

# The Clay Research Group

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## RESEARCH AREAS

Climate Change ♦ Data Analysis ♦ Electrical Resistivity Tomography  
Time Domain Reflectometry ♦ BioSciences ♦ Ground Movement  
Soil Testing Techniques ♦ Telemetry ♦ Numerical Modelling  
Ground Remediation Techniques ♦ Risk Analysis  
Mapping ♦ Software Analysis Tools  
Artificial Intelligence



July 2019  
Edition 170

# The Clay Research Group

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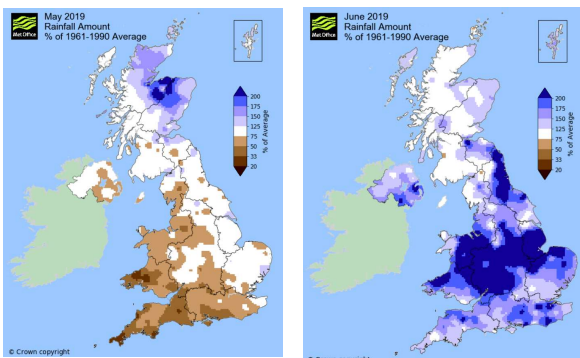
Service Standards – or, when things go wrong

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Subsidence Risk Analysis – Bexley

## Dry April, Wet May

The Met Office anomaly maps compare current weather patterns (temperature, hours of sunshine, rainfall etc) with various 30-year averages.

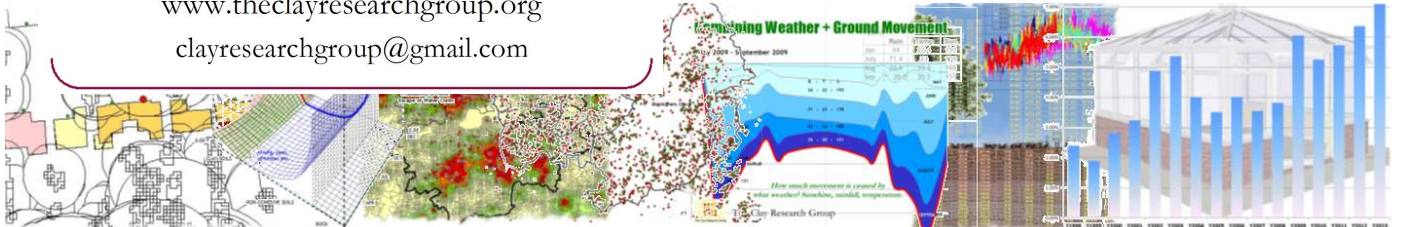


Above left, May 2019 was slightly drier than the 1961 – 1990 average, but rainfall over the last month has reduced the deficit as shown on the June map, above right.

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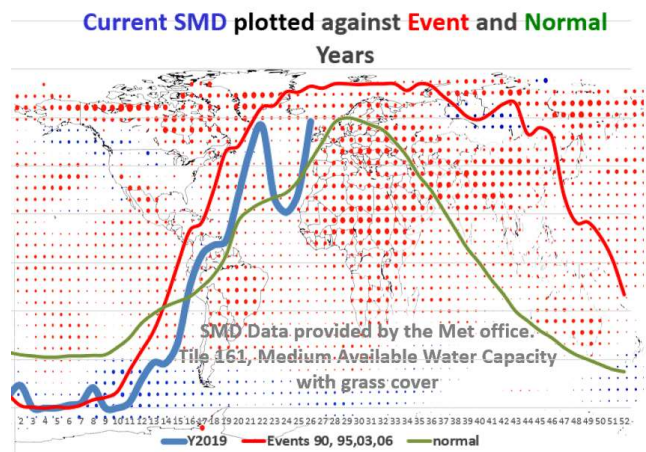
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## 2019 Surge?

The SMD continues to fluctuate by month as can be seen in the graph below. After steady drying up to the end of May, heavy rainfall in June reduced the deficit significantly, reducing the prospect of a surge.



*Soil Moisture Deficit data from tile 161, supplied by the Met Office for grass cover, medium available water capacity soils.*

The Met Office forecast “There is a lot of uncertainty in the forecast through the second half of July, however it is most likely that high pressure will dominate at the start of this period, bringing us a good deal of fine and settled weather, and with any rain most likely to be in the north and northwest.”

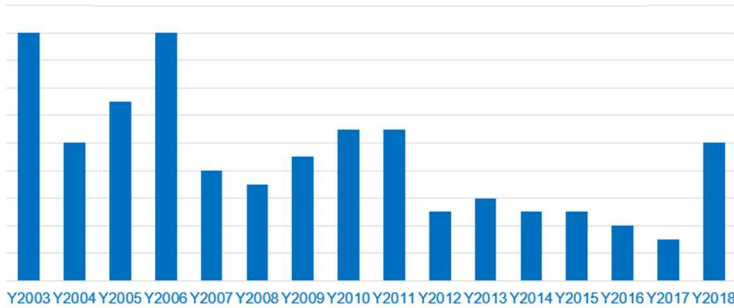
## TDAG Diary Note

A meeting is to be held on Tuesday 16th July 2019 from 3-5pm at the Royal Horticultural Society, 80 Vincent Square, London, SW1P 2PE and includes a topic on ‘Trees, Subsidence, Foundations, Insurance’ delivered by Sue James and colleagues. Download from the CRG web site by selecting ‘Monthly Newsletters’ tab and ‘TDAG Agenda’ from the drop-down list.

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## Third Quarter Claims – 2003-2018

Third Quarter Claims Notified to ABI



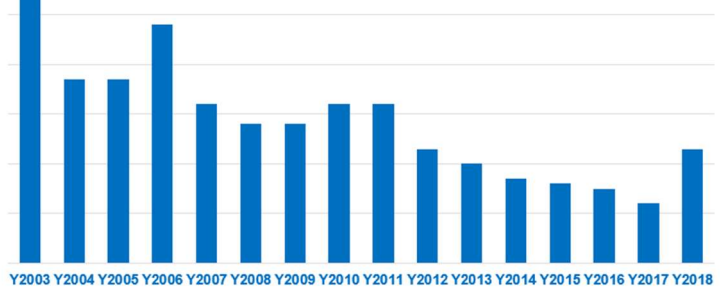
The third quarter of 2018 delivered an unexpected surge in subsidence claim numbers and left, the relative standing by year comparing claims notified in the period July, August and September since 2003.

Although numbers were high in 2018, they didn't match the third quarter figures for the recognised surge years of 2003 and 2006.

Total claims per annum (right) follows a similar pattern to the third quarter claims, above.

This comes as no surprise given that the dominant cause of subsidence is root induced clay shrinkage.

Total Claims Notified for Year (ABI)



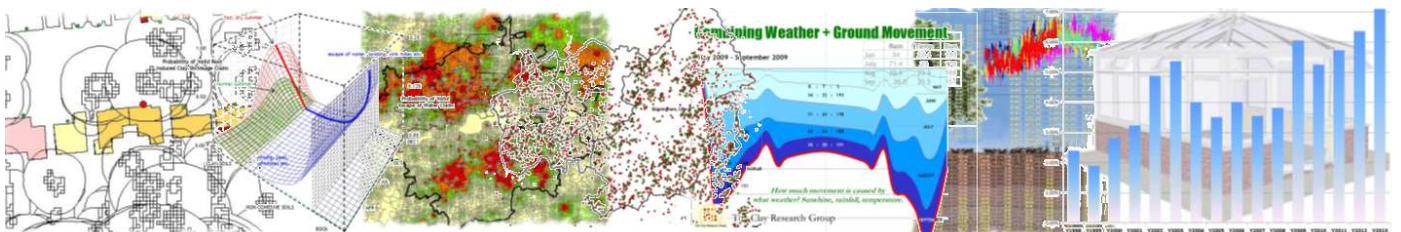
## Measure Tree Height using your Smartphone

NASA are promoting a smartphone application that can add to our understanding of the environment and supplement the satellite data they (NASA) gather. Their web site explains:

“The GLOBE Observer app provides a step-by-step guide for people to collect scientific data on their surroundings. With the new GLOBE Trees feature of the app, observers record tree height by tilting their phone up and down to align the screen with the tree’s top branch and base, and pace off the distance to the tree; the app does the rest to calculate the tree’s height.”

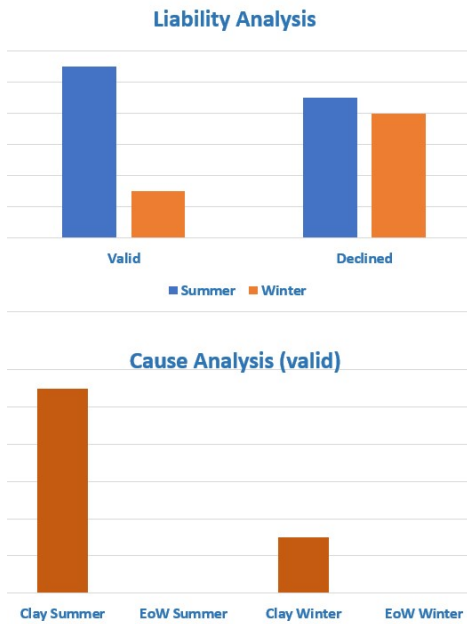
Brian Campbell, GLOBE Trees science lead explains “The data points – along with a GPS tag of the tree’s location – are sent back to NASA and collected in a database. Anyone can visualize all of the tree height and other GLOBE data simply by visiting the GLOBE website.” Go to:

<https://www.nasa.gov/feature/goddard/2019/help-nasa-measure-trees-with-new-app>



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## Using Past Claims Data to infer Geology and Derive Probability of Liability and Cause ... *cont. from previous editions*



**NW6 6** - Claims from sample plotted by postcode and season provide a strong indication of the underlying geology.

Valid claims (lower graph) from the sample increase significantly in the summer, peaking around October. The cause in all cases is attributed to root induced clay shrinkage. There are no escape of water claims in the sample for this sector.

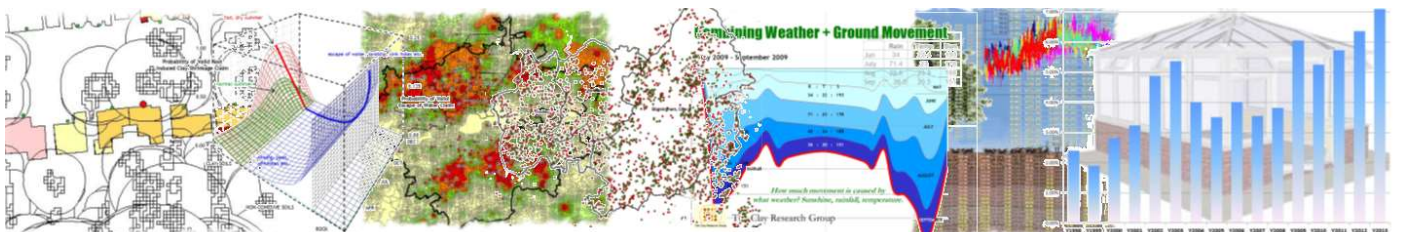
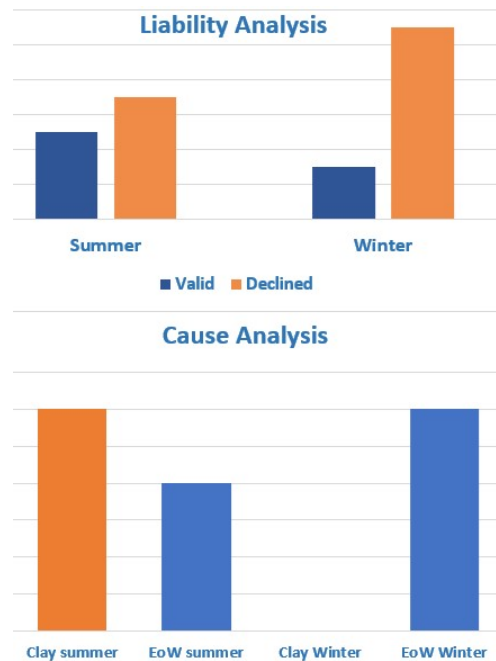
The data suggests the area is underlain by a predominantly shrinkable clay soil. Referring to the BGS 1:50,000 series maps reveals the solid geology to be London clay and Lambeth group.

Total spend on valid claims from sample in this postcode sector exceeds £168,678.

**B28 0** – This postcode has fewer claims than NW6 6 with a high number of declinatures in both summer and winter. Escape of water is the dominant cause of subsidence damage from the sample we hold, with clay shrinkage count rising in the summer, suggesting a variable geology with both cohesive and non-cohesive soils.

Reference to the BGS 1:50,000 scale map reveals the geology to be Sidmouth formation, head, alluvial and till deposits

By mapping and analysing each sector, profiles can be constructed to help identify the risk of subsidence. Total spend on valid claims from this sector = £78,537



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## Service Standards – or, when things go wrong.

*A personal communication from Tony Boobier, FICE*

It's been a while since I've been on a subsidence claim, and I can hear current practitioners saying I've no right to comment. After all, they might say, when did you last look down a trial pit, or deal with a call from an angry policyholder? Fair comment.

But old habits (and interests) die hard. I still get notes from people asking for informal advice. I usually tell them to be patient and courteous. After all, losing your temper doesn't help, does it? Even at a time when not only is the value of your property falling, but also that its cracking up around you.

I recently received a note from a young professional colleague. This is what they said.

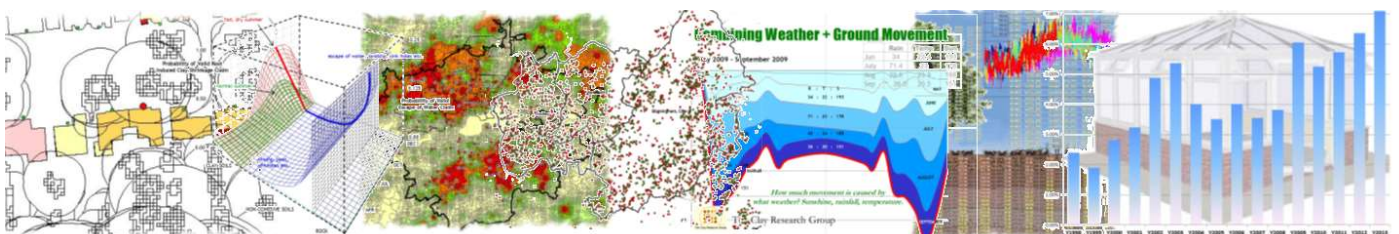
*'Subsidence thing continues to drag... and drag... the soil samples and whatnot were taken at the end of March and, as of this week, I have still heard nothing. I have been calling regularly to annoy the claims handler, I shall continue to do so. I know the process can be lengthy, but we're still only at the investigatory stage, and I initiated the claim on August 14th last year; things do seem to be very much on the slow side of slow, if you see what I mean, and I'm getting rather anxious.'*

So here we are, over 10 months after the claim was initiated, and with soil samples taken in February/March when the ground will have rehydrated during the winter. What do the investigators hope to find from these soil samples? Will they tell the homeowner that there is no problem, or that no action needs to be taken?

Are there no Key Performance Indicators in place? Has best practice been forgotten?

This is a claim which occurred in 2017 when there were 12,000 claims. In 2018 there were around 23,000 claims. Those I speak to in the industry refer to a 'silent surge', which I guess is jargon for having too many claims to handle, but quite not enough for the wider industry to lose sleep over. Surge for some of us means 50 or 60 thousand claims per year. We planned for 100 thousand per year, to be on the safe side.

*... continued*



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## Service Standards – or, when things go wrong.

*A personal account from Tony Boobier FICE.*

Is this an industry in crisis? Who is to blame, if anyone? Surely not the front line troops, who no longer have the luxury of time, but rather now have to cope with being contacted through multiple channels. Phone, text, email, snail mail....

Is it the supplier managers, who failed to adequately plan for volumes in their supply chains? Is it the supply chain itself, who after many quiet years just decided that this was, for them, a dead industry, and decided to move on? Or is it insurers, who elsewhere are increasingly moving to a proactive rather than reactive business model, in wellness for health and telematics for cars, and just took their eye off this particular ball?

Maybe it's the technology sector, 'Insuretech', who (with a very few exceptions) failed to see the opportunity to use their wizardry to reinvent subsidence? Or perhaps we just couldn't predict the number with any degree of accuracy, because the task was, well, just too complex (combination of weather, trees, soil, people, economy, behaviour, that sort of thing.)

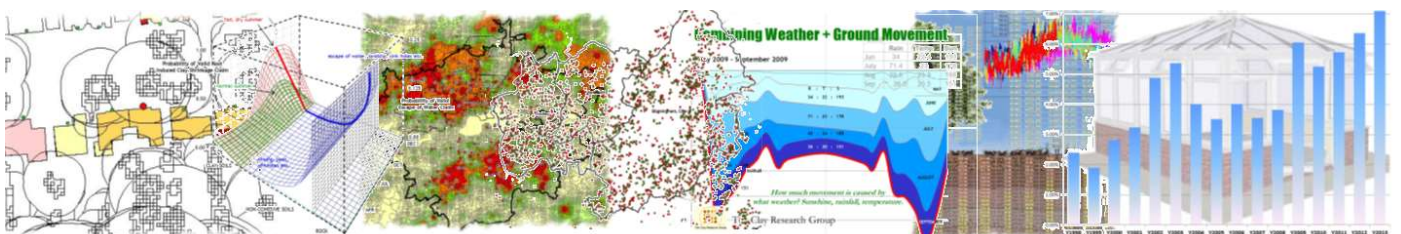
Isn't it everyone's and nobody's fault? Because subsidence, to operate efficiently and effectively, is no more and no less than a complex ecosystem.

Digitalisation of the process supported by new tech platforms should allow insurers and intermediaries to operate with greater agility and coherence, reducing claims cost and delighting the customer. We've known for ages that the longer the claim goes on, the more expensive it becomes.

Evolution tells us that it's not the biggest and strongest which will survive, but those most willing to adapt.

For my friend, there is only one claim in the world, and that is theirs. The sweet taste of owning their first home is rapidly turning bitter. Their current subsidence experience will probably affect their attitude towards the insurance industry for the rest of their life.

Pity really.



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## Subsidence Risk Analysis - BEXLEY

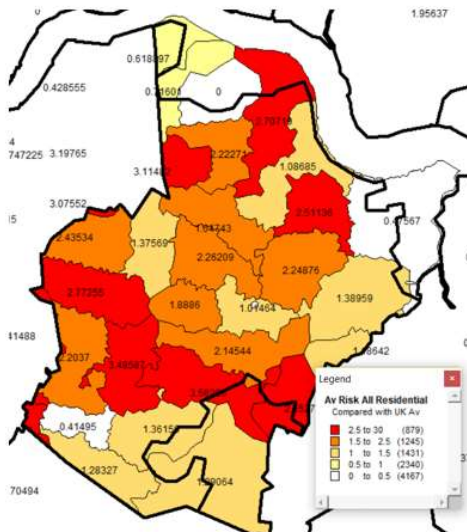
The following pages examine the risk of subsidence in Bexley. The borough has around 97,736 houses, a population of around 244,300 and an area of 61km<sup>2</sup>.

*Table of earlier studies.*

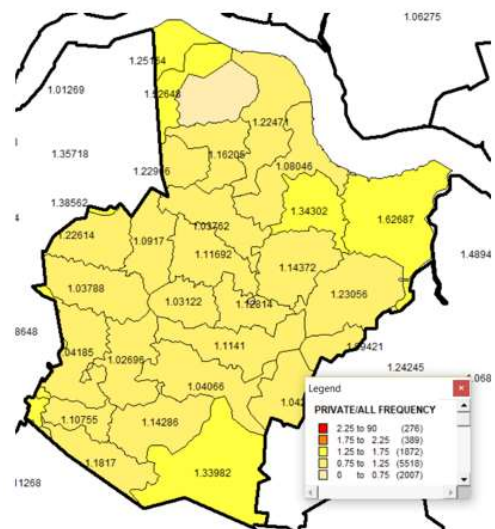
Borough	Edition	Date
Islington	Issue 47	Apr-09
Camden	Issue 69	Feb-11
Brent	Issue 71	Apr-11
Haringey	Issue 72	May-11
Barnet	Issue 77	Oct-11
Waltham Forest	Issue 79	Dec-11
Welwyn and Hatfield	Issue 80	Jan-12
Ealing	Issue 84	May-12
Sutton	Issue 91	Dec-12
Hillingdon	Issue 106	Mar-14
Havering	Issue 149	Oct-17
Harrow	Issue 150	Nov-17
Enfield	Issue 155	Apr-18
Southwark	Issue 156	May-18
Lewisham	Issue 157	Jun-18
Bromley	Issue 158	Jul-18
Croydon	Issue 159	Aug-18
Basingstoke & Deane	Issue 160	Sep-18
Merton	Issue 161	Oct-18
Wandsworth	Issue 162	Nov-18
Basildon	Issue 163	Dec-18
Redbridge	Issue 166	Mar-19
Leicester	Issue 167	Apr-19
Coventry	Issue 168	May-19



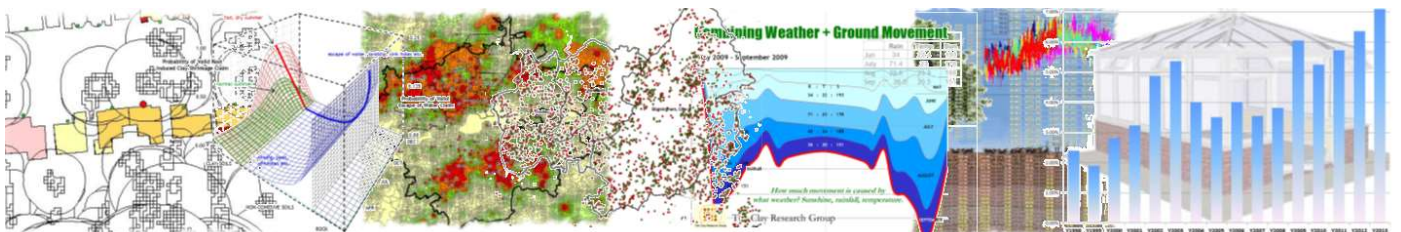
### Risk Compared with UK Average



All Residential

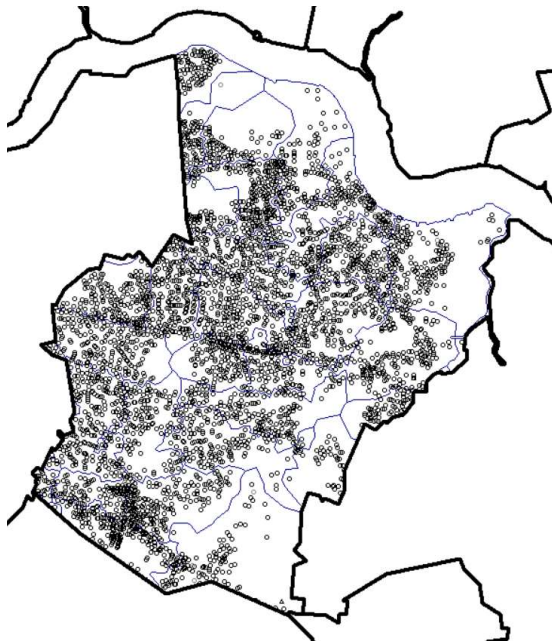


Increase for Private Only



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## Subsidence Risk Analysis - BEXLEY

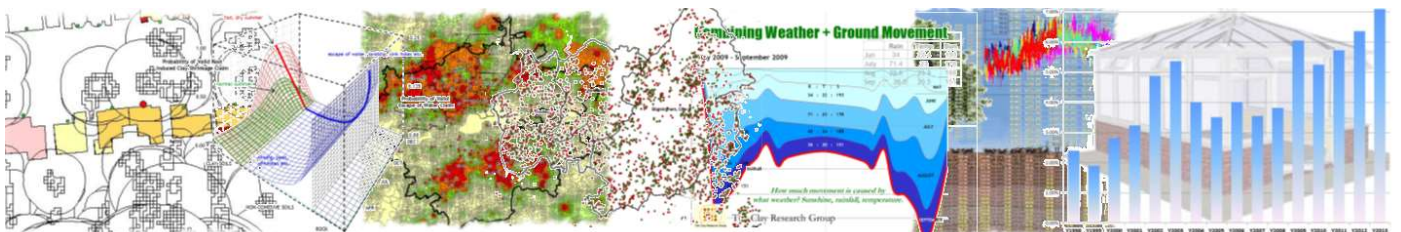
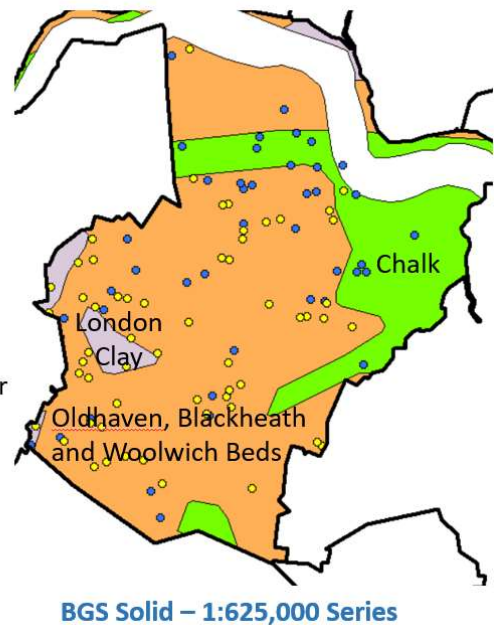
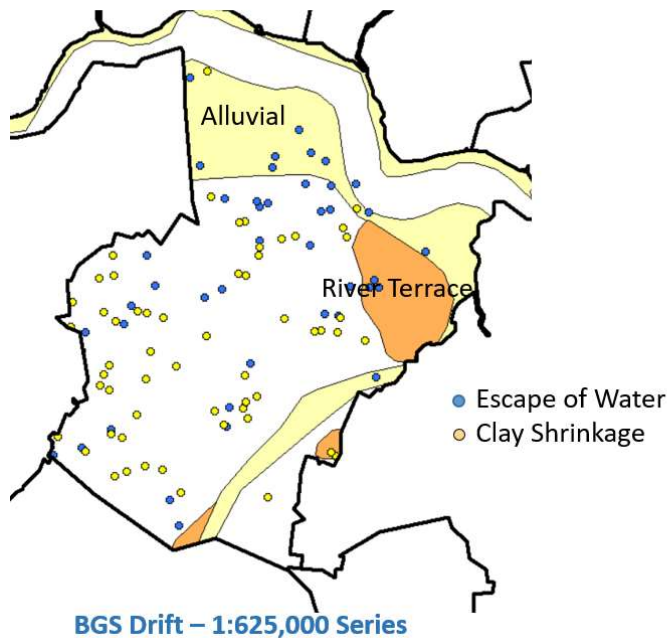


Left, mapping the distribution of postcodes helps put the claim distribution into context.

It is useful to relate them as high density of claims could simply be the result of high housing density.

It is also useful in delivering a high-resolution image of risk – broadly a street by street analysis, rather than by postcode sector. Below, the distribution of claims by cause from the sample held.

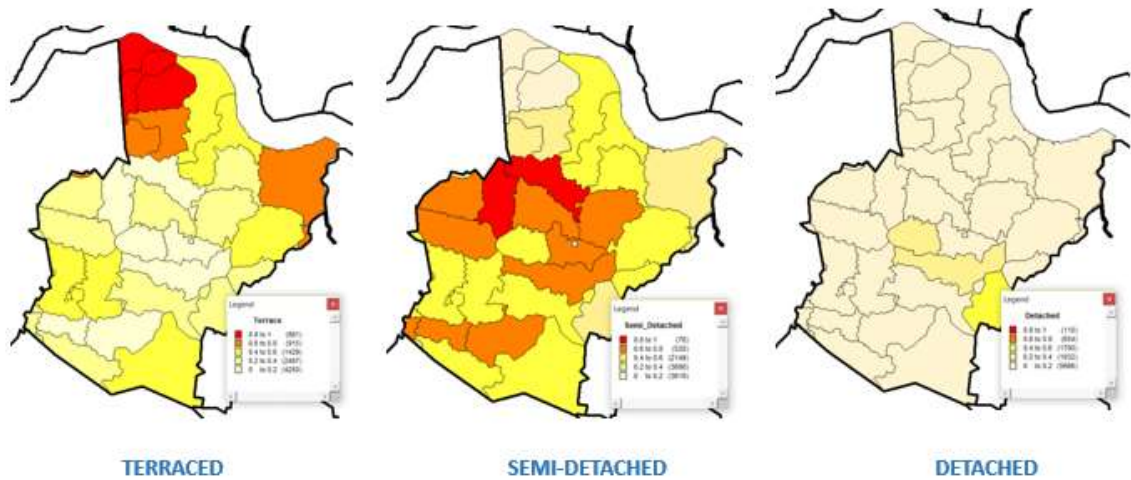
Bexley comes 56<sup>th</sup> out of 414 in our 'rank order of risk by district' table, with a risk rated as 1.6 times the UK average.





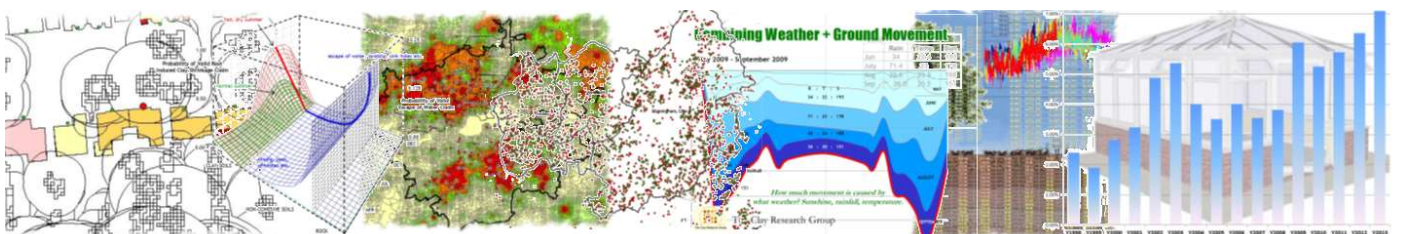
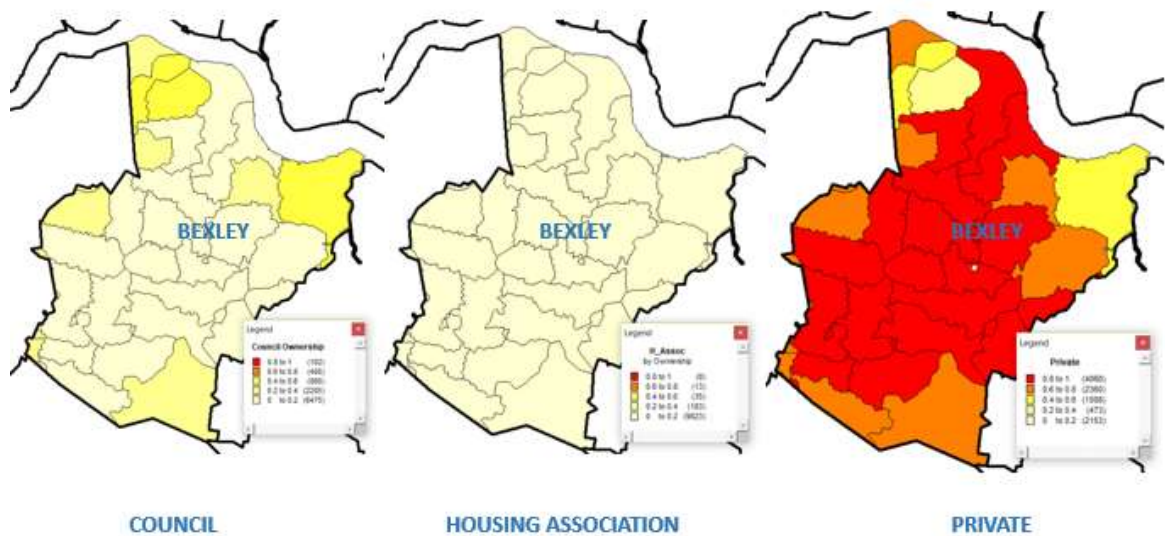
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## BEXLEY - Properties by Style and Ownership



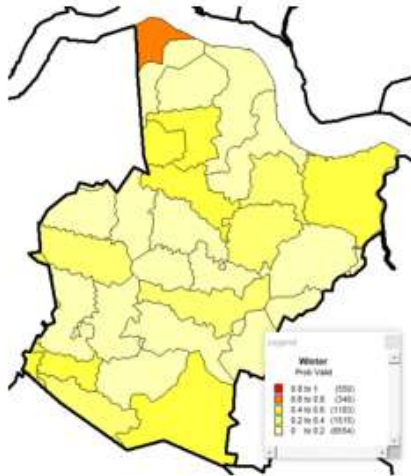
Above, the frequency distribution of differing house styles at postcode sector level showing the concentration of each style in relation to the total housing stock. The 2014 census lists 4,370 detached, 35,640 semi-detached and 26,520 terraced properties (all figures rounded). The balance consists of flats, maisonettes and bungalows.

Distribution by ownership is shown below, revealing a high number of privately owned properties across the borough.

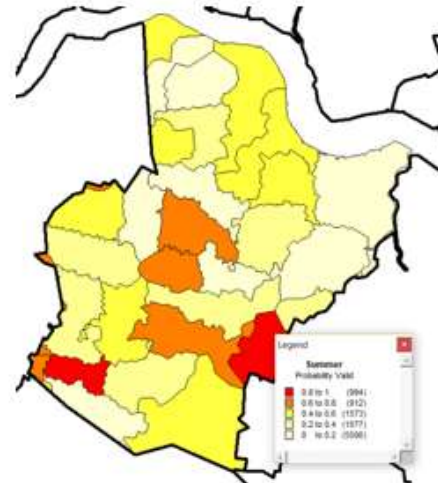


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## BEXLEY - Liability by Season and Geology

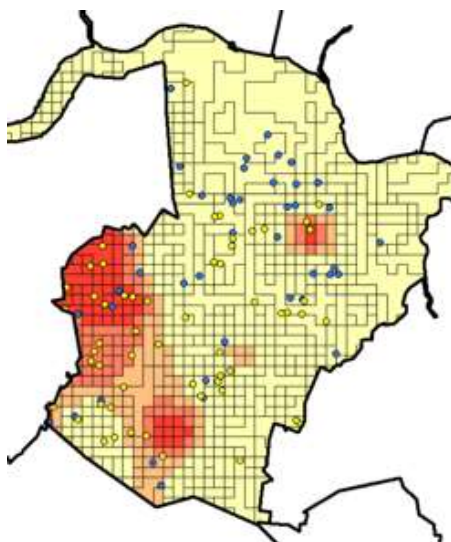


PROBABILITY VALID – WINTER

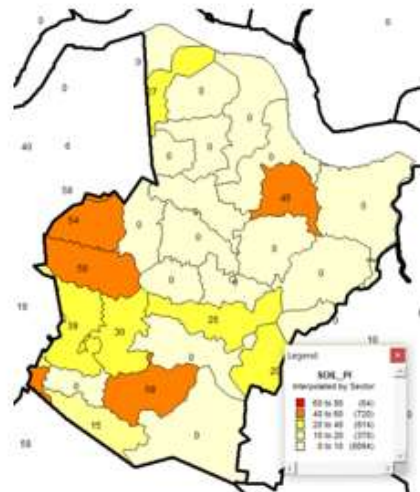


PROBABILITY VALID - SUMMER

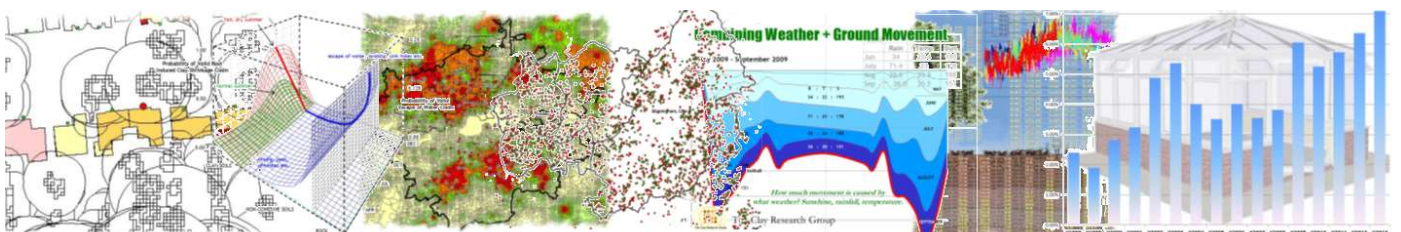
The probability of whether a claim is likely to be valid or declined varies by season (above) and geology (below). Claim frequency data by season can be used to infer the nature of the underlying soil (i.e. either cohesive or non-cohesive) and its relationship with the weather. Clay soils respond to warm, dry summers, but deliver far fewer claims in the winter months. Houses on non-cohesive soils tend to deliver fewer claims overall, but with little change by season. The shrinkable clay series, where present, has a variable PI of between 20 – 50% as shown on the CRG map below.



CRG 250m DATA GRID

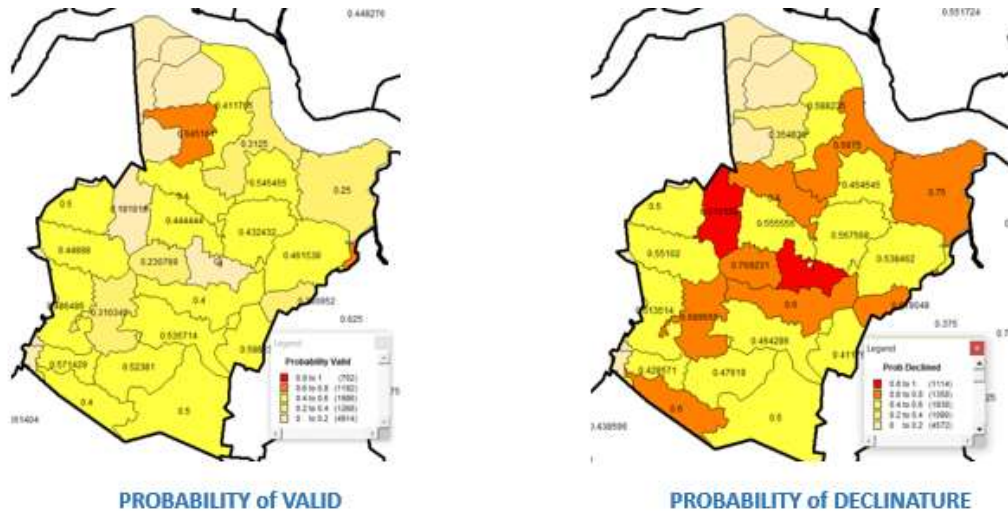


CRG SECTOR LEVEL SOILS DATA



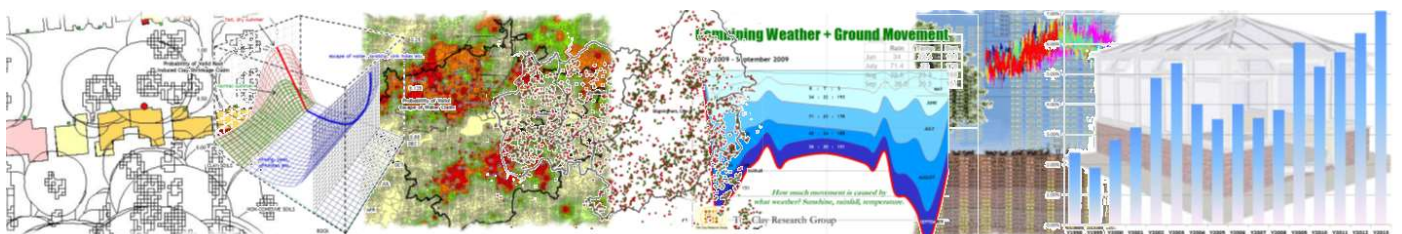
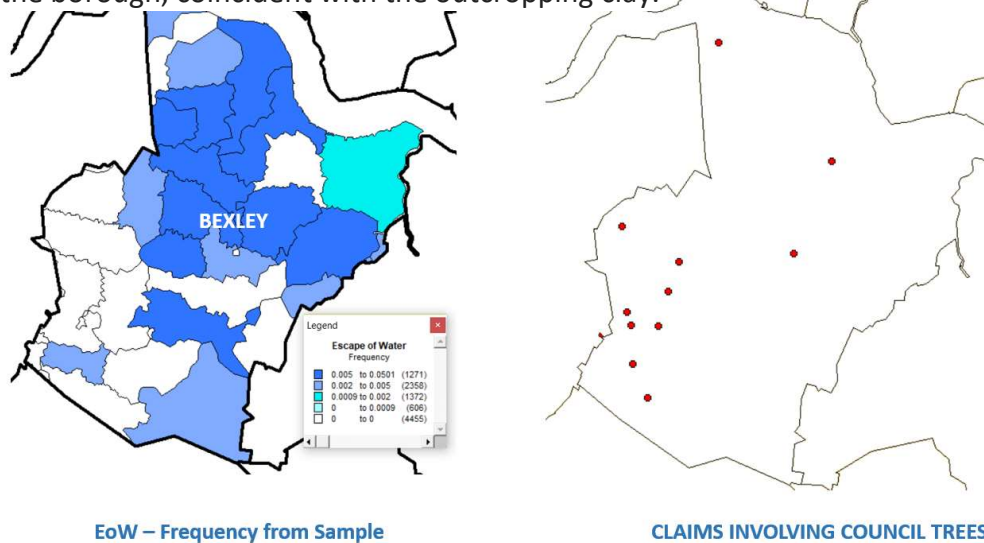
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## BEXLEY – Liability by Sector. Escape of Water and Council Tree Claims Distribution



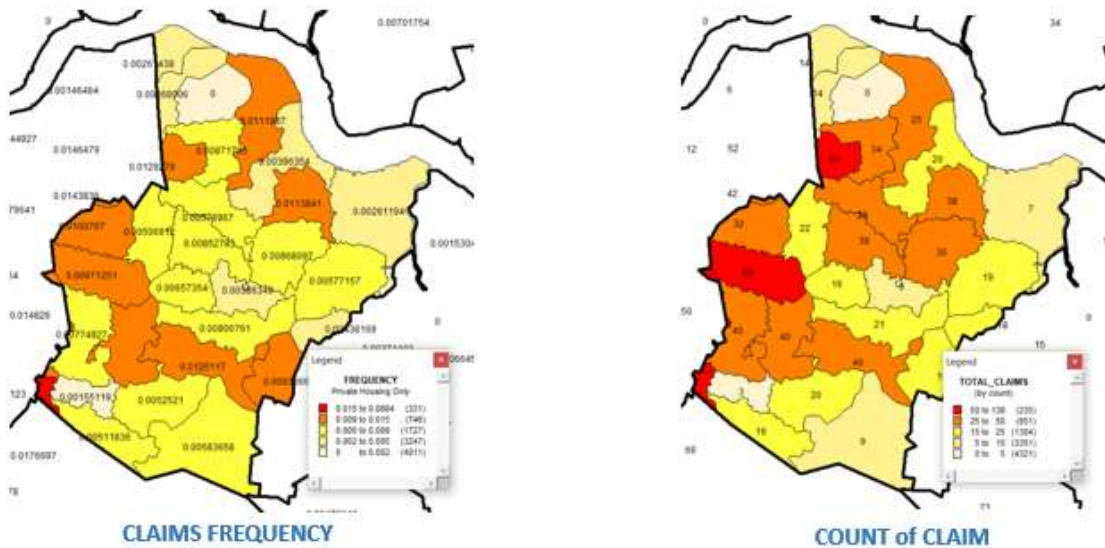
Above, mapping historic claim liability on a normalised scale revealing postcode sectors where the claims have either high or low probabilities of being accepted as valid or declined throughout the year, not taking into account any seasonal influence.

Below left, mapping the frequency of Escape of Water claims from the sample, showing the concentration to the north of the borough, adjoining the Thames, and a pocket to the south, corresponding with the presence of the predominantly non-cohesive and alluvial soils. Below right, dots on the 'Council Tree Claims' map, represent properties where damage has been attributable to vegetation in the ownership of the local authority with a concentration to the SW of the borough, coincident with the outcropping clay.



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## BEXLEY – Frequencies, Count & Probabilities

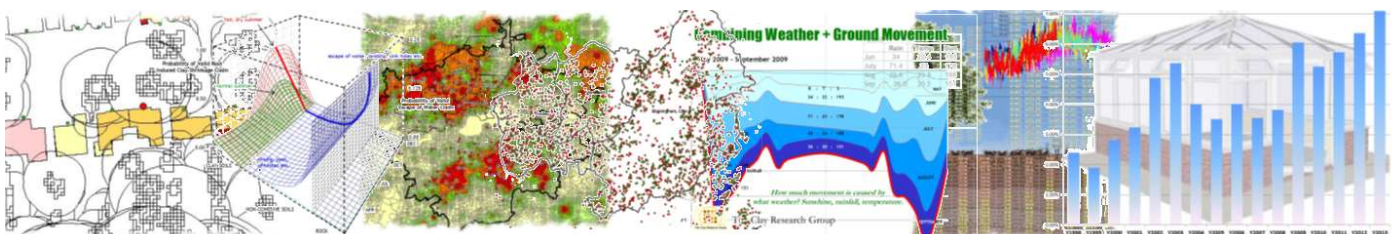


Below, the figures reveal a borough with a more variable risk than those to the north west of London in terms of subsidence, and by season. The chances of a claim being declined in the summer are around 38%, and if it is valid, the chances of it being due to clay shrinkage will be around 30%. In the winter, the repudiation rate is around 30%, and if it is valid, the chance of a claim being due to either an escape of water or clay shrinkage is around 50 - 50.

The figures suggest a variable geology. By contrast, a borough like Harrow with a large coverage of outcropping London clay, has a likelihood of a valid claim being due to clay shrinkage of around 70% in the summer, falling dramatically in the winter months. Data is of course less reliable when there is geological variability across the district, as is the case here, when sector level analysis is preferable.

### PROBABILITIES by SEASON – CAUSE AND LIABILITY

District	valid summer clay	valid summer EoW	Repudiation Rate (summer)	valid winter clay	valid winter EoW	Repudiation Rate (winter)
Bexley	0.313	0.305	0.382	0.35	0.34	0.302

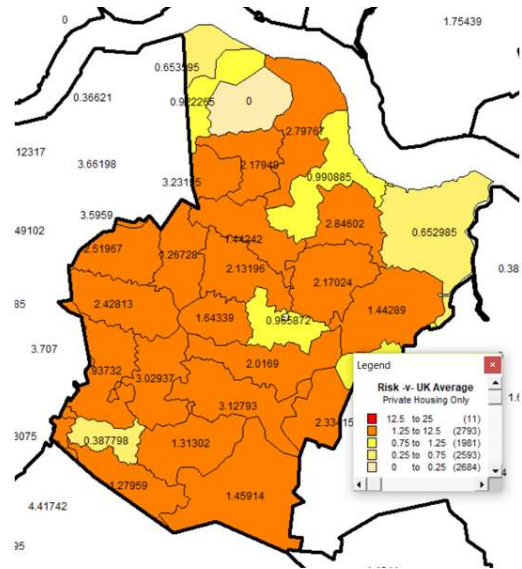


## Bexley in Context

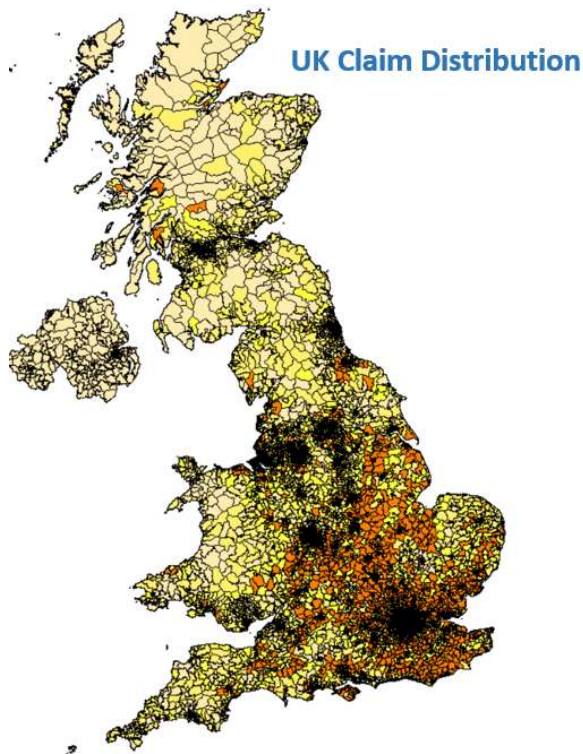
Right, a map showing the risk of subsidence from the sample held compared with the UK average at postcode sector level and taking into account private housing only.

Although there are sectors where the risk is rated in excess of a factor of three, this isn't unusual for the south east and in fact, is lower than other areas to the north west of London.

The rating is distorted due to the large number of postcodes in the UK with less than average claim count – see below.



RISK COMPARED WITH UK AVERAGE



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