The Gateshead mine water heat scheme

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The Coal Authority

Kept people safe and provided peace of mind
- We carried out 8,370 mine entry inspections
- We investigated 589 surface hazard reports
- We assessed 212 subsidence damage claims

Used our information and expertise to help people make informed decisions
- We delivered 195,371 mining reports
- We issued 1,704 permits to intersect coal
- We provided 7,599 planning consultation responses

Protected and enhanced the environment
- We treated 122 billion litres of water
- We replaced 32,000m² of our 350,000m² reed beds
- We prevented 4,540 tonnes of iron solids from entering water courses

Created value and minimised cost to the taxpayer
- We saved £2.4 million by recycling reedbed material
- We generated £6 million of income through our advisory services
- We recycled 78% of removed iron solids
Coal Mining in GB

• Coal has been extracted from 23,000 collieries

• Majority of coal mines are now closed, with access shafts filled and capped

• The Coal Authority owns the below ground infrastructure and coal reserves on behalf of UK Government

• 25% of GB properties on Coal Mine Reporting Area (green area on map)
Considerations

- **Feasibility**
  - Age and depth of workings
  - Accuracy of mine plans
  - Connections

- **Drilling**
  - Experience in coalfields
  - Ability to deviate to hit targets
  - Coal mine gas

- **Pumping tests**
  - Water chemistry – aggressive/Fe rich?
  - Achieve sustainable yields & return?
  - Hydraulic properties of old workings
CASE STUDY: Gateshead – Feasibility

- Heat Network for Gateshead Council/Gateshead Energy Company
  - £15.2m scheme with £5.9m of HNIP
  - BH and Heat pump ~£4m
- CA facilitate boreholes and testing
- Located and to be connected to existing CHP heat network
- First heat network scale mine water source network in UK (6MW)
CASE STUDY: Gateshead – Feasibility

• Commissioned Nov 2019
• Heat Network for Gateshead Council

<table>
<thead>
<tr>
<th>Seam</th>
<th>Shearlegs Road Depot</th>
<th>Gateshead Energy Centre</th>
<th>Baltic Business Quarter (SE)</th>
<th>Baltic Business Quarter (NW)</th>
<th>Exemplar Neighbourhood</th>
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</thead>
<tbody>
<tr>
<td>High Main (E)</td>
<td>Recorded and Possible unrecorded</td>
<td>Possible unrecorded</td>
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<td>No</td>
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</tbody>
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High Main Plan - Gateshead Park Colliery (Ab. 1786)
Low Main (Hutton) Tyne Main Colliery (Ab. 1926)
CASE STUDY: Gateshead – Exploratory and Production Drilling

- Abstraction ~150m deep (Hutton Seam)
- Return ~ 50m deep (High Main)
- Multi-seam borehole
CASE STUDY: Gateshead – Conceptual Model

- Buildings are connected with a heat network
- Heat pump boosts the temperature
- Heat exchanger takes ~5°C from the mine water

Water removed from mine

Water returned to mine

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To Conclude

• Aligns with many government strategies
• Low carbon and uses available technology
• An opportunity to repurpose a legacy
• Share with other mining regions as part of just transition
• One size does not fit all
Thank you
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