Mining Remediation Authority

Accelerating mine water geothermal projects

Development and research

Fiona Todd

SPE Geothermal 12th March 2026

Mining Remediation Authority

- Non departmental public body
- Own and manage abandoned coal mines across GB
- **Enabling mine water heat schemes** is a key deliverable in our business plan

How can we access mine water heat ?

Boreholes

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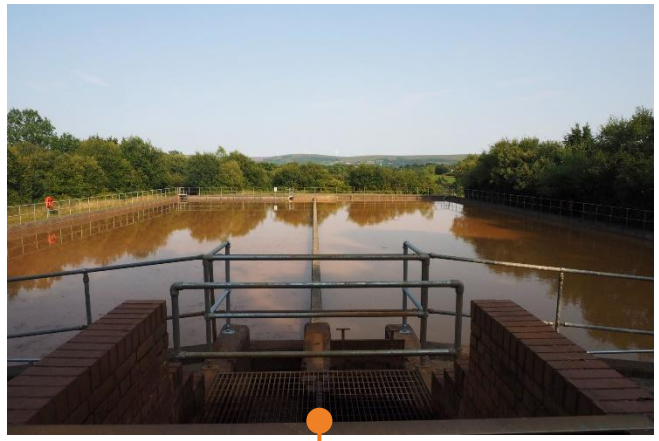
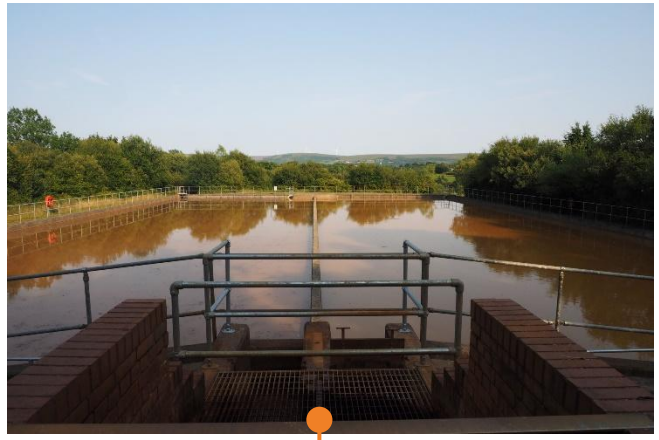
Boreholes



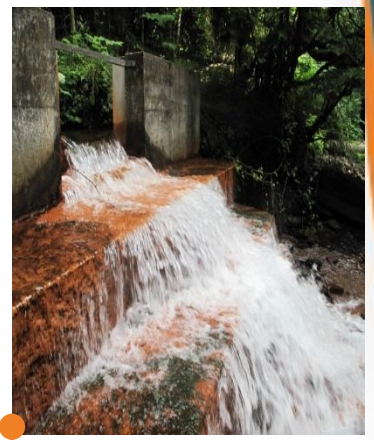
Treatment Schemes

How can we access mine water heat ?

Boreholes



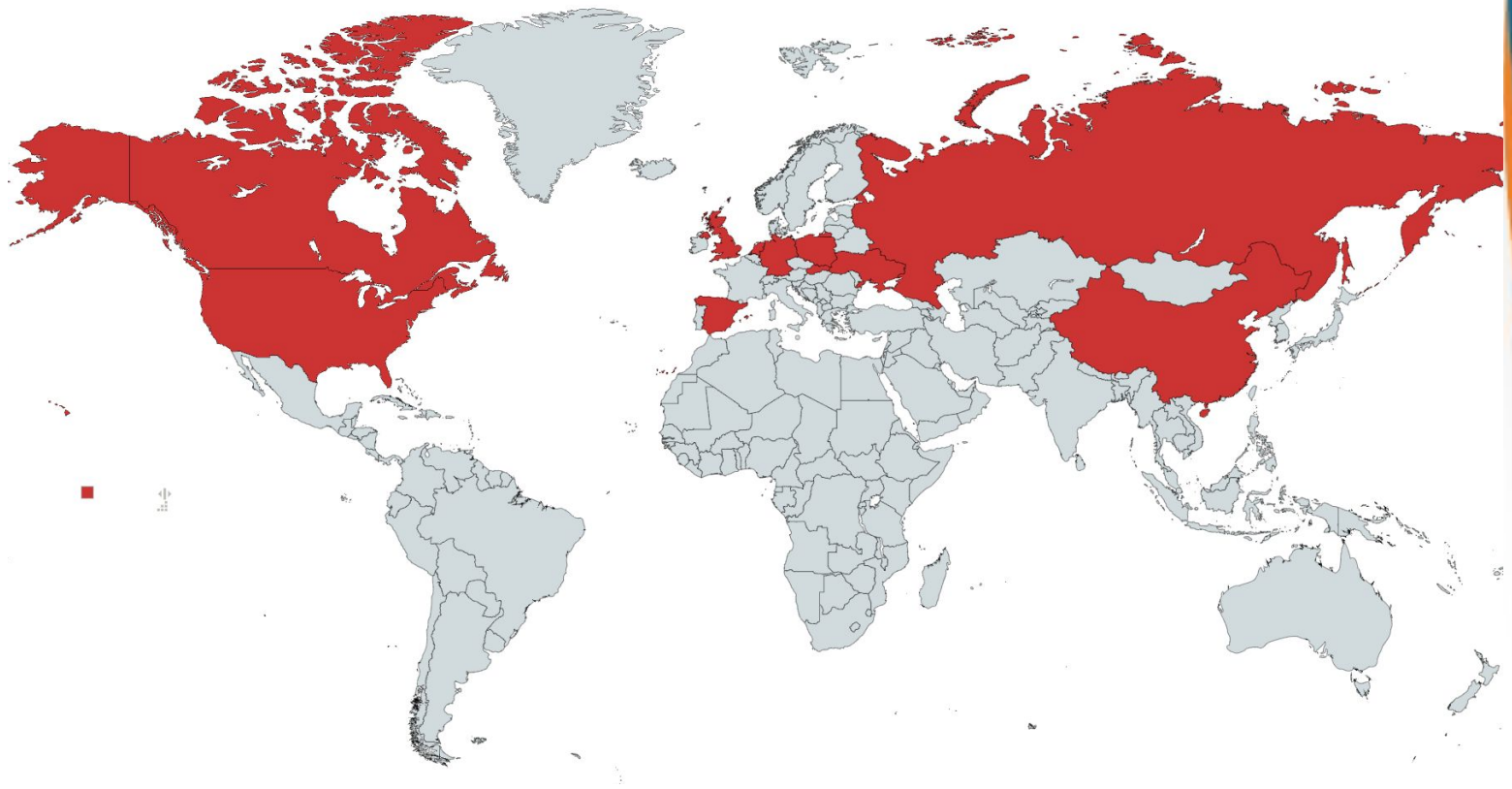
Treatment Schemes



Shafts/ Discharges

World wide mine water heating schemes

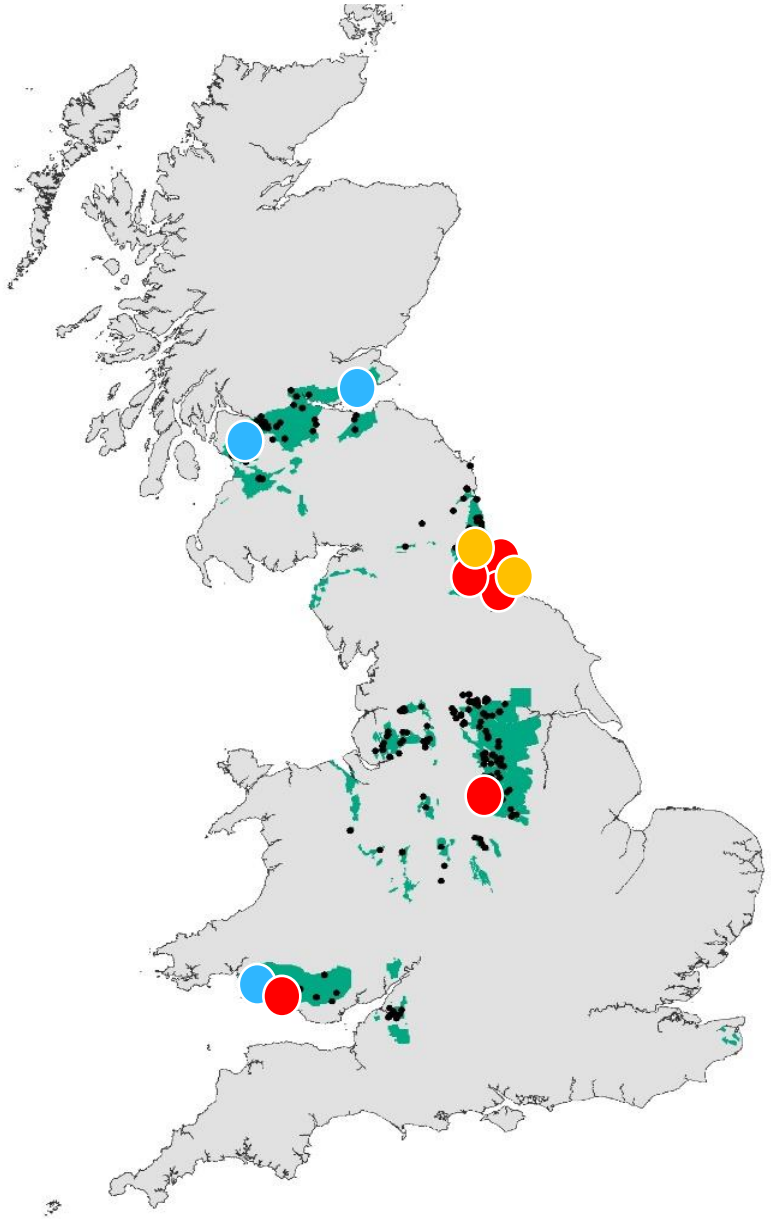
Country	No
China	7
Great Britain	6
Germany	6
Spain	2
USA	2
Netherlands	1
Poland	1
Russia	1
Ukraine	1
Slovakia	1



Estimated number of live mine water heating schemes based on Oppelt et al 2025

Global reviews e.g. Hall et al 2011, Ramos et al 2015; Walls et al 2021, Oppelt et al 2025

Mine water heat schemes in Great Britain



Name	Live	Use	Type	MWth
Gateshead	2023	>600 homes 24 large buildings Warehouse Light industry	Borehole doublet	6
Lanchester Wines	2018	Warehouse	Borehole doublet	2.4
Lanchester Wines	2018	Warehouse	Borehole doublet	1.2
Thermal Earth	2025	Warehouse and offices	Closed loop in settlement pond	0.04
Markham Shaft	2016	Office	Open loop in shaft	0.2
Seaham Garden Village	tbc	750 social homes	Shaft / treatment	~2.3
North East England	tbc	Leisure centre	Borehole	0.5
Decommissioned Schemes (n3)	1999-2015	Social homes and R&D trials	various	various
Closed loop boreholes (n=250)	2006-2024	250 schemes permitted across GB	Closed loop boreholes	Est 30

Gateshead Heat Network (boreholes)

LIVE

Owned & operated by:
Gateshead Energy Company

Total heat pump capacity
6MWth

Mine water yields
Up to 140 L/s

Consumers
- >600 residential
- 24 large buildings
- Warehouses
- Light Industry

Consumers play **at least**
5% lower than gas

Lanchester Wines (boreholes)

Delivered by:
Privately funded/Lanchester wines/Townrock Energy

Total heat pump capacity
Abbotsford Road: 2.4 MW
Nest Road: 1.2 MW

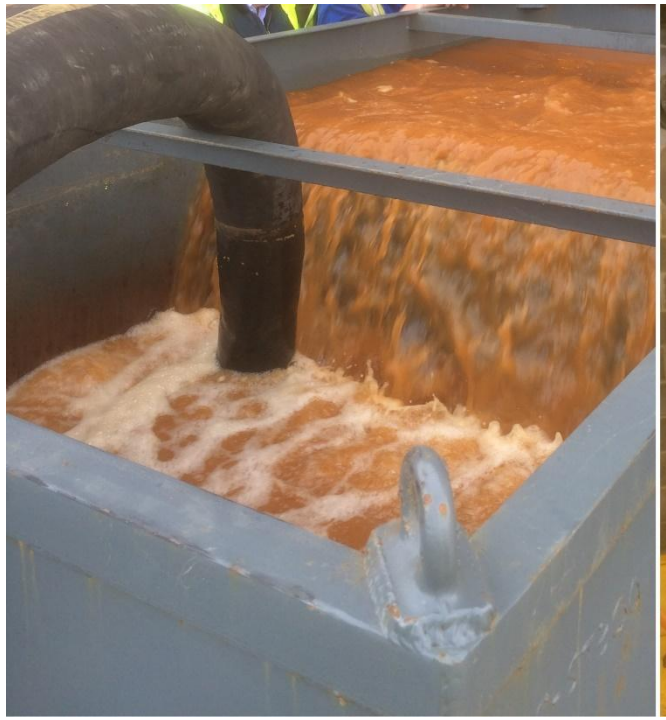
Mine water yields
Abbotsford Road: 30 L/s
Nest Road: up to 70 L/s

Consumers
Two large beverage warehouse facilities operated by Lanchester Wines.

Status
Live

https://www.iea-gia.org/case-studies

Heat pumps at Abbotsford Road. Photo by © Jonathan Steven



Circulating citric acid solution to remove ochre scaling from the plate heat exchanger at Abbotsford Road. Photo by © David Banks

Thermal Earth (closed loop)

Delivered by:
Thermal Earth/Innovate UK's New Innovators in Net Zero Industry, South West Wales funding

Total heat pump capacity
0.04MW & passive cooling

Mine water yields
Closed loop

Consumers
Industrial unit /warehouse

Status
Live

Predicted CO2 savings
17.5 tonnes/yr v oil heating

Seaham Garden Village (shaft/treatment)

Delivered by:
Durham CC, Karbon Homes
Esh group, Funding HNIP

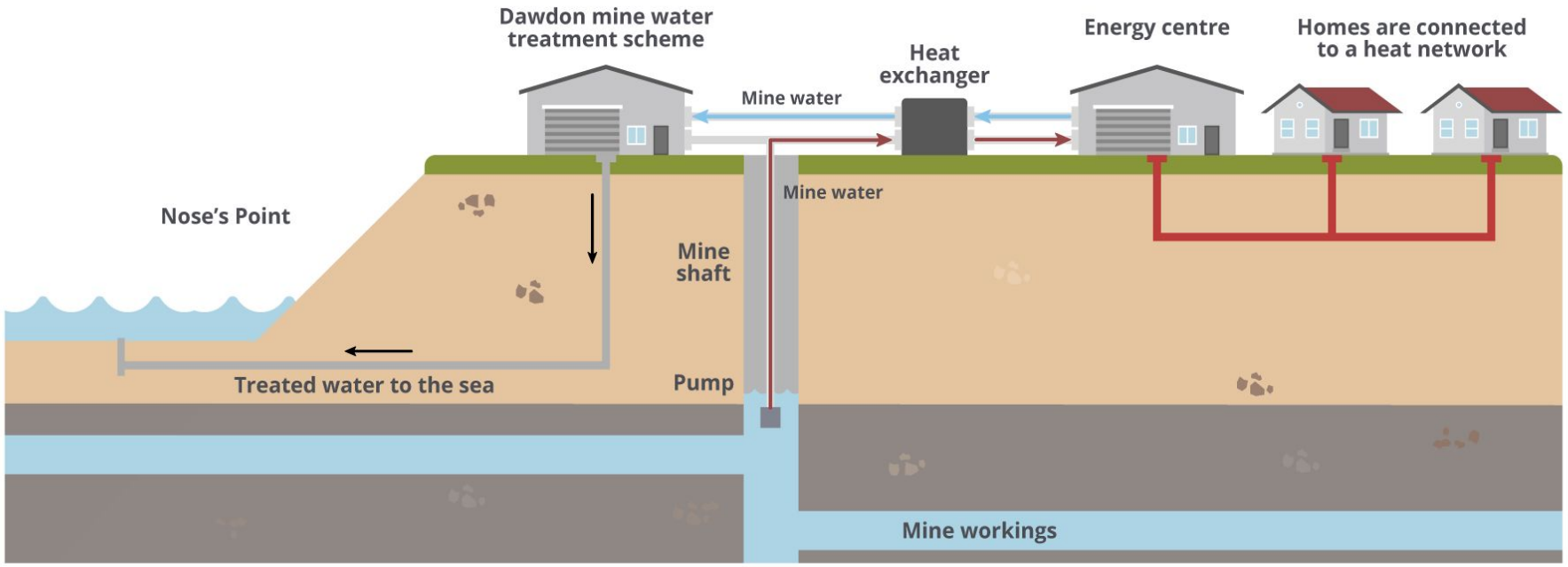
Total heat pump capacity
~2.3MW

Mine water yields
Up to 90 L/s @20oC

Consumers
750 social homes

Status
Commissioning

Predicted CO2 savings
64Ktonnes over 40 years



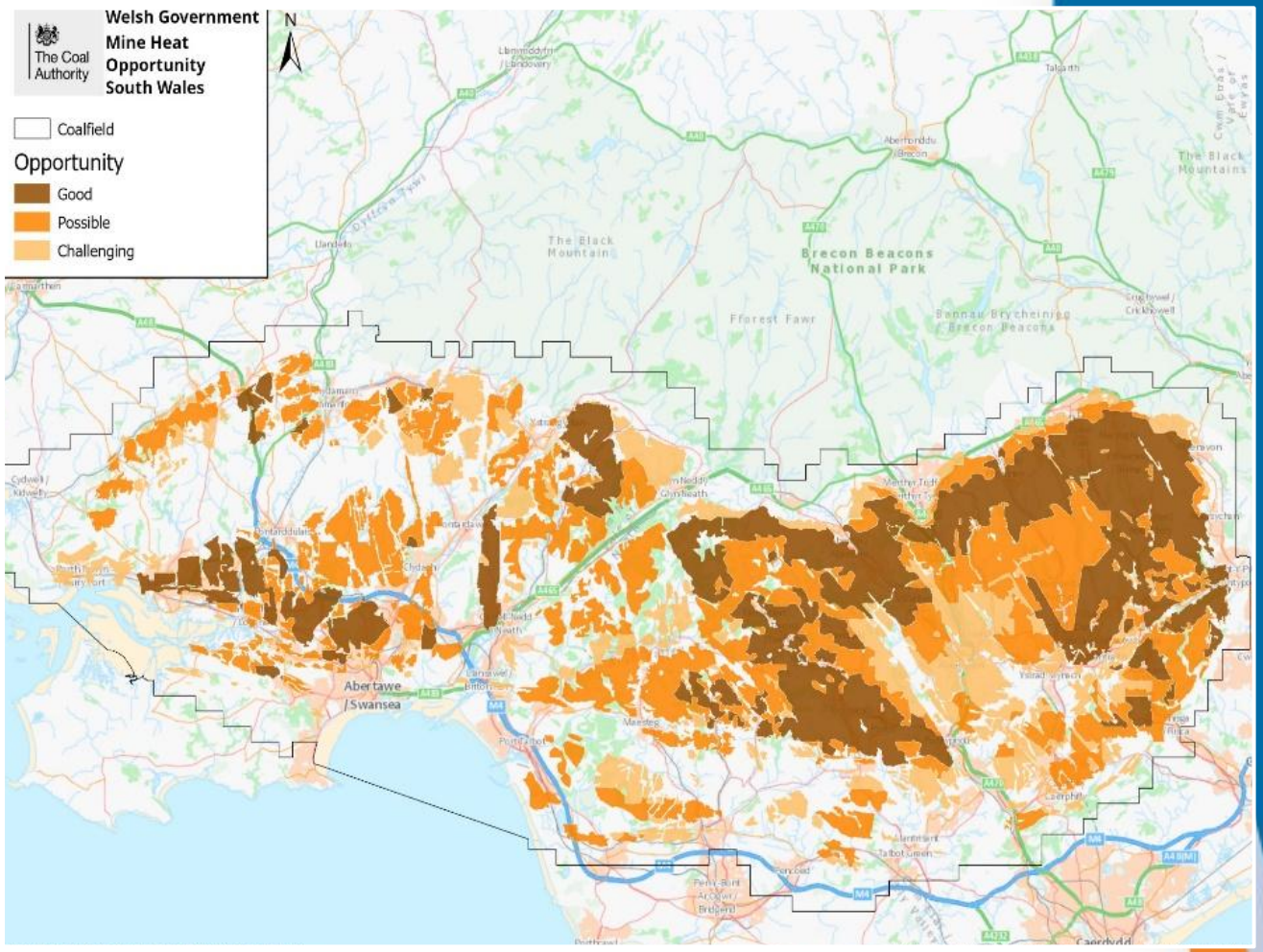
Seaham Garden Village (Shaft/Treatment)

Energy Centre

750 social homes under construction

Developing mine water heat

- Advisory services
- Opportunity mapping
- Waste heat source prioritisation
- Mine heat licensing roadmap development



https://www.gov.wales/mine-water-heat-opportunity-map

Mine Water Heat R&D

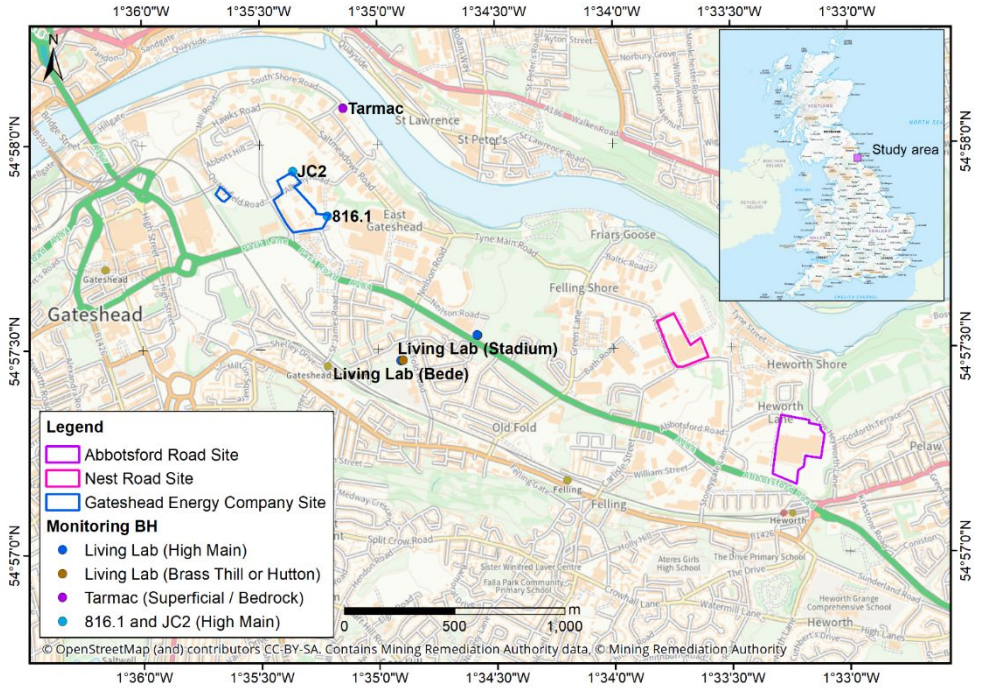
We have several key priorities:

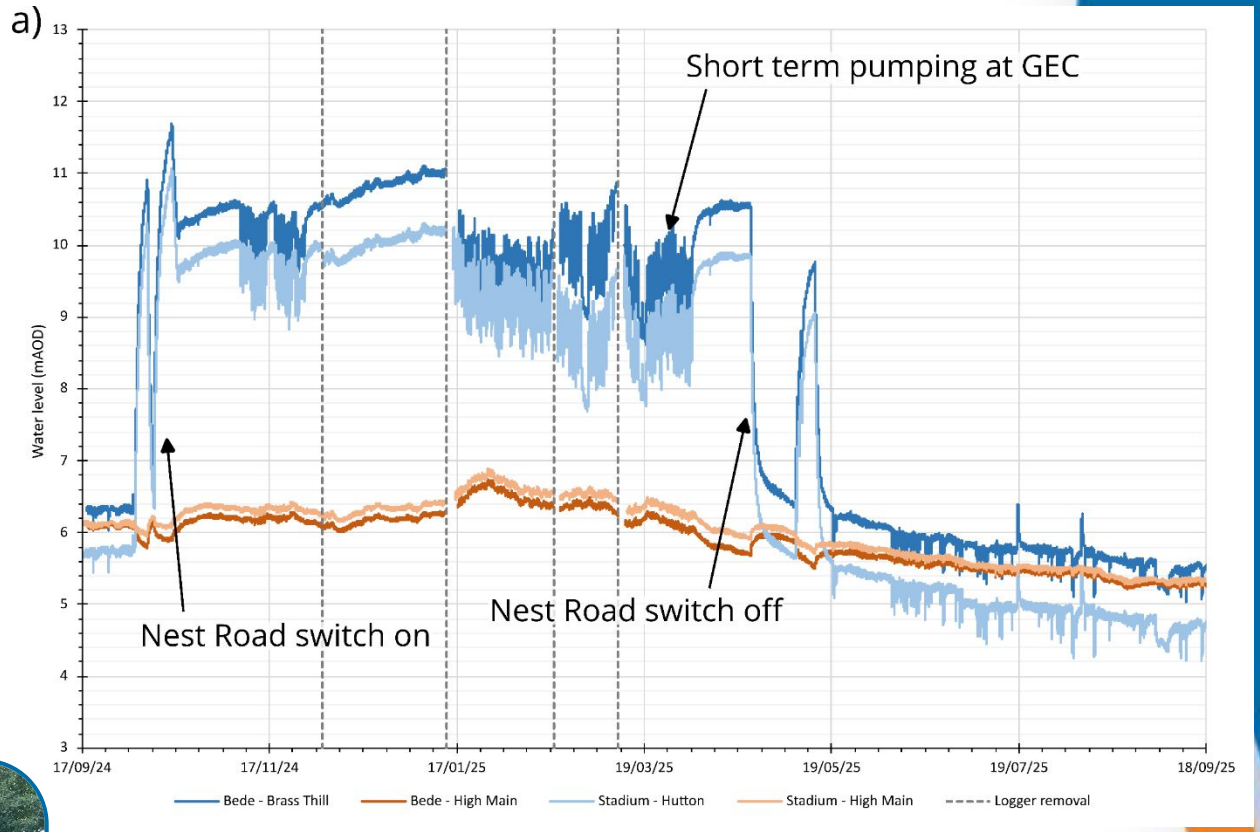
- **Contributing to net zero & energy security**
- **Working with partners**
- **Supporting R&D**
- **Mine Water heat awareness**

Our research aims to:

- Understand interactions between mine water heat schemes
- Support evidence-based decision making
- Drive wider uptake of mine water heat networks

Internal project: Mine heat living lab





OPEN ACCESS | Research article | 2 March 2026

Construction of the 'Gateshead Mine Water Heat Living Laboratory'

Authors: Fiona Todd, Charlotte Adams, Dan Mallin Martin, Lee Wyatt, Rebecca Chambers, Kate Turner, and Gareth Farr

Publication: Quarterly Journal of Engineering Geology and Hydrogeology • Accepted Manuscript

52

PDF/EPUB

Internal project: Drilling success rates

- Myth busting: perceived 1 in 3 success rate

- Assessed 564 boreholes
  - 87-93% suitable for original purpose
  - 97% success of hitting void >300m

OPEN ACCESS | Case study | 23 June 2025 Check for updates

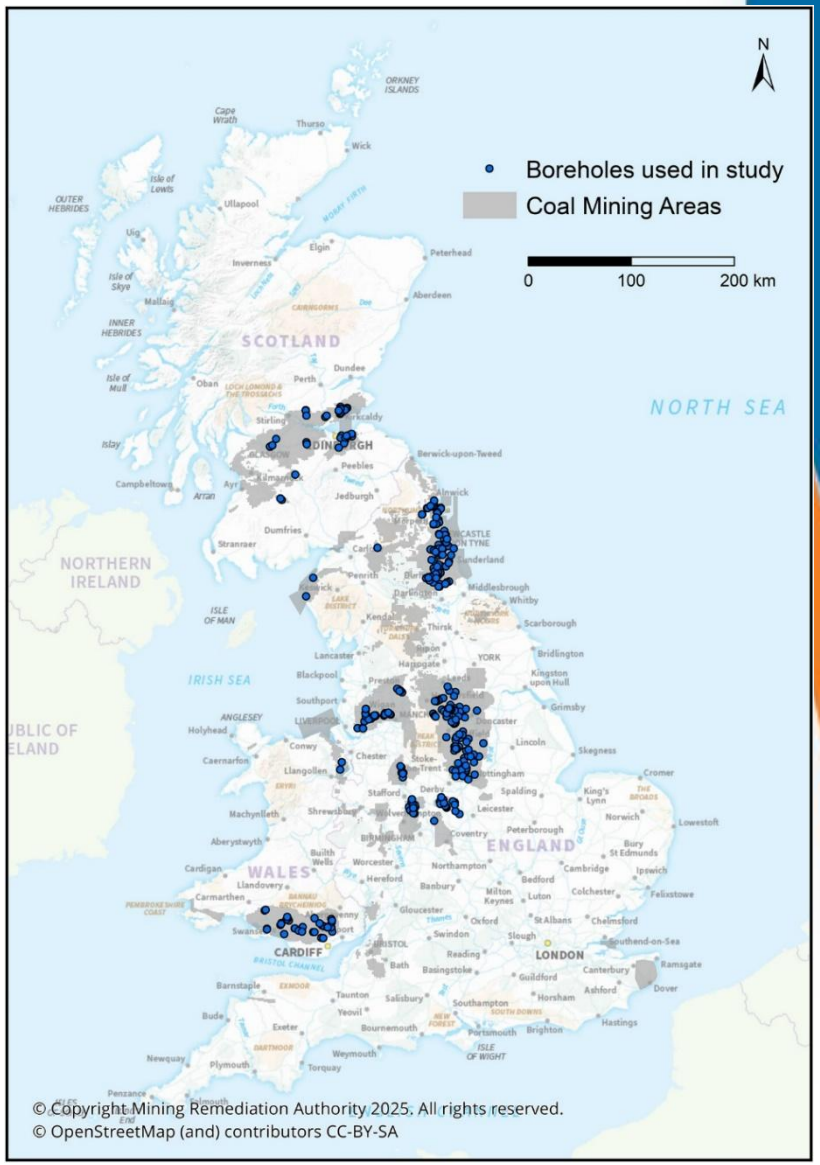
Drilling into coal mine workings: overview and experience from Britain's coalfields

Authors: L. M. Wyatt, K. Parker, D. Mallin Martin, M. Fox, F. Todd, and G. Farr

AUTHORS INFO & AFFILIATIONS

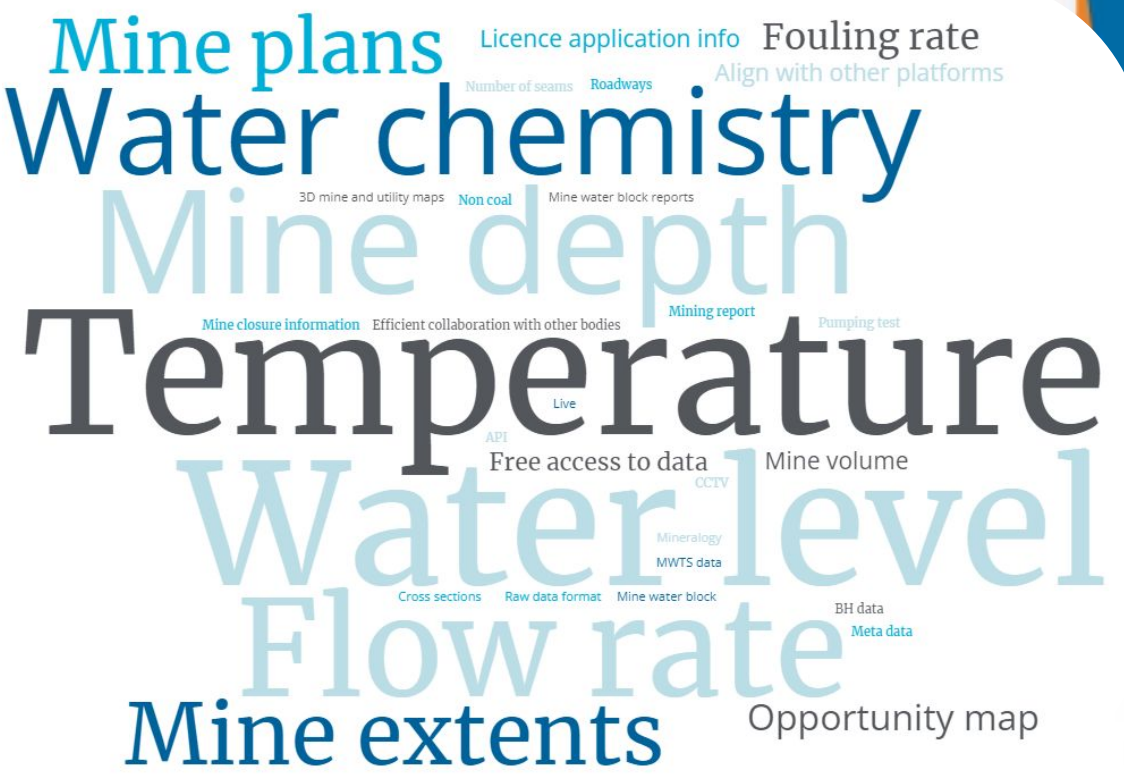
Publication: Quarterly Journal of Engineering Geology and Hydrogeology • Volume 58

https://doi.org/10.1144/qjegh2025-016



Internal projects: Data improvements

- Map viewer – mine heat theme
  - https://datamine-cauk.hub.arcgis.com/
- Enhanced data sharing
- Mine plan digitisation



Summary word cloud of responses to top three data requirements

External research

- Supporting most major mine heat research projects in UK
- Supporting **>10** student projects (BSc, MSc, PhD)
- Written **>10** letters of support for mine heat projects since 2023
- International relationships
- **Open to collaboration**

Future of mine water heat in UK

- New projects
  - Leisure centre (~0.5MW) live soon
  - General hospital (~2MW) drilling in 2026

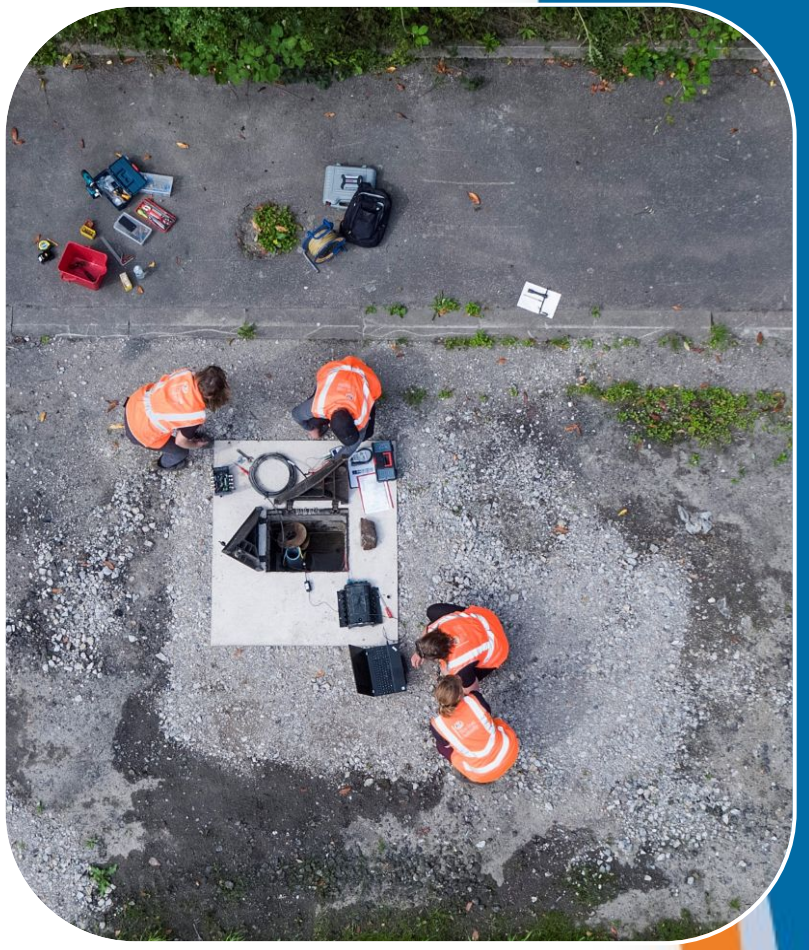
- Future opportunities
  - Heat storage in mine workings
  - Exploration of mine shafts for ‘quick wins’
  - Hydrogen electrolysis

Summary

- Mine water heat is a proven technology
  - Over 25 schemes worldwide
  - ~10MW installed capacity in UK

- Accelerating mine heat via R&D
  - Living Lab providing confidence to operators and regulators
  - Supporting developers understand risk and drilling success rates
  - Developing next generation of geothermal specialists
  - Enabling development through open access data

- Developing future research activities



Thank you

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