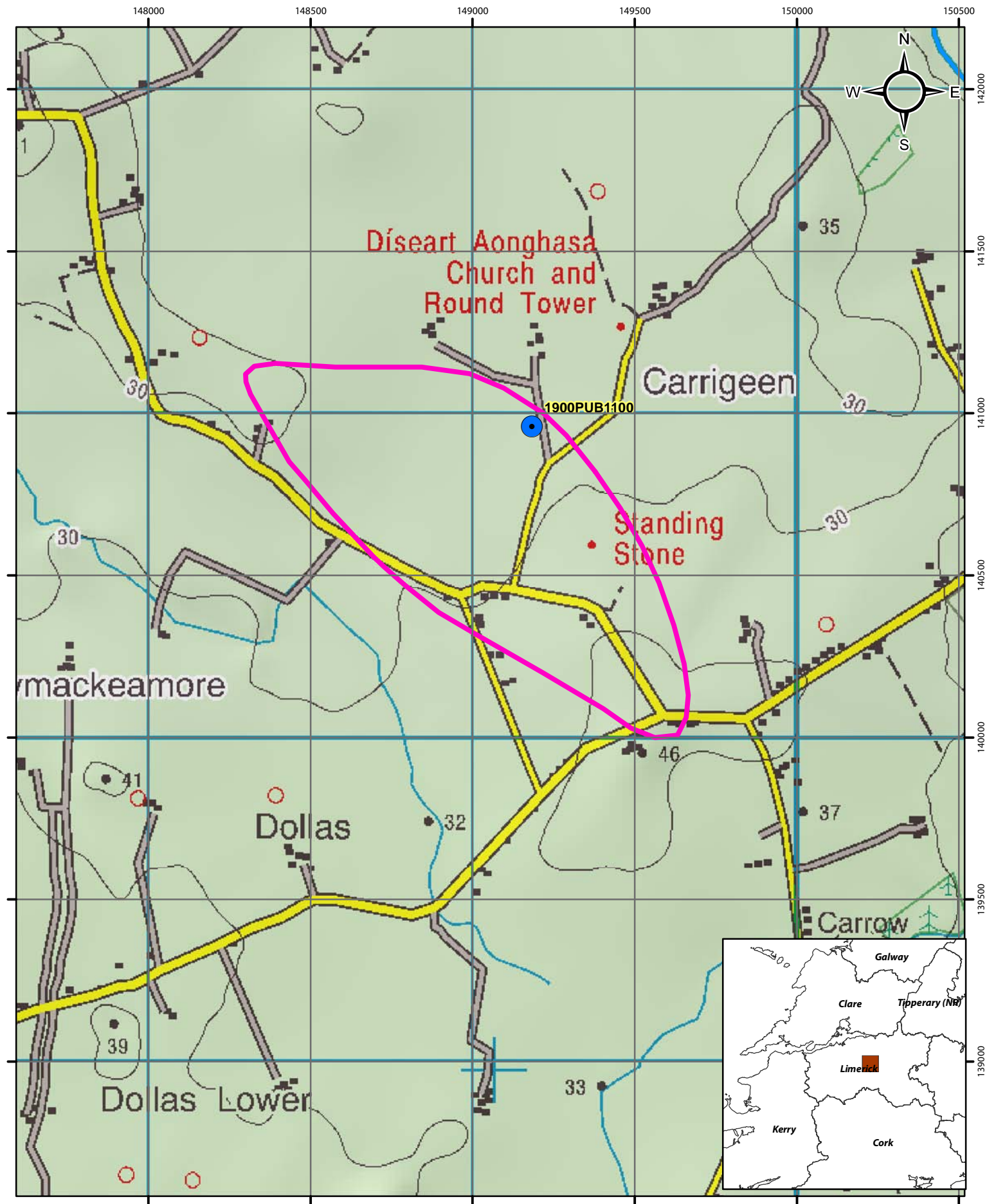
General Downgradient Distances (XL) applied to boreholes sourced in bedrock aquifers are constrained to estimate approximate limits based on data at the GSI. In some cases they may be higher or lower depending on local conditions.

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

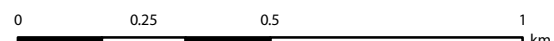


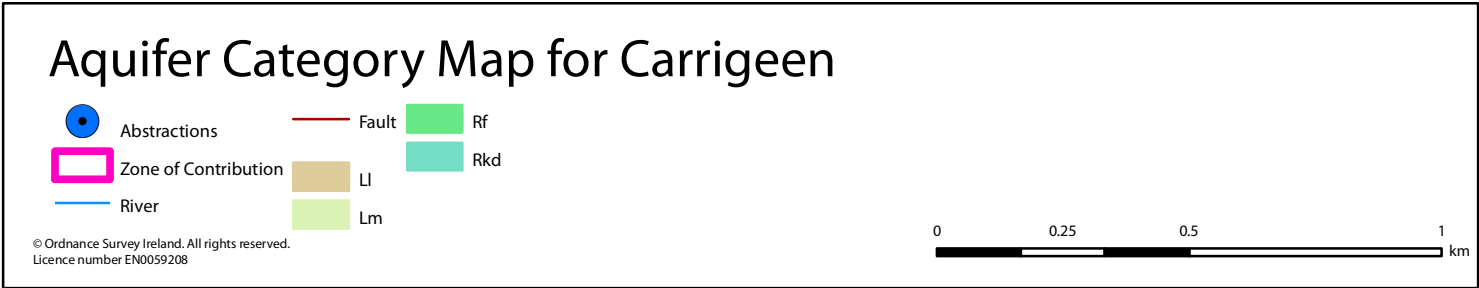


## Location Map for Carrigeen

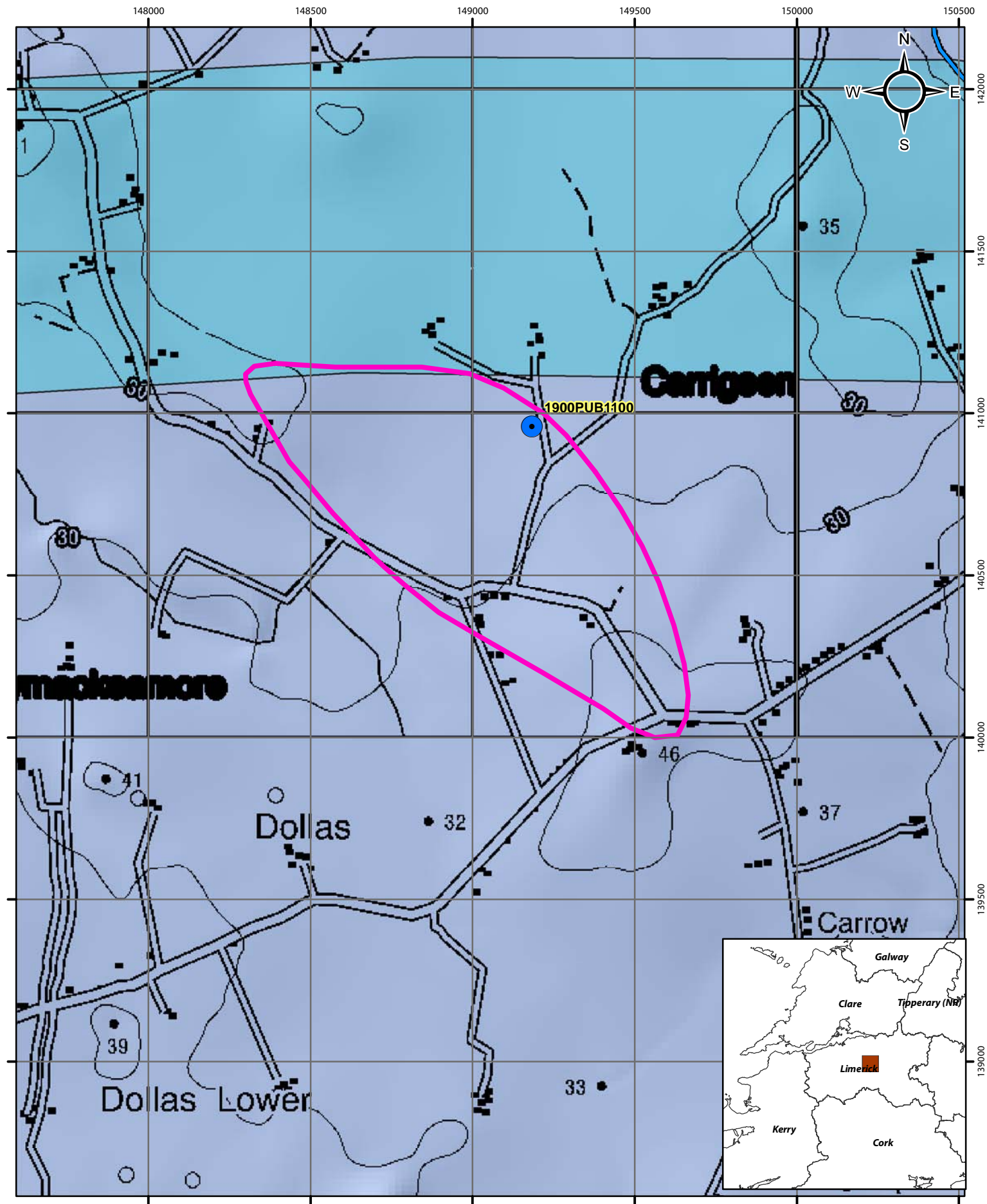
-  Abstractions
-  Zone of Contribution
-  River

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## Bedrock Map for Carrigeen

- Abstractions
- ▭ Zone of Contribution
- River
- Dinantian Lower Impure Limestones
- Dinantian Pure Unbedded Limestones



148000

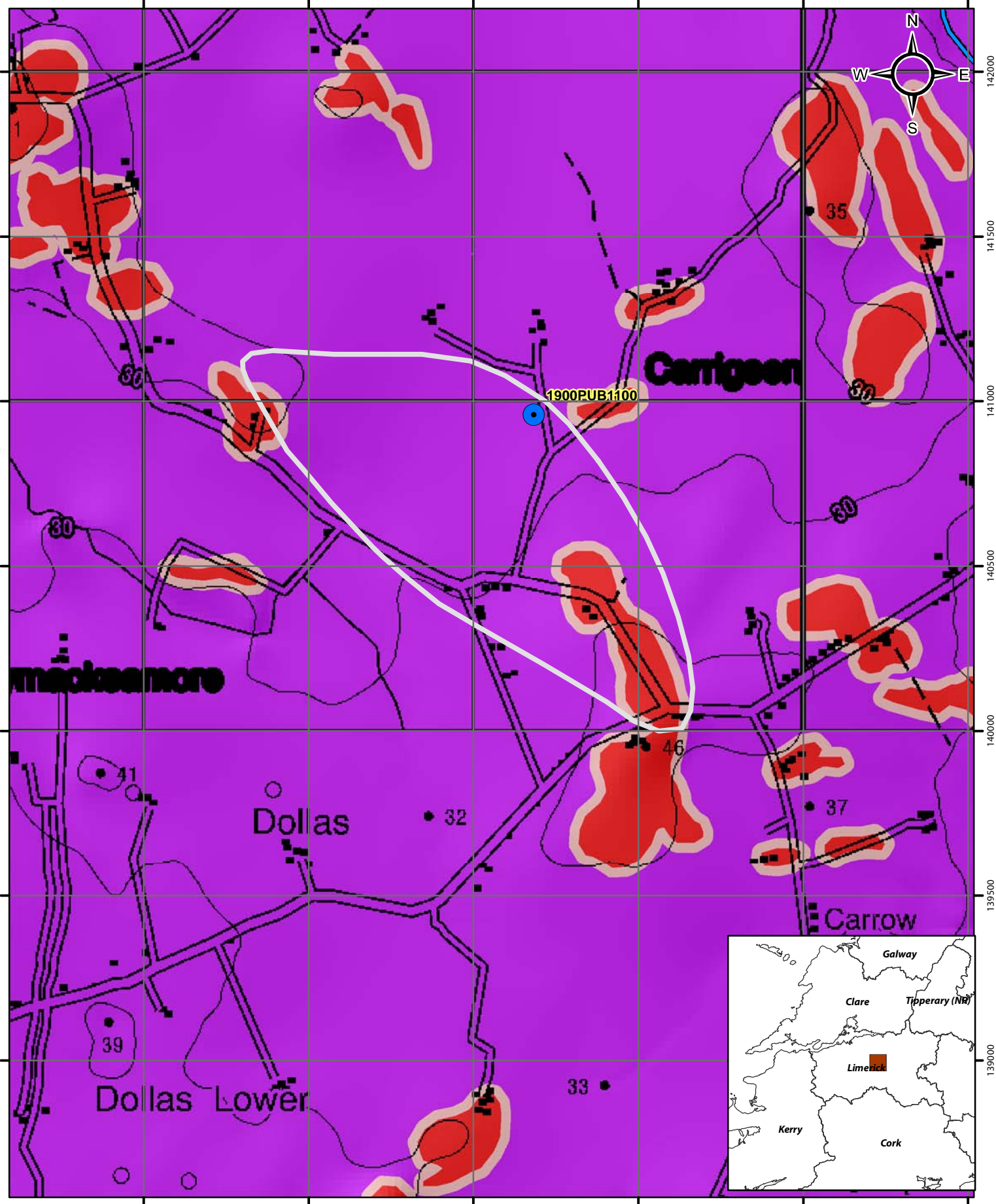
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149000

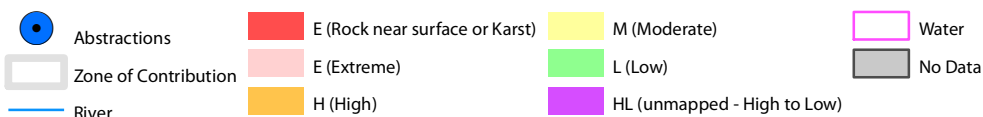
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150000

150500



## Groundwater Vulnerability Map for Carrigeen



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0 0.25 0.5 1 km

148000

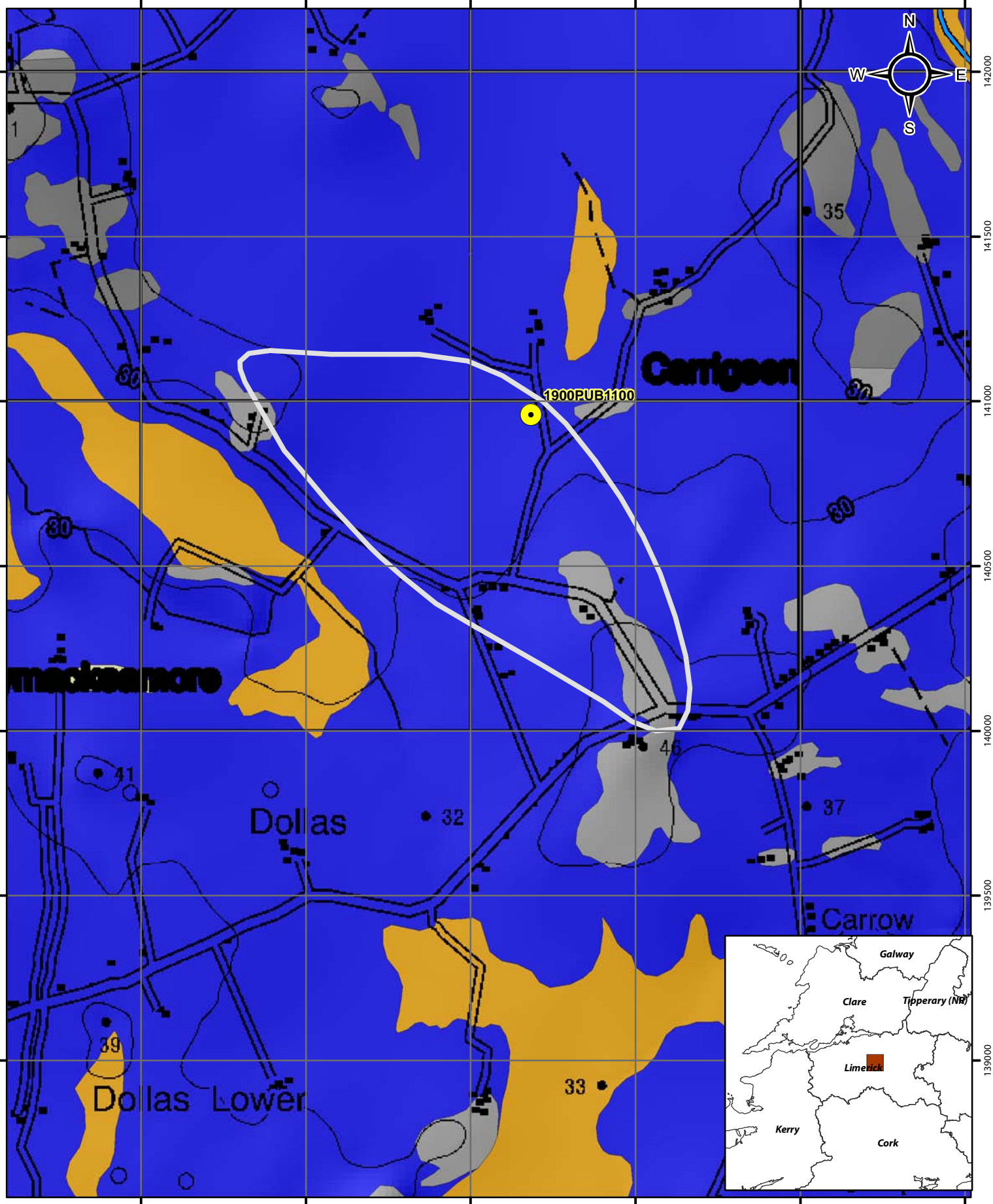
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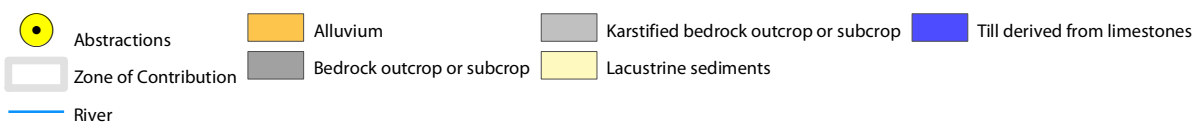
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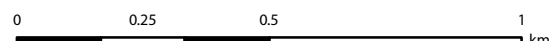
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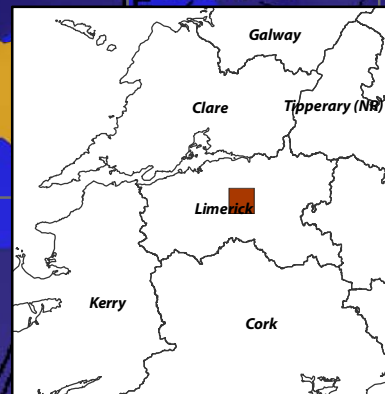
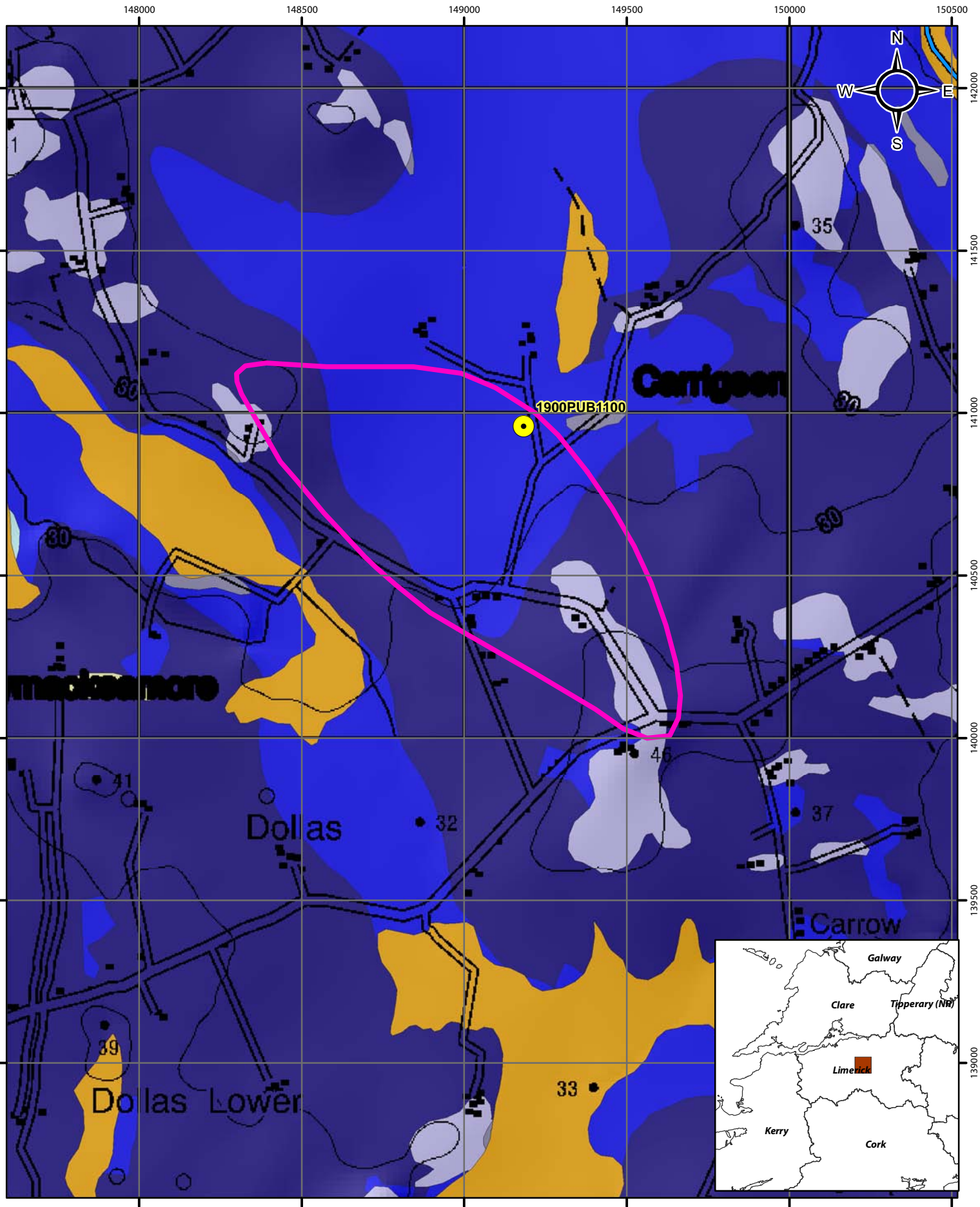
## Subsoils Map for Carrigeen



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## Soils Map for Carrigeen

- Abstractions
- Zone of Contribution
- River
- Basic Deep Well Drained Mineral
- Basic Deep Poorly Drained Mineral
- Basic Poorly Drained Peaty Mineral
- Basic Shallow Well Drained Mineral
- Basic Shallow Poorly Drained Mineral
- Mineral Alluvium
- Lacustrine