Groundsure LOCATION INTELLIGENCE

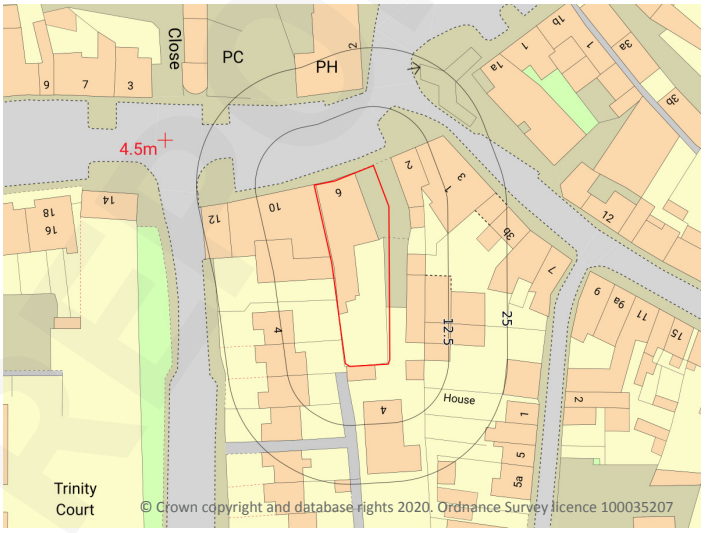
GeoRisk

Specimen Address, Specimen Town

Professional opinion

PASS

Site plan



Search results

Non-coal mining
Pass

Historical features
Identified page 3

Geological features
Not identified

Oil and gas extraction
Information page 3

Satellite monitoring
Not identified

Natural instability
Not identified

Infilled land
Not identified

Sinkholes
Not identified

Coal mining alert
Not identified

Cheshire brine alert
Not identified

Overview of findings and recommendations

This product is intended for use by professional advisers who are experienced and skilled in the use and interpretation of environmental data and/or risk assessment opinions.

To save you time when assessing the report, we only provide maps and data tables of features we have identified to be of note. These relate to mining and ground risks that may have liability implications, affect insurance premiums, property values and/or a lender's willingness to lend.

You can view a full list of the information we have searched on **page 11**.

Non-coal mining assessment

We consider the property to be acceptably free from non-coal mining related settlement or subsidence risk.

Non-coal mining

The site lies outside areas potentially impacted by non-coal mining related settlement or subsidence risk. These areas have been defined by detailed analysis of available data by Groundsure and Mining Searches UK.

If any specific features have been identified within the Mining records, Historical features or Geological features sections of this report it should be noted that they are sufficiently removed from the property and are themselves considered to pose no risk.

No further action is required.

Other considerations

Other ground subsidence hazards have been identified at the site. Please refer to the findings and recommendations below for further details.

Energy

Oil and gas

A record of a well used for oil and gas extraction, exploration, or development has been identified in the locality of the property, although not in close proximity. The presence of a well does not necessarily mean that any active exploration or producing is occurring. We recommend checking the data within the report to see if the well has a 'completed by' date within the data as this would indicate that no further activity is taking place at the site. You may wish to visit the website of any identified operator for further information.

Non-coal mining summary

Mining records

No records relating to recorded mining areas or activity have been identified in the vicinity of the site.

Mining features	Not identified
Mine plans	Not identified
Researched mining	Not identified
BritPits	Not identified
Mineral Planning Areas	Not identified
Non-coal mining areas	Not identified
Mining cavities	Not identified
Coal mining areas	Not identified
Brine areas	Not identified
Gypsum areas	Not identified
Tin mining areas	Not identified

Historical features

Historical mapping has identified mining features in the vicinity of the site.

See **page 5** for details. The Non-coal mining assessment on **page 2** will cover any next steps relating to these features, if applicable.

Non-coal mining	Identified
Coal and associated mining	Not identified
Industry associated with mining	Not identified

Geological features

No geological features indicative of mining activity or other sources of ground instability have been identified in the vicinity of the site.

Artificial and made ground	Not identified
Mineral veins	Not identified

Oil and gas extraction

Historical, active or planned wells or extraction areas have been identified near the property.

See **page 6** for details and **page 2** for recommended next steps.

Oil and gas areas	Not identified
Oil and gas wells	Information

Subsidence summary

Satellite monitoring

Satellite radar measurements have not detected any notable ground movement in the vicinity of the property.

Property	Green
Surrounds	Green
Local area	Green
Gradient	Green
Acceleration	Green
Range	Green

SatSense Rating Green

Ratings provided by SatSense Ltd, experts in analysis of InSAR ground movement data from satellite radar.

Natural instability

Searches of natural ground stability data have not identified any potential ground stability risks.

Shrink-swell hazard	Non-Plastic
Natural ground subsidence	Not identified
Landslides	Not identified
Natural cavities	Not identified
Coastal erosion	Not identified

Infilled land

No recorded areas of infilled land or landfill have been identified in the vicinity of the site.

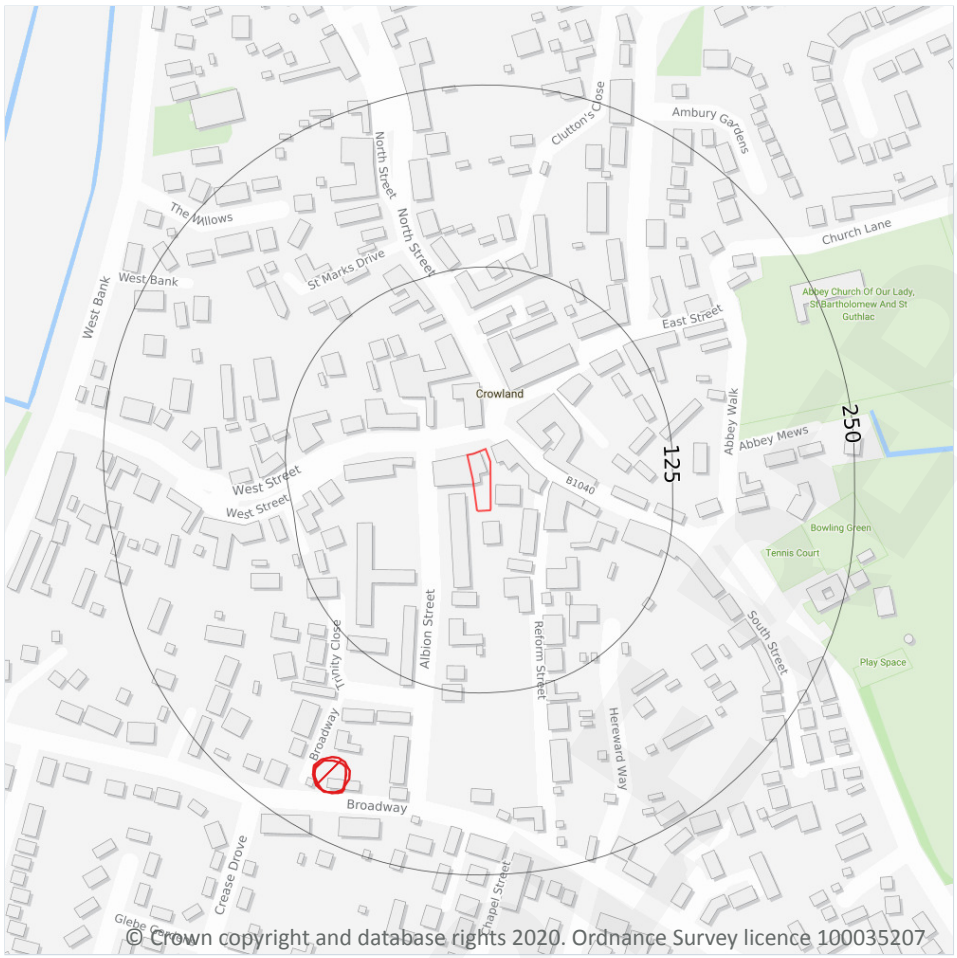
Infilled land	Not identified
Historical landfill sites	Not identified

Sinkholes

No records of sinkholes have been identified in the vicinity of the property.

Reported recent incidents	Not identified
Recorded incidents (BGS)	Not identified
Recorded incidents (PBA)	Not identified
Historical incidents	Not identified

Historical features



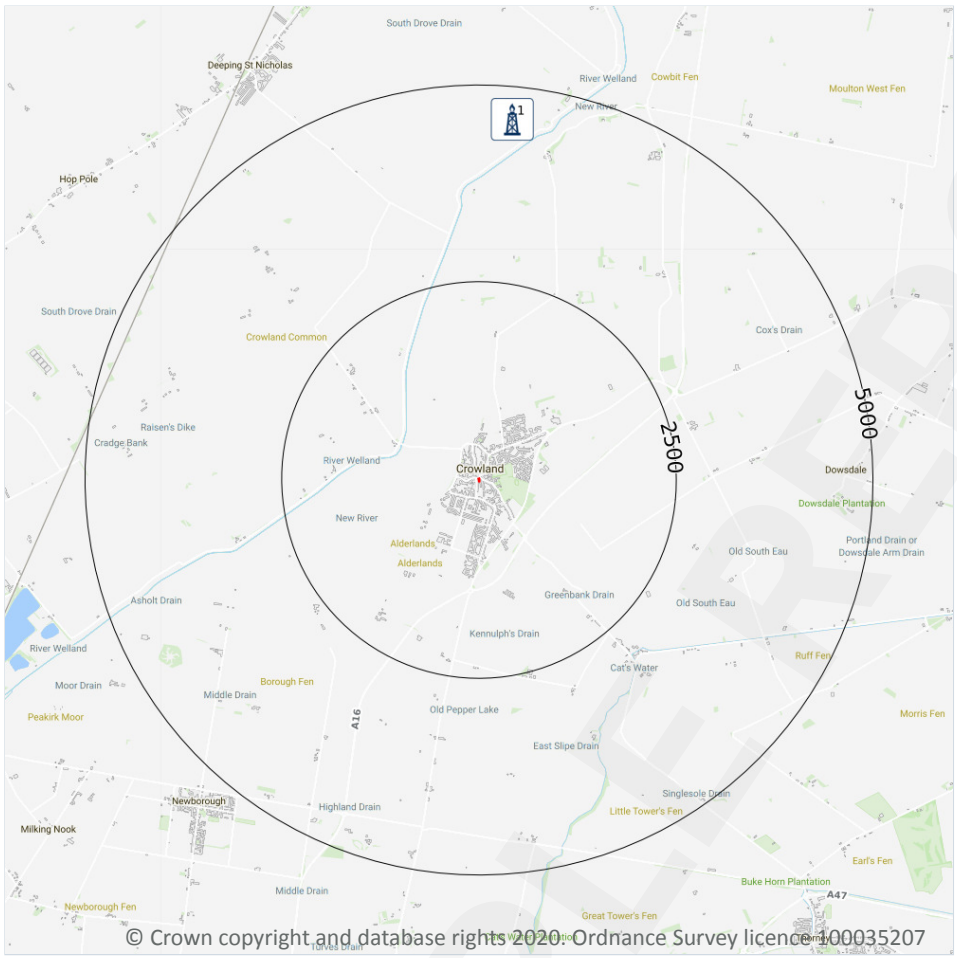
Non-coal mining

Historical land uses identified from Ordnance Survey mapping that involved mining for substances other then coal.

Location	Land use	Date
195m SW	Unspecified Heap	1950
195m SW	Unspecified Heap	1950
197m SW	Unspecified Heap	1906
197m SW	Unspecified Heap	1903

This data is sourced from Groundsure.

Oil and gas extraction



Site Outline

Search buffers in metres (m)

Oil or gas drilling well

Proposed oil or gas drilling well

Licensed blocks

Potential future exploration areas

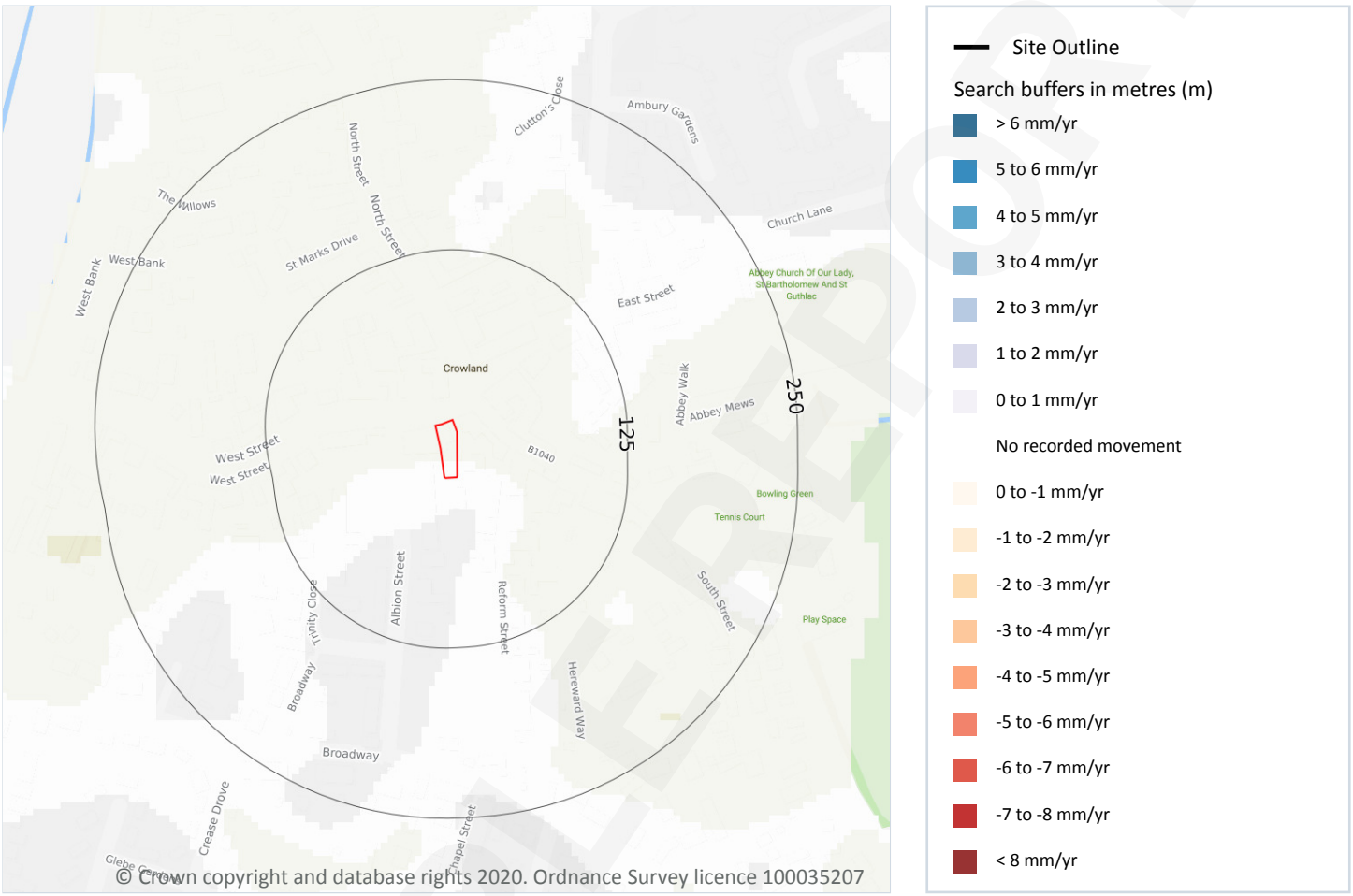
Oil or gas drilling well

The database of oil and gas wells shows all existing and historic licensed oil, gas, shale gas, and coalbed methane extraction sites. These wells may have been licensed in any one of the 14 licensing rounds since 1910.

ID	Distance	Direction	Details	
1	4-5 km	N	Site Name: SPALDING 1 Operator: TEXACO Type: Conventional Oil and Gas Intent: Exploration	OGA References: LO/10- 1 Licence Number: PL104 Date of first drilling: 25/02/1971 Date of well completion: 07/03/1971 Licence Expiry: 07/03/1976

This data is sourced from the Oil and Gas Authority (OGA).

Satellite monitoring



Satellite monitoring
Satellite radar data captured and analysed to measure real-world ground movement, accurate to the millimetre.

The map above shows the general rate of movement in the area since 2015 indicating broad ground movement trends. However, an identified risk will not always be visible on the map.

Potential risk to property is summarised with a simple traffic light system in the table below across six assessments relating to different types and scales of ground movement.

Further information on this assessment can be found in the Notes and guidance section within this report.

- **Property** looks at the relative movement of ground within the property boundary when compared to movement of the immediate surroundings (100m around the property)
- **Surrounds** looks at the relative movement of the immediate surroundings (100m) when compared to movement of the local area (1km around the property)

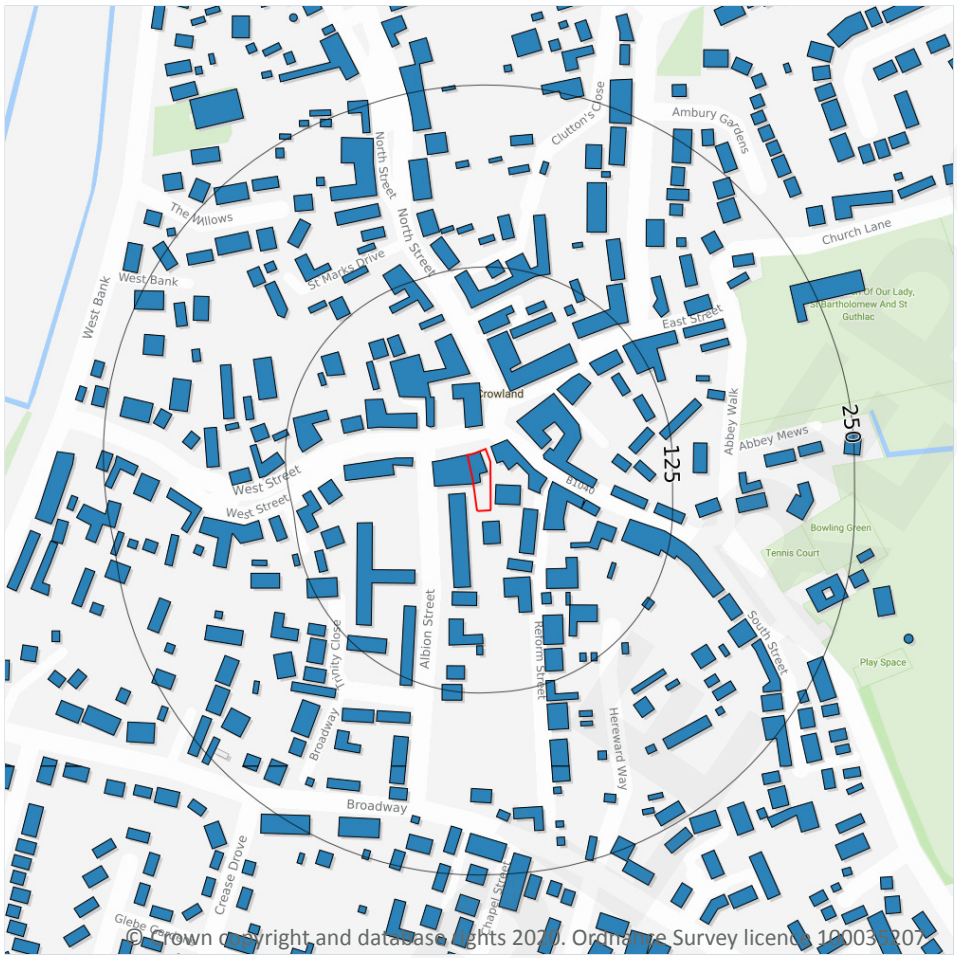
- **Local Area** looks at the absolute recorded movement in the local area (1km)
- **Gradient** looks at differences in movement over medium spatial scales (surrounds) and identifies risk due to active bending or warping
- **Acceleration** looks at the recent changes in movements, providing information about whether ground movements are stabilising or accelerating
- **Range** looks at a moving window over the time series to identify the maximum range of non-linear displacement seen.

Green rating - the property is stable and unlikely to be at risk.
Amber the property may be at risk of damage, either now or in the future.
Red the property is likely to be at significant risk of damage, either now or in the future.
Not Assessed - measurements available are insufficient for a viable assessment.

Scale	Rating	Value	Units	Assessment
Property	**Green**	0.96	mm/yr	Measurements suggest that the site itself is stable with respect to its immediate surroundings.
Surrounds	**Green**	0.11	mm/yr	The immediate vicinity of the site is reasonably stable.
Local area	**Green**	0.13	mm/yr	No significant regional movements have been detected in the area around the site.
Gradient	**Green**	0.0052	mm/yr	The site does not seem to be at risk of damage from the bending of the ground associated with ground movement in the vicinity of the site.
Acceleration	**Green**	3.48	mm/yr	Recent measurements suggest that local ground movements have not significantly sped up or slowed down over the past year.
Range	**Green**	8.26	mm	The site does not show any significant seasonal or one-off movement over the course of a year.

This data is sourced from SatSense Ltd.

Property shrink-swell assessment



Property shrink-swell assessment

This dataset provides information on the susceptibility to shrink-swell subsidence given underlying geological properties, proximity of trees (using Bluesky National Tree Map), and the characteristics of local buildings (type, age, height, and drainage). These multiple inputs contribute to an overall hazard score for shrink-swell subsidence susceptibility; either 'Low', 'Medium', 'High' or 'Very high' ('Non-Plastic' for areas with this kind of underlying geology). The score for each input is also presented (on a scale 1-10, where 10 is a high susceptibility factor) to provide context of the contributing factors. Please note that building characteristics are taken from Office for National Statistics Lower Super Output Area data, and as such are generalised to give the most likely characteristics for the property. Any assigned rating should not be relied upon if the property is a new build.

Location	Susceptibility	Input factors
on site	Hazard score: Non-Plastic Description: The underlying geology is non-plastic, therefore cannot undergo any change in volume and subsequently cannot have shrink–swell related subsidence	Tree proximity: 2 Underlying geology: 1 Local building age: 7 Local drainage: 10 Local building height: 10 Local building type: 6

This data is sourced from the British Geological Survey.

Datasets searched

This is a full list of the data searched in this report. If we have found results of note we will state "Identified". If no results of note are found, we will state "Not identified". Our intelligent filtering will hide "Not identified" sections to speed up your workflow. Please note: if a GeoRisk + report, the CON29M and Cheshire Salt Search content is not covered in the below.

Mining Features	
Mine entries	Not identified
Mineralised veins	Not identified
Surface workings	Not identified
Surface features	Not identified
Underground mine workings	Not identified
Reported subsidence	Not identified
Mine waste tips	Not identified
Secured features	Not identified
Licence boundaries	Not identified
Researched mining	Not identified
Mining Record Office plans	Not identified
BGS mine plans	Not identified

Mining Records	
BritPits	Not identified
Mineral Planning Areas	Not identified
Non-coal mining areas	Not identified
Mining cavities	Not identified
Coal mining areas	Not identified
Brine areas	Not identified
Gypsum areas	Not identified
Tin mining areas	Not identified

Historical Features	
Non-coal mining	**Identified**
Coal and associated mining	Not identified
Industry associated with mining	Not identified

Geological Features	
Artificial and made ground (10k)	Not identified
Linear features - mineral veins (10k)	Not identified
Artificial and made ground (50k)	Not identified
Linear features - mineral veins (50k)	Not identified

Oil and gas extraction	
Oil or gas drilling well	**Identified**
Proposed oil or gas drilling well	Not identified
Licensed blocks	Not identified
Potential future exploration areas	Not identified

Satellite monitoring	
Satellite monitoring	**Identified**

Natural instability	
Property shrink-swell assessment	**Identified**
Shrink-swell clays	Not identified
Landslides	Not identified
National landslide database	Not identified
Running sands	Not identified

Natural instability	
Compressible deposits	Not identified
Collapsible deposits	Not identified
Dissolution of soluble rocks	Not identified
Natural cavities	Not identified

Coastal Erosion	
Projections with intervention measures in place	Not identified
Projections with no active intervention	Not identified

Infilled land	
Infilling from historical mapping	Not identified
Active landfill sites	Not identified
Historical landfill (from Environment Agency records)	Not identified
Historical landfill (from Local Authority and historical mapping records)	Not identified

Sinkholes	
Reported recent incidents	Not identified
Recorded incidents (BGS)	Not identified
Recorded incidents (PBA)	Not identified
Historical incidents	Not identified

Notes and guidance

Non-coal mining assessment

This mining search has been compiled from the archive information held by Groundsure and Mining Searches UK. As with all historic mining records, there is no guarantee or assurance of reliability or accuracy of these records. Not all mining activities were recorded or are publically available. Neither Groundsure nor Mining Searches UK can be held responsible for any omissions or errors in the information upon which our interpretation has been based.

Historical mining records vary in document age, reliability, reproduction, quality of the original record, the reason to produce the original document, the skill of the original surveyor and the accuracy of the available surveying equipment at the time of production. It must be accepted that the information is subject to interpretation. Alternative interpretations may be possible.

In any area, sporadic, un-surveyed and ancient mine workings can exist, and unrecorded mine workings or mineralised veins can never be ruled out. Groundsure or Mining Searches UK cannot be held responsible for any settlement or subsidence associated with unrecorded mining features, or from mining plans that are not publically available.

If the property or site is subject to future development we recommend that the ownership of the minerals below the site's surface is established. This detail may be sought from a legal adviser or via the Land Registry. You can then assess whether there is a possibility of any proposed development disturbing or trespassing upon any minerals in third party ownership at the site.

In addition, a mining site investigation may be required to satisfy planning or building regulation conditions. Contact Groundsure for further advice.

Coal Authority data

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Satellite monitoring

SatSense produces countrywide ground movement products based on satellite radar data. For property movement products in the UK we use data from the ESA Sentinel-1 satellite constellation, which has a resolution of 4 by 14 metres. This means that the smallest objects we can detect are the size of a large shed, and we often get multiple measurement points over individual houses. We receive a new radar image every six days, and data collection started in 2015 (although initially, acquisition frequency was lower). This means we have 250+ measurements in time everywhere in the UK. By analysing this long time history using a technique known as InSAR, we can detect long-term movements as low as 1 mm/yr, which is far below movement levels expected to cause property damage.

What is InSAR?

Interferometric Synthetic Aperture Radar (InSAR) is a processing technique that uses the difference between radar images to detect ground movements with high precision. Two (or more) radar images are overlaid such that they match exactly, and the radar measurements for every matching pixel in the images are differenced.

The phase information from this difference is then used to extract ground movement for every pixel. SatSense processes all available data over the United Kingdom.

Why can't we measure everywhere?

A limitation of InSAR is that it relies on consistent radar returns from the reflecting surface (buildings, fields, woodland). While some types of surfaces, like buildings, bridges and bare ground are naturally very consistent, ground cover like dense vegetation and fast-growing crops inherently can vary rapidly over time and therefore interfere with the radar measurement. During our processing, we detect which points provide usable measurements, and which points have had too much interference. This means coverage is variable; dense in urban areas, but much more sparse in rural areas.

Why do we need risk indices?

The SatSense ground movement product measures a wide range of ground movements, from long-term, large regional signals to event level movement of individual points. Not all movements have the same damage potential for buildings. Compare an entire town that is subsiding due to groundwater variations to a single building subsiding due to local instability. Buildings in the subsiding town are all moving at very similar rates, meaning there is little to no relative movement between them. This makes the potential for damage much lower than the individual building moving with respect to its neighbours.

To differentiate between different types of movements, we've developed a way to extract different types of movements that are potentially damaging to property. This information is captured by the SatSense risk indices. These risk indices are described below:

- Property - This shows any long-term differential movement of the property with respect to its immediate surroundings, in other words, very localised movements. Examples of processes that could flag up this risk index would be trees affecting the nearby water table, local ground instability and small scale nearby building work.
- Surrounds – Focuses on slightly larger scale movements, how is the street or estate moving with respect to the wider area. Examples of processes that could flag up this risk index are tunnelling, large scale nearby building work and groundwater extraction.
- Local Area - Our widest scale index, showing how a town/neighbourhood as a whole is moving. This index is normally flagged up due to the presence of large scale historic mining or large scale groundwater extraction. Due to the wide area and the limited potential for damage likely to be associated with this type of movement, this index will only indicate amber or green, never red.
- Gradient – Looks for bending over medium spatial scales. This index will flag up properties that might not be moving much themselves but are being affected by movements in the vicinity.
- Acceleration - Looks at the recent changes in movements, flagging up properties that might not have historically been moving, but have recently seen an increase. It also provides information on whether properties that have moved historically continue to move, or whether the movement is decreasing.
- Range – Looks at the amplitude of movement over time. This will highlight periodic (seasonal) movements, and event style movements like sinkholes.

National Coastal Erosion Risk Mapping (NCERM)

The National Coastal Erosion Risk Mapping (2018-2021) shows the coastal baseline. This baseline is split to 'frontages'. These are defined as lengths of the coast with consistent characteristics based on the cliff behaviour characteristics and the defence characteristics. It is intended as an up-to-date and reliable benchmark dataset showing erosion extents and rates for three periods:

- Short Term (0 – 20yr);
- Medium Term (20 – 50yr); and
- Long Term (50 – 100yr).

For the 5th, 50th and 95th percentile confidence levels (degrees of certainty, where 95th percentile equates to 95% certainty) for:

- No Active Intervention Policy Scenario; and
- With the implementation of Shoreline Management Plan (SMP) 2 Policies.

Defence type and SMP policies for each of the three periods described above are included.

The data and associated information is intended for guidance - it cannot provide details for individual properties. The NCERM information considers the predominant risk at the coast, although flooding and erosion processes are often linked, and data on the erosion of foreshore features are, in general, not included.

The data describes the upper and lower estimates of erosion risk at a particular location, within which the actual location of the coastline is expected to lie. The data does not estimate the absolute location of the future coastline. Details of geologically complex areas, known as "complex cliffs" are, in general, not included within the dataset due to the inherent uncertainties associated with predicting the timing and extent of erosion at these locations.

This dataset succeeds National Coastal Erosion Risk Mapping (NCERM) - National (2012 - 2017) Attribution statement: © Environment Agency copyright and/or database right

BGS Property Shrink Swell Assessment

This dataset uses OS Open Maps building polygons to derive its assessment. These are often representative of more than one building and so the score assigned is representative of the highest risk found within the connected building units e.g. a pair of semi-detached properties or a terraced row. The baseline mapping used to derive the assessment will be updated at least annually.

The assessment does not cover any man-made hazards and is based on, and limited to the input datasets including OS Open Buildings, Office for National Statistics data, Bluesky Tree Map and BGS GeoSure shrink-swell. An indication of natural ground instability related to shrink–swell does not necessarily mean that a location will definitely be affected by ground movement or subsidence. Such an assessment can only be made by inspection of the area by a qualified professional.

Conveyancing Information Executive and our terms & conditions

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- normally deal with it fully and provide a final response, in writing, within 20 working days of receipt
- liaise, at your request, with anyone acting formally on your behalf

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