

# A Gas Incident in Gorebridge

# Introduction

GECL

Confidentiality

Sources of Information (Public)

# Contents

- Background
- Timeline (2004 – 2019)
- Interesting Things
- Lessons Learnt
- The Judgement



March 1986, Loscoe  
Derbyshire



March 2016 Gorebridge

## Introduction



1. This commercial action arises out of a social housing development at Gorebridge which had to be demolished a few years after it was built.
2. The development site was located above coal strata and former mine workings.
3. The defenders advised the pursuer in relation to site investigation and assessment. In reliance on the advice the pursuer built a development of sixty-four houses on the site.
4. It had no ground gas defence system.

## Introduction (cont.)



5. The houses were occupied by tenants of the pursuer. Following complaints of gas in some of the houses all of the houses were found to be uninhabitable because of the danger to health caused by gas ingress.
6. The pursuer decanted the tenants.
7. It demolished the houses.
8. It proposes to re-build housing on the site, but with a ground gas defence system.

- 22 people were hospitalised – some with serious acute conditions
- 64 families lost their homes
- An Incident Management Team was established involving Midlothian NHS, Local Authority, SEPA and others
- For a period residents had to live with gas alarms in their homes
- The Council demolished the entire estate
- The Council wasted £12M of taxpayers money building the estate
- Additional costs were incurred in significant investigations, demolition, legal fees, expert fees and court time
- Reputational damage / blight / negative press coverage

# Background

Geology, mining, gas risk.

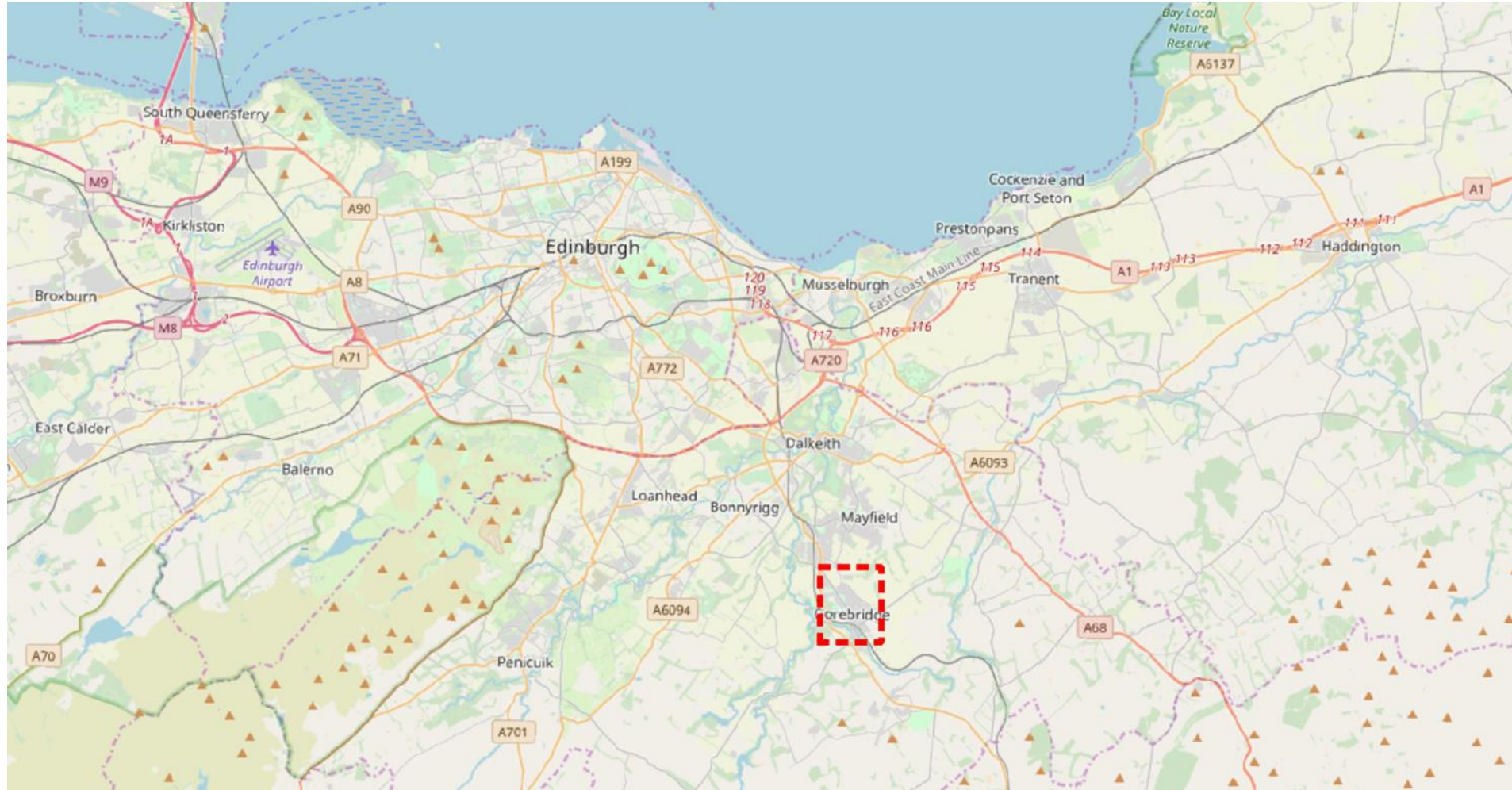


# Midlothian

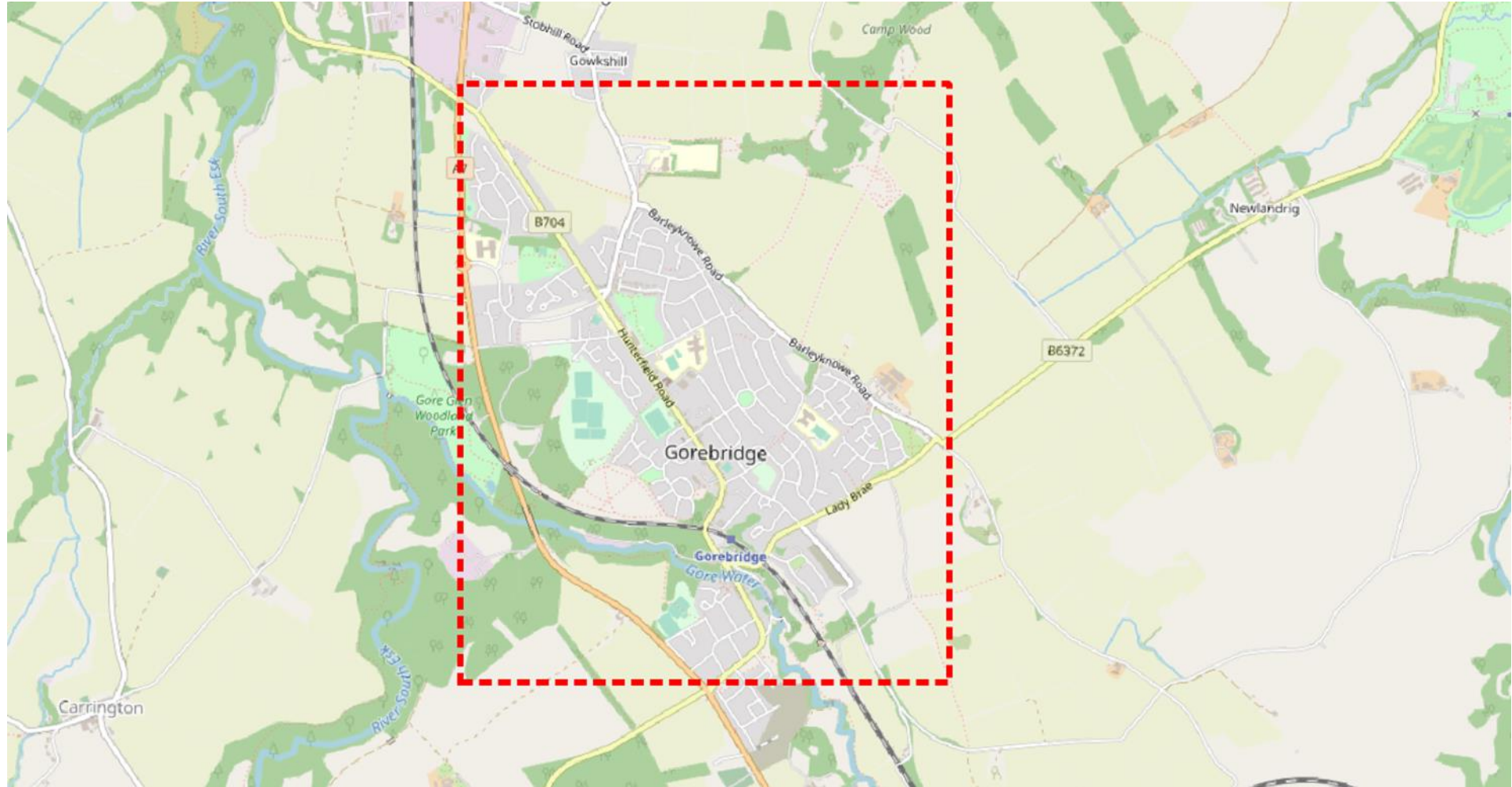




# Gorebridge



# Gorebridge

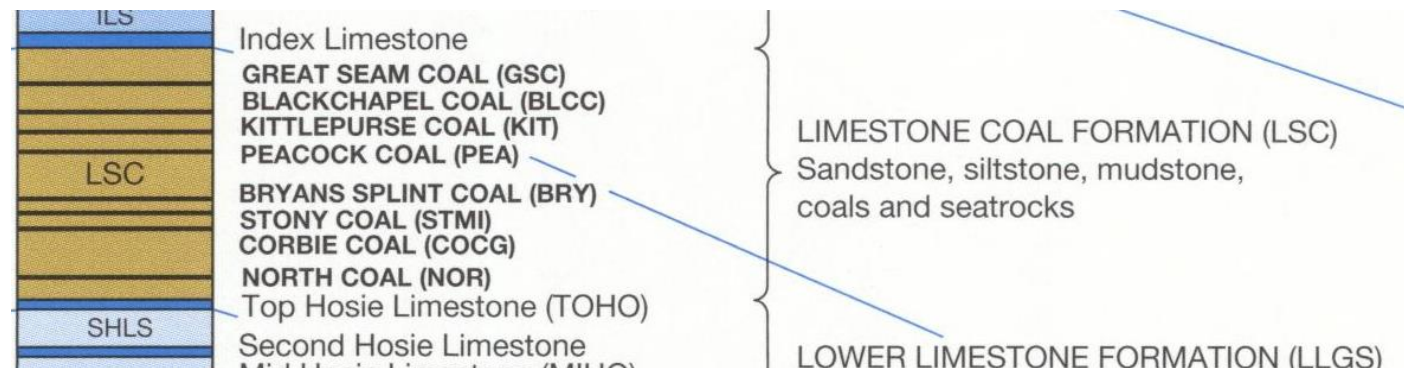
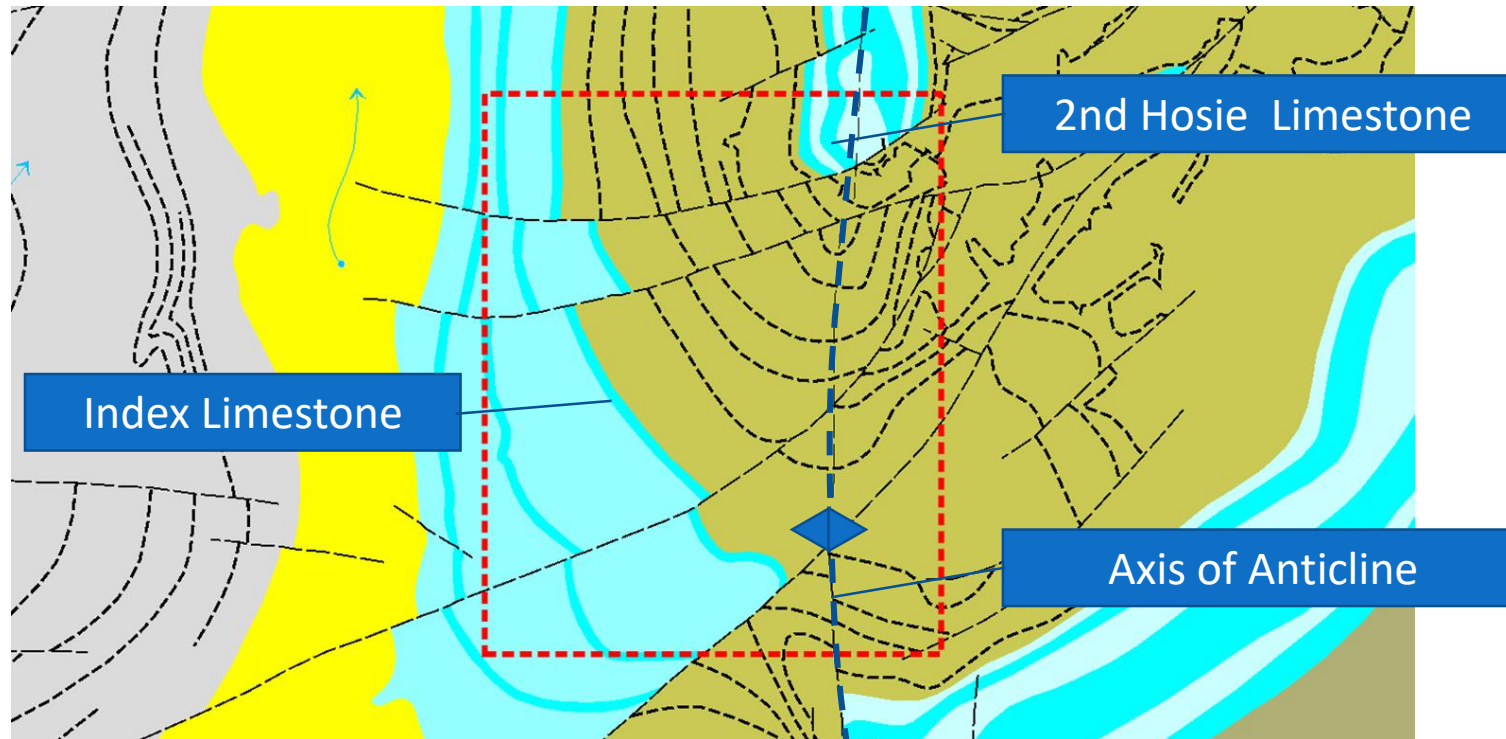




# Aerial Photo Isometric

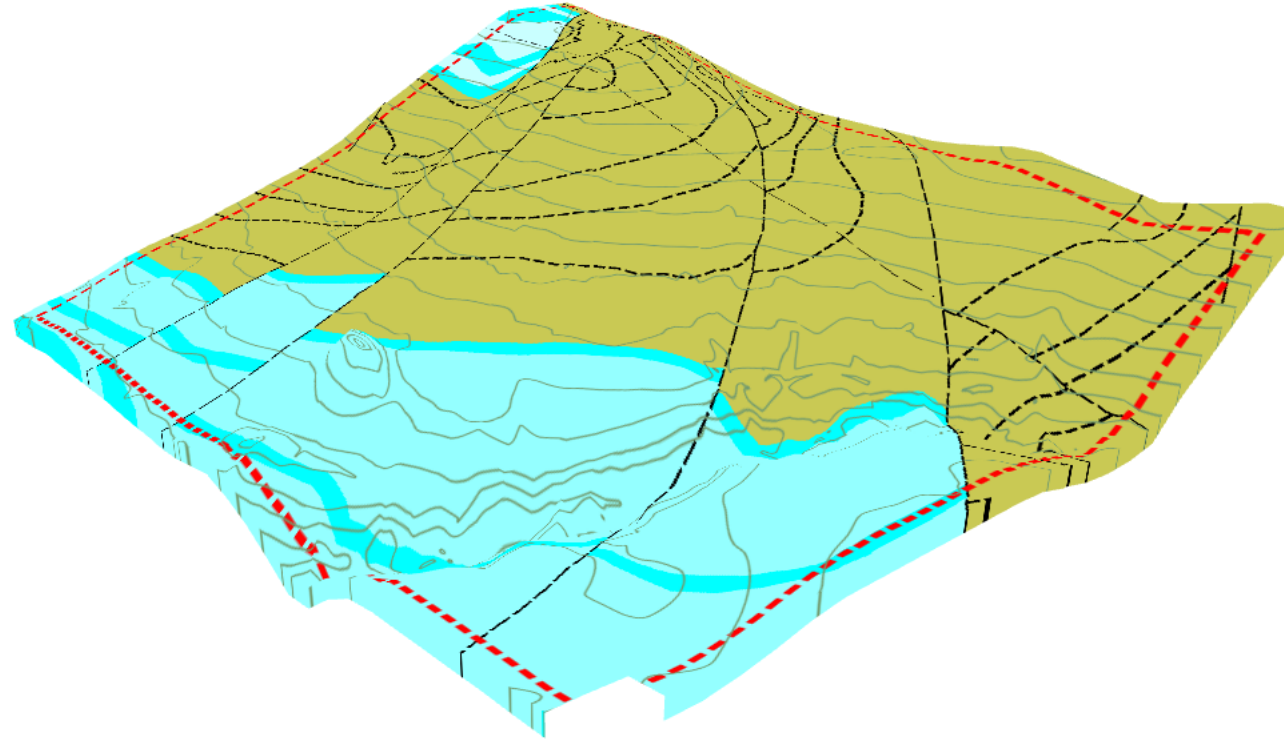


# Solid Geology



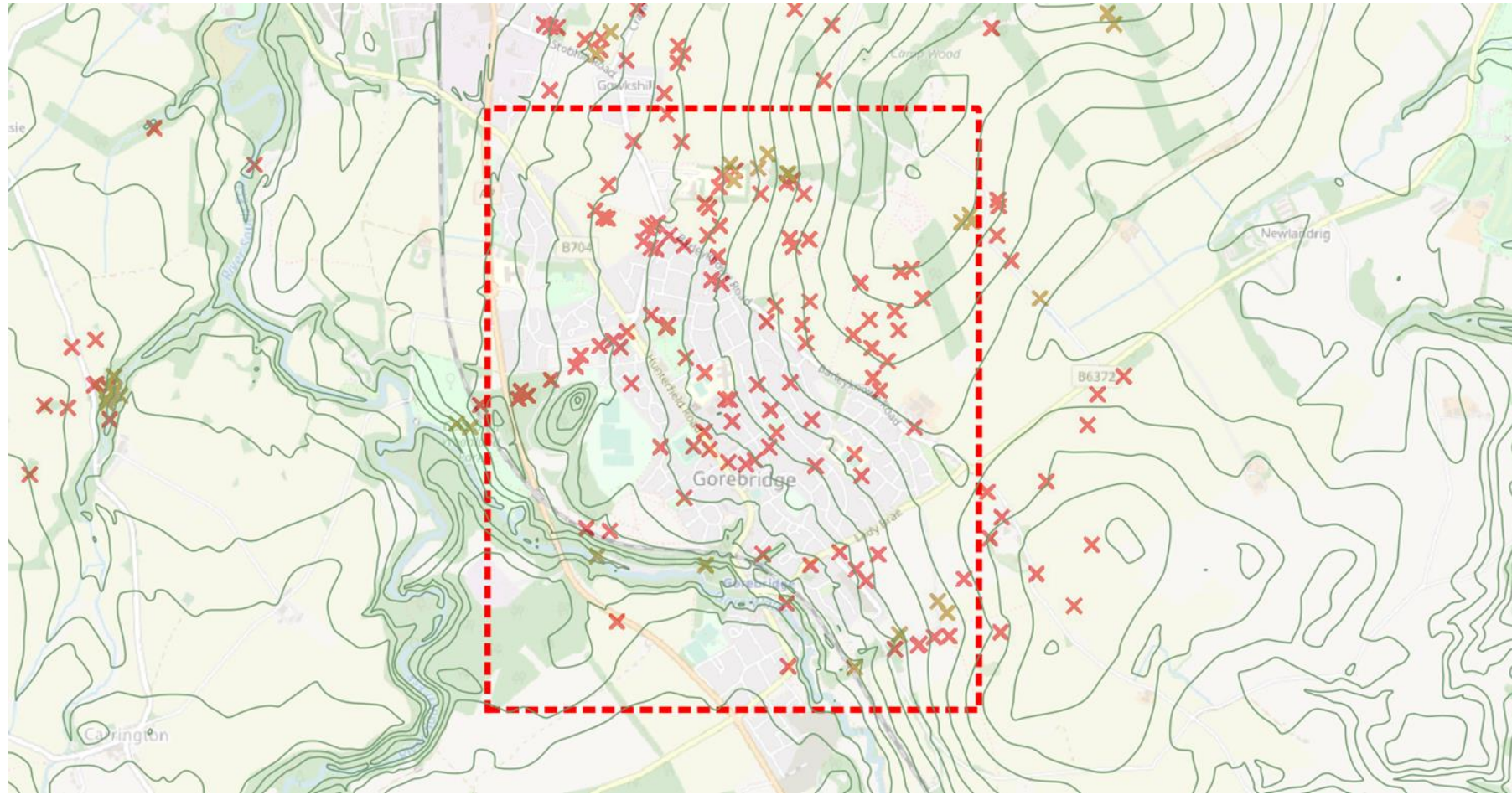
Extract from Sheet 32E Edinburgh. Bedrock

# Solid Isometric

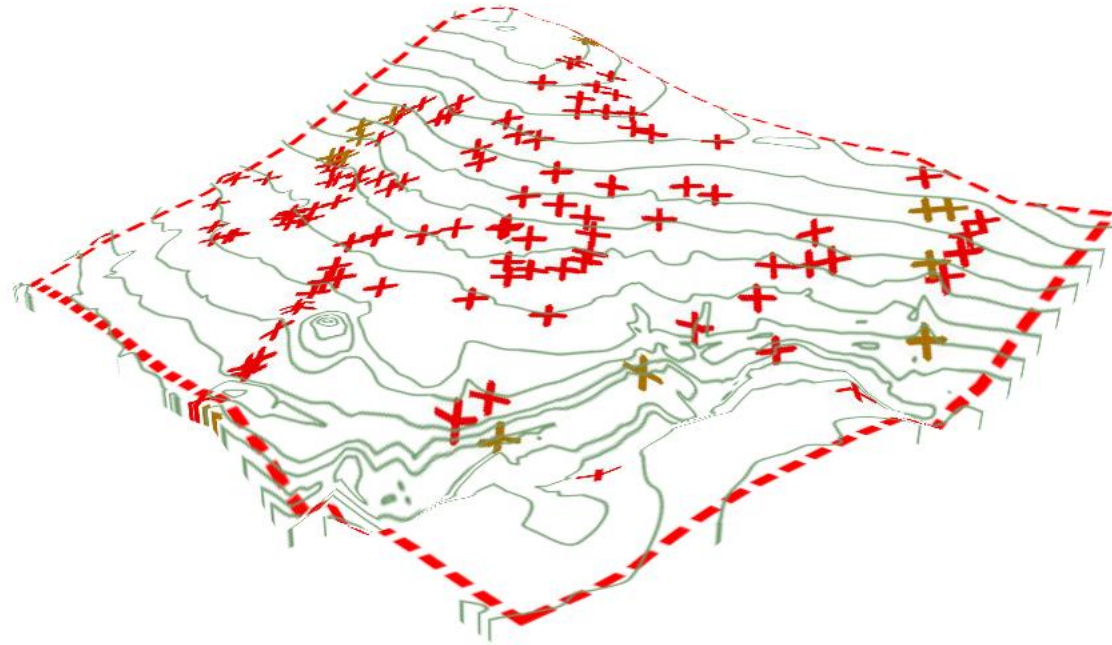




# Mineshafts

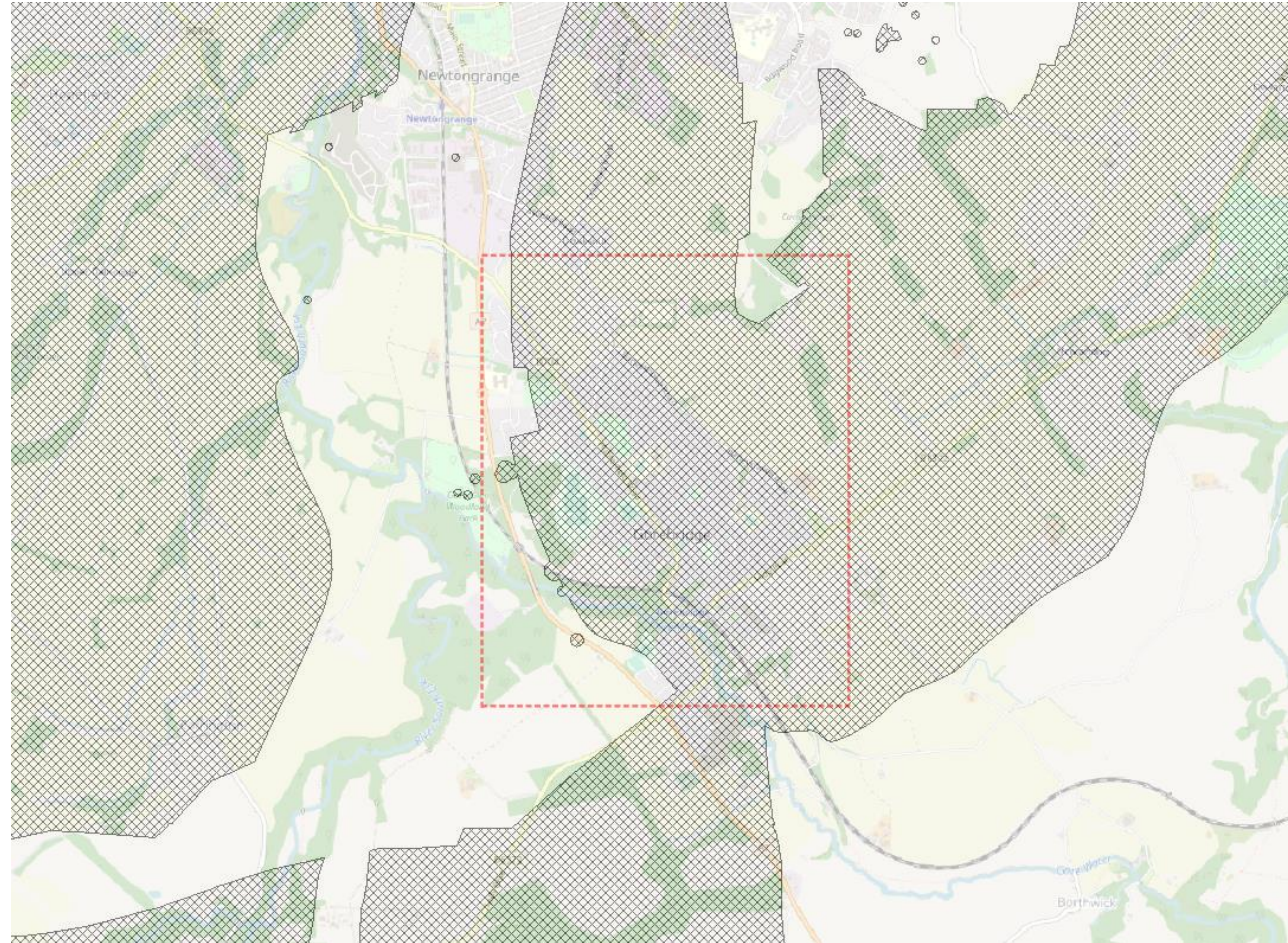


# Mineshafts Isometric



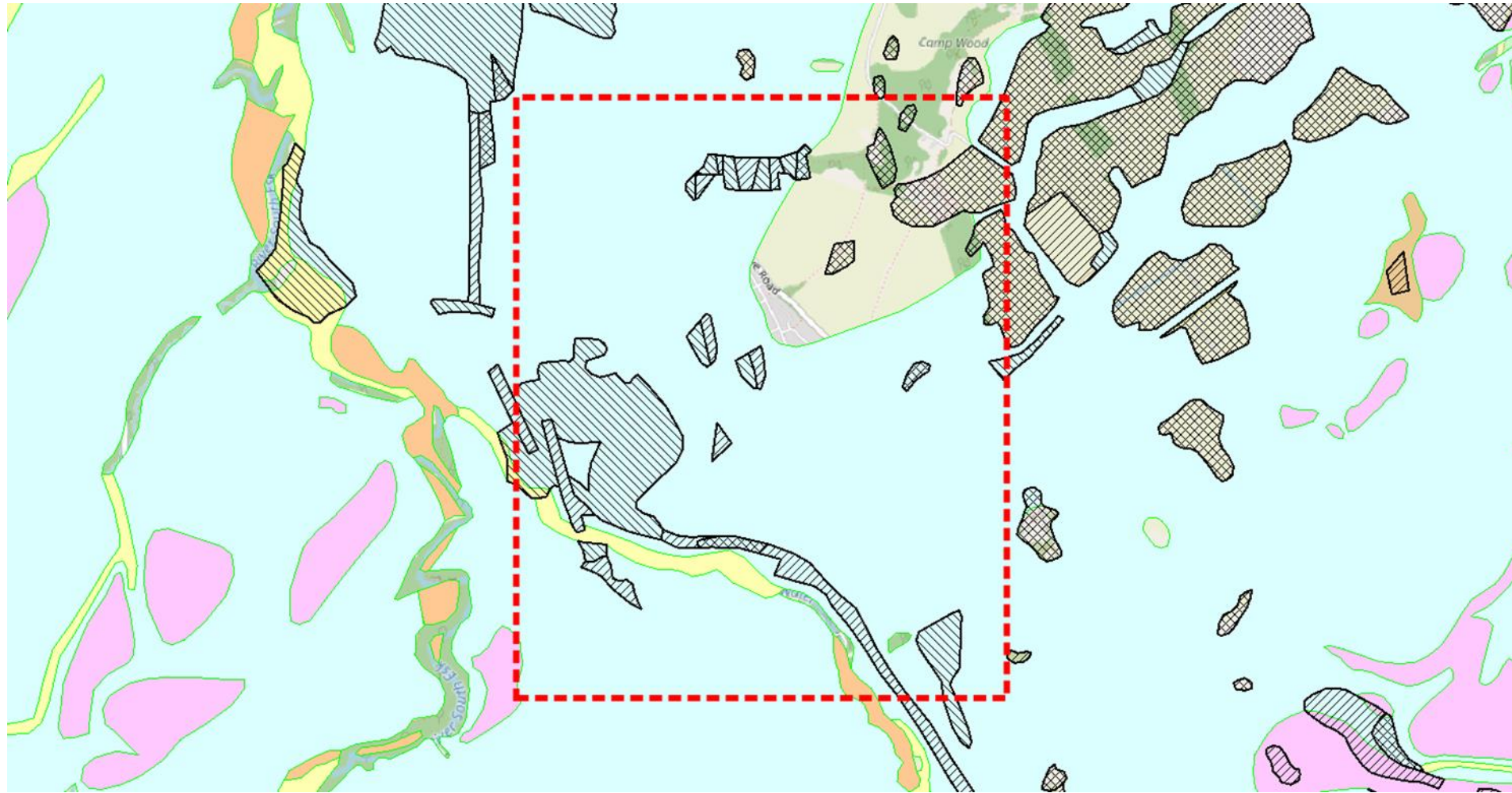


# Mining Development High Risk Area





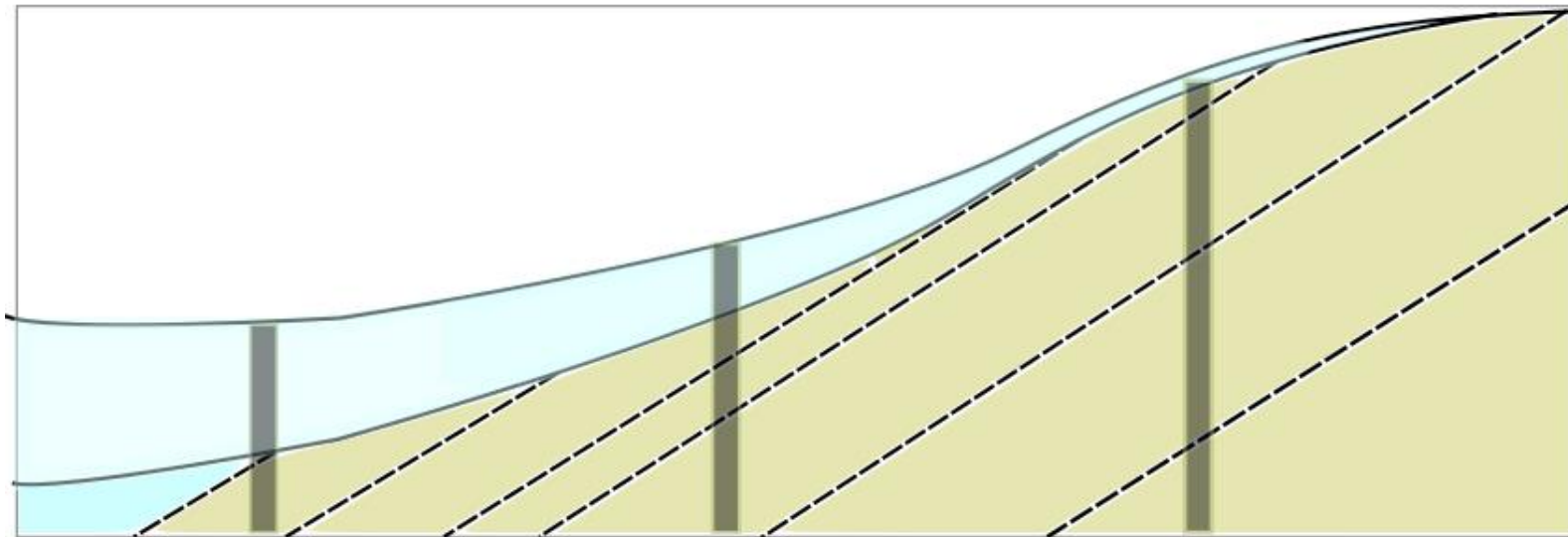
# Drift Geology



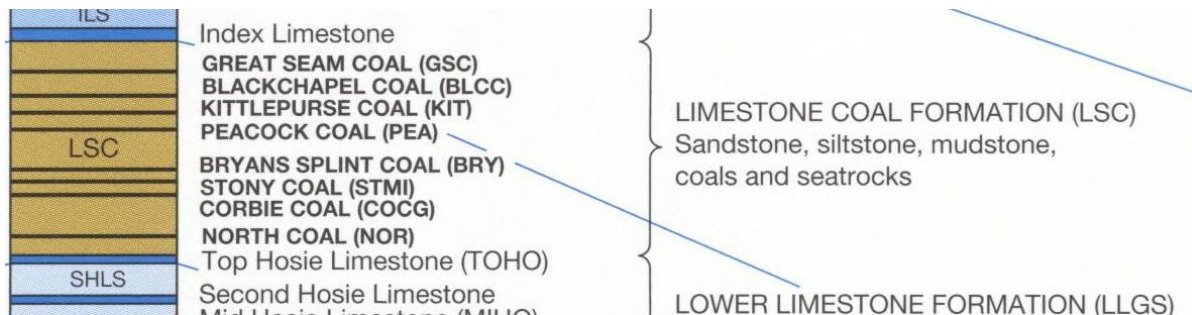
# Generic Sketch Section

SW

NE



Up to 20m Boulder Clay  
 Overlying shallow mineworkings  
 Mineshafts Penetrating Drift  
 into underlying Coal Measures  
 Strata dip ~ 15 – 20 degrees to SW



# Timeline

Date	Event
	Professional Team Appointed
	Site Investigation & Hazardous Gas Risk Assessments Written
2007 – 2009	64 Houses Built (without gas protection)
2009	Approx. 170 Tenants Moved In to the estate
2009 – 2013	Houses Occupied by Tenants for 4 years without any complaints.
Sept 2013	First complaint of Ill Health associated with v high concentrations of CO2
2013 – 2014	IMT Established and Detailed Internal Monitoring Carried Out
Sept 2013– Sept 2014	22 Further complaints of ill health.
2014 – 2015	All properties gradually decanted
March 2016	All properties on the estate demolished



# Google Streetmap 2010



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## Plan to demolish Gorebridge homes after carbon dioxide gas leak

🕒 12 June 2014     Share



Officials are recommending all 64 homes on Gorebridge's Newbyres Crescent estate are flattened before a special gas membrane is installed at the site

Houses built on a former Midlothian coal mine are set to be demolished after carbon dioxide was discovered seeping into the properties.

### Top Stories

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Addressing his party conference in Manchester, the PM says his offer to the EU offers compromise on both sides.  
🕒 17 minutes ago

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🕒 30 September 2019

**Royal tour ends as paper vows to fight Meghan case**  
🕒 1 hour ago

### Features



Some children drinking alcohol 'every day'





## **Midlothian** **ADVERTISER**

**Midlothian Council's anger at Gorebridge  
'Gas Street' time bar decision**





## Prevalence of CO2 from disused mineral mines and the implications for residential buildings: research

Published: 5 Sep 2019

Directorate: [Local Government and Communities Directorate](#)Part of: [Building, planning and design](#), [Environment and climate change](#), [Health and social care](#)

ISBN: 9781839601309

In 2017 the NHS Lothian Incident Management Team investigated reported cases of ill health affecting residents of a recently built local authority housing estate. This research is looking for similar incidents and considers implications for building standards.

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198 page PDF

4.3 MB

ACCESSIBILITY: This document may not be fully accessible.

### Contents

[1 Executive Summary](#)[2 Glossary](#)[3 Introduction](#)

#### 1 Executive Summary

During April 2014, a number of cases of ill health were reported to be affecting some residents in the former mining area of Gorebridge, Midlothian. An Incident Management Team (IMT) was set up by NHS Lothian and a report compiled which produced wide ranging recommendations, some of which related to the

# What is Common Practice?

- Common practice is the standard by which breach of contract is judged.
- It's a reasonably low bar to jump.
- Operating below the standard of common practice risks breach of contract.
- How do we know what common practice is?

# Sources of CO<sub>2</sub> in the Home

- *CO<sub>2</sub> flow from 4 burner gas hob = 0.1766 l/s (630 l/h)*
- *Compared to active gassing landfill*

*Extract from CIRIA Report 151 - Interpreting measurements of gas in the ground*

*1995 C R Harries, P J Witherington and J M McEntee*

## Box 3.4 Generation of carbon dioxide in a dwelling by gas combustion in a cooking hob

If the hob is rated at a combined heat output of 7.5 kW for the four burners combined, this means that it will consume a volume of gas with an energy value of 7500 Joules per second. At a calorific value of 38.7 MJ/m<sup>3</sup> for mains gas this equates to a gas volume of 0.1937 litres gas/second. Assuming the gas to be 100% methane which burns completely to CO<sub>2</sub> and water according to the stoichiometry



then, as each mole of carbon dioxide occupies 22.264 litres at STP, 0.1766 litres CO<sub>2</sub> will be produced per second.

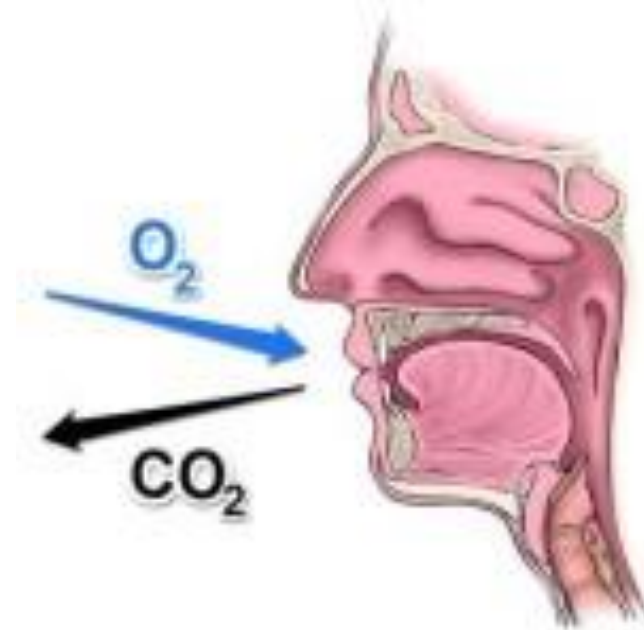
If the kitchen has a floor area of 30 m<sup>2</sup> then this equates to a carbon dioxide ingress into the room of approximately 0.6 m<sup>3</sup>/hr or on a unit area of floor basis, 0.021 m<sup>3</sup> CO<sub>2</sub>/m<sup>2</sup>.hr. or 186 m<sup>3</sup> CO<sub>2</sub>/m<sup>2</sup>.yr. This value would of course be proportionately smaller if the gas generated was averaged over the whole house floor area rather than just the kitchen. However, even at 25% of the rate calculated above it is a substantial CO<sub>2</sub> volume liberated into the house.

This rate of gas 'ingress' into the dwelling is comparable to the CO<sub>2</sub> output of an actively gassing landfill. For example a landfill 20 metres deep producing landfill gas (50% CO<sub>2</sub>) at a rate of 20 m<sup>3</sup>/tonne.yr would be producing a similar amount of CO<sub>2</sub> on a unit area basis. The difference between the hob and the landfill is that the landfill gas will be produced, perhaps with some fluctuation, 24 hrs per day and 365 days per year whereas the gas hob will have only short periods of use of perhaps an hour or two at most per day and will rarely run at maximum output. The gas hob liberates all its CO<sub>2</sub> directly into a main room of the dwelling, whereas the landfill gas has to find a way in. However, the landfill gas might emerge into a confined space thus increasing the risk of build up of hazardous concentrations.



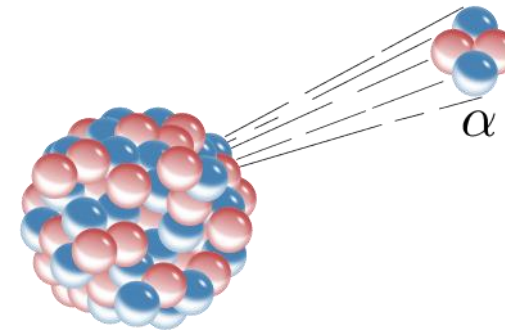
# Sources of CO<sub>2</sub> in the Home

- Breathing
- 20 breaths per minute
- 500ml volume
- 4% CO<sub>2</sub> by volume
- 0.4 l/min ( 24 l/hour/adult)
- Say 4 residents in property  
~ 100 l/h



# Radiocarbon Dating CO2

- Radiocarbon age of Atmospheric CO2 = 0 years bp
- Radiocarbon age of CO2 Mines Gas = 50,000 years before present
- Radiocarbon age of CO2 from cooking hob = 50,000 years bp



# Lessons Learnt

conceptual model keep under review, csm has to see the future. Keep responsibility in the most appropriate place.



# Design Responsibility

- Keep design responsibility in the most appropriate place.
- Don't mess with industry standard contracts and specs.
- Really important that the people overseeing the design and construction work are sufficiently competent on ground gas risk assessments.

## Prime Minister's advice to Queen to prorogue Parliament 'not unlawful', judge rules

A legal challenge by a cross-party group of parliamentarians against the proposed suspension of the UK Parliament ahead of "Brexit day" has been dismissed.

 Court of Session Outer House  4 September 2019



## Judge rejects legal bid for interim suspension of decision to prorogue Parliament

A legal challenge brought by a cross-party group of parliamentarians to temporarily halt the effect of Prime Minister Boris Johnson's advice to Her Majesty the Queen to shut down the UK Parliament ahead of "Brexit day" has been rejected.

 Court of Session Outer House  30 August 2019



## Council's £12m damages claim against engineers over botched social housing development dismissed

A Scottish local authority which sued engineering contractors over a failed social housing development that had to be demolished for health and safety reasons has had its £12 million damages claim dismissed.

 Court of Session Outer House  21 March 2019



## Decision

...it follows that the pursuer was aware of having suffered loss, injury or damage more than five years before the action was raised on 4 September 2018; and that, accordingly, the obligation of the defender to make reparation has been extinguished by the short negative prescription. That is sufficient to decide the case...

Thanks for listening 😊

Any Questions?



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