

The Clay Research Group

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



April 2025
Issue 239

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March 2025

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Subsidence Risk Analysis by District
Winchester

District and Sector Risk

Winchester is situated near to the south coast of England, above the Isle of Wight. It has a population of around 48,500 and occupies an area of 658km². It is the subject of the 'Risk by District' series in this month's edition. Its geology is predominantly outcropping chalk – see Page 6.



Warming Climate - Fewer Claims?

We welcome any thoughts from readers to help us understand why there has been a steady decline in subsidence claim numbers over the last 20 years when the climate is warming.

The dominant cause of subsidence is root induced clay shrinkage and warming was anticipated to be a trigger to a significant increase in claim numbers, but the reverse appears to be happening. Thoughts please.

The risk maps are built from a data sample covering four claim years, including one surge and three 'normal' years.

Contributions Welcome

We welcome articles and comments from readers. If you have a contribution, please Email us at: clayresearchgroup@gmail.com

Arboricultural Journal

Keiron Hart of Tamla Trees Limited, has had a paper published in the Arboricultural Journal entitled "Vegetation-related subsidence" See issue 208 Spring 2025.

The article reviews the current approach to root induced clay shrinkage subsidence claims, considering the merits and drawbacks of different approaches and outlining the benefits of satellite imagery.

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ChatGPT – Determining Subsidence



Question to ChatGPT

Are the number of domestic subsidence claims increasing with the drier, warmer weather patterns?

ChatGPT Response

Yes, the number of domestic subsidence claims tends to increase during periods of drier and warmer weather, and this trend has been observed in recent years due to climate change.

Here's why:

Dry Weather and Subsidence

- Subsidence is often caused by the shrinkage of clay soils beneath a property. When there's a prolonged dry spell or heatwave, clay soils lose moisture and shrink.
- As the ground shrinks, it can cause movement in a building's foundations, leading to cracks in walls, sticking doors/windows, and other signs of structural distress.
- Trees and shrubs near buildings can exacerbate the issue by drawing out even more moisture from the soil.

Trends in Claims

- In years with hot, dry summers (like in the UK during 2018 or 2022), insurers saw a noticeable spike in subsidence claims.
- Insurers often flag a surge in claims following these weather patterns, sometimes referring to them as "event years" due to the volume.

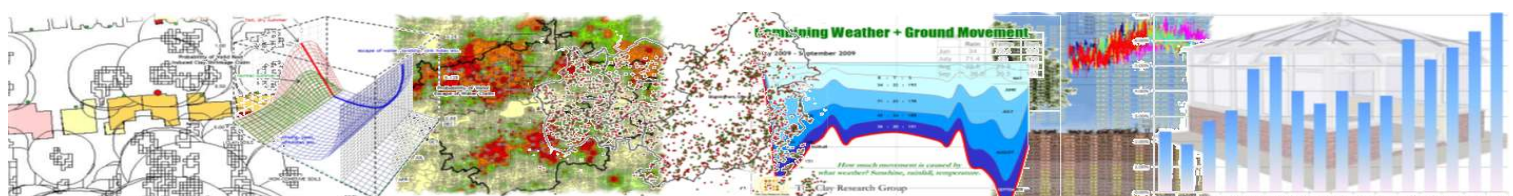
What This Means

- As warmer and drier weather patterns become more common due to climate change, subsidence claims are expected to increase over the long term.
- Some insurers are already factoring this into risk assessments and premiums, especially in areas with clay-heavy soils.

Would you like stats or charts on claim trends over recent years? I can look that up for you.

Our Response: Yes please.

Certainly! Recent data indicates a significant rise in domestic subsidence claims in the UK, correlating with drier and warmer weather patterns. Here's a summary of the trends over recent years:



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Increase in Subsidence Claims

- **2022 Surge:** In 2022, UK insurers received approximately 23,000 subsidence claims, leading to payouts around £219 million. This marked the highest annual subsidence payout in 16 years, attributed to the record-breaking heatwave that year. [Insurance Risk Hub+1Insurance Age+1](#)
- **2023 Trends:** Building on the previous year's surge, the first half of 2023 saw a continued increase in subsidence claims. For instance, Zurich Insurance reported a 26% rise in overall claim volumes in 2022 compared to 2021. Moreover, from January to May 2023, reported claim volumes were 40% higher than during the same period in 2022. [Zurich Insurance UK](#)
- **Q2 2024 Record:** The second quarter of 2024 recorded subsidence payouts of £60 million, the highest quarterly figure on record and a 12% increase from the £53 million paid in Q1 2024. [Home](#) | [ABI+1Home](#) | [ABI+1](#)

Financial Impact

- **Rising Costs:** Between January 2020 and July 2023, average subsidence claim costs more than doubled, increasing by over 100%, while costs for all perils rose by just over 40%. This substantial rise is largely due to challenges such as the complexities of removing trees causing subsidence, often necessitating more expensive and disruptive underpinning solutions. [I Love Claims](#)

Climate Change Implications

- **Future Projections:** Analysts warn that if the current trend of extreme heat continues, subsidence insurance payouts could surge to a staggering £1.9 billion by 2030. [Insurtech Insights](#)

These statistics underscore the growing impact of climate change on property stability and the insurance sector. Homeowners are advised to be vigilant for signs of subsidence and ensure their insurance policies provide adequate coverage.



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Winchester - Sector Level Sample Using Past Claims Data to Infer Geology and Derive Probability of Cause and Liability

S032 2 – Housing is a mixture of predominantly detached and detached housing in private ownership. Geology in the sector is outcropping London clay and Oldhaven, Blackheath, Woolwich, and Reading and Thanet beds.

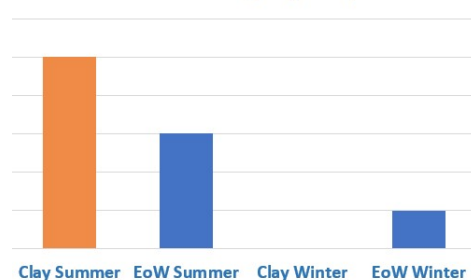
Clay shrinkage is the dominant cause of damage in the summer months and Escape of Water in the winter, reflecting the likely presence of shallow superficial deposits.

Site investigations associated with the investigation of valid claims reveals a PI of around 35%.

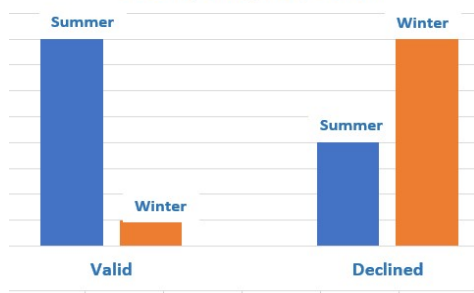
Liability Analysis by Season



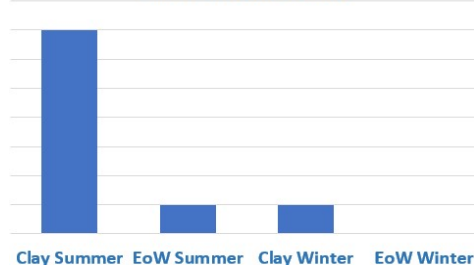
Cause Analysis (valid)



Liability Analysis by Season



Cause Analysis (valid)



S032 1 – The sector has a selection of property types in private ownership.

The geology is outcropping red chalk to the north of the sector, a thin band of London clay to the south with superficial deposits of Oldhaven, Blackheath, Woolwich, and Reading and Thanet beds running alongside.

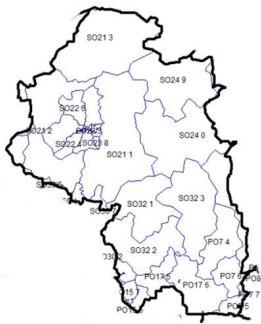
The shrinkable clay soils have a PI of around 40% from records relating to results from site investigations undertaken.

The dominant cause of subsidence in the summer is clay shrinkage, with higher number of declinatures in the winter.

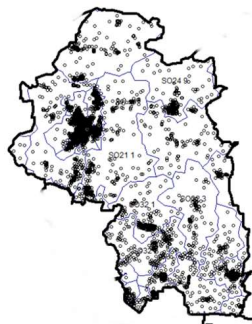


Winchester is situated immediately above the Isle of White, close to the south coast of England, and occupies an area of around 658km² with a population approaching 48,500.

WINCHESTER



Postcode Sectors



Housing Distribution

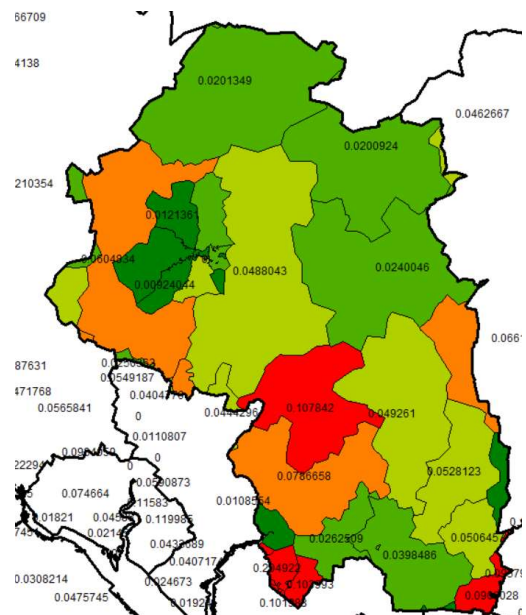
Distribution of housing stock using full postcode as a proxy. Each sector covers around 3,000 houses on average across the UK and full postcodes include around 15 – 20 houses on average, although there are large variations.

From the sample we hold, sectors are rated for the risk of domestic subsidence compared with the UK average – see map, right.

Winchester is rated 123rd out of 413 districts in the UK from the sample analysed and is around 1.191x the risk of the UK average, or 0.308 on a normalised 0 - 1 scale.

Sector and housing distribution across the district (left, using full postcode as a proxy) helps to clarify the significance of the risk maps on the following pages. Are there simply more claims in a sector because there are more houses?

Using a frequency calculation (number of claims divided by private housing population) the relative risk across the borough at postcode sector level is revealed, rather than a 'claim count' value.



Sector risk compared to UK (normalised) from the sample analysed. Private ownership only.



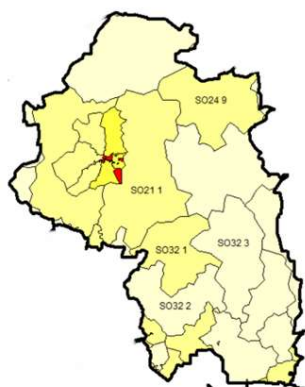
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Winchester - Properties by Style and Ownership

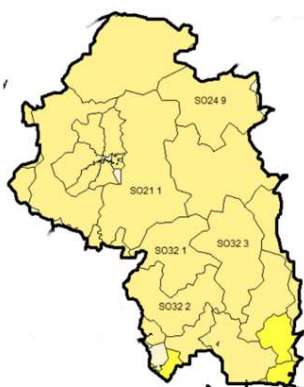
Below, the general distribution of properties by style of construction, distinguishing between terraced, semi-detached and detached. Unfortunately, the more useful data is missing at sector level – property age.

Risk increases with age of property and the model can be further refined if this information is provided by the homeowner at the time of taking out the policy.

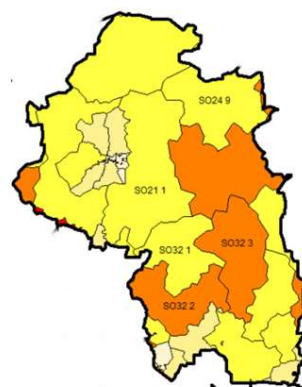
WINCHESTER - Distribution by House Type



Terraced



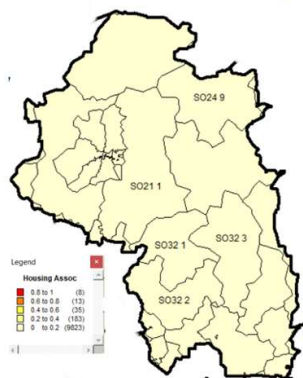
Semi-Detached



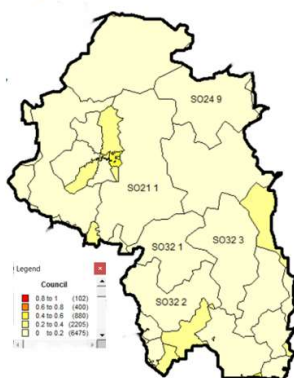
Detached

Distribution by ownership is shown below. Detached, private properties are the dominant class across the district.

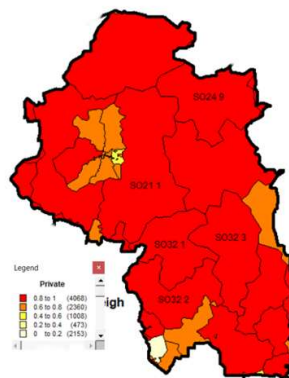
WINCHESTER - Distribution by Ownership



Housing Association



Council Ownership

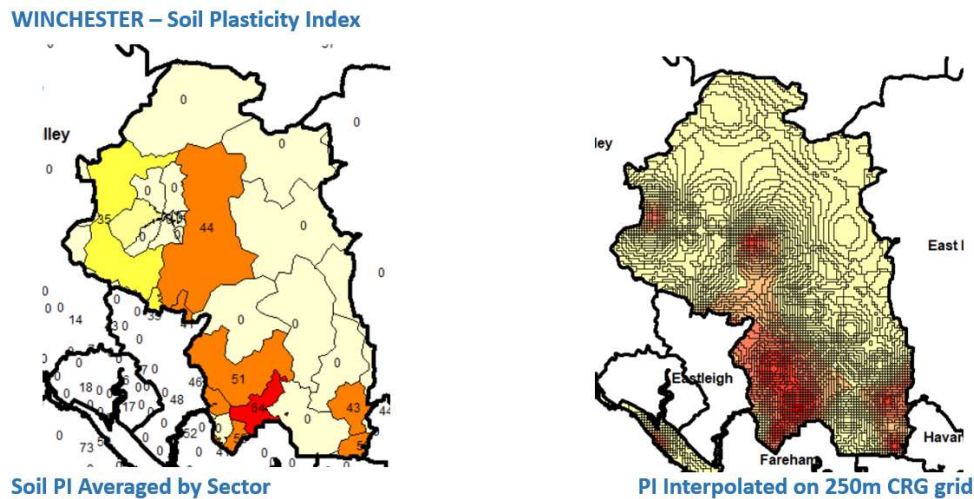


Private Ownership



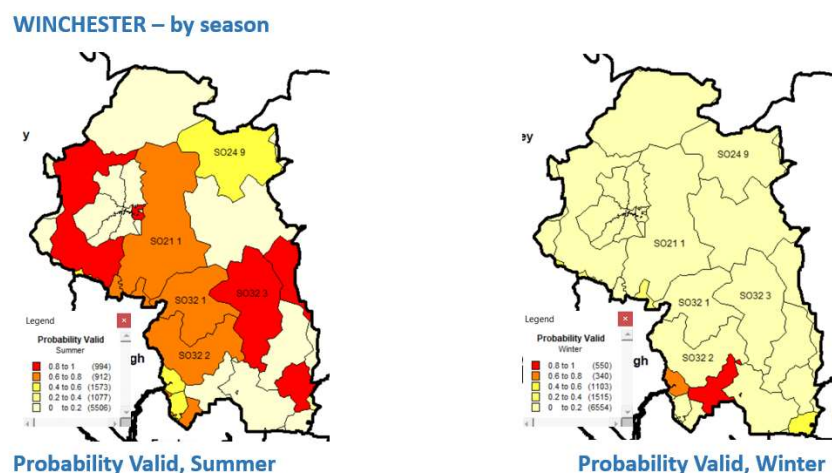


Below, the average PI by postcode sector (left) derived from site investigations and interpolated to develop the CRG 250m grid (right). The higher the PI values, the darker red the CRG grid.



Zero values for PI in some sectors may reflect the absence of site investigation data - not necessarily the absence of shrinkable clay. A single claim in an area with low population can raise the risk as a result of using frequency estimates.

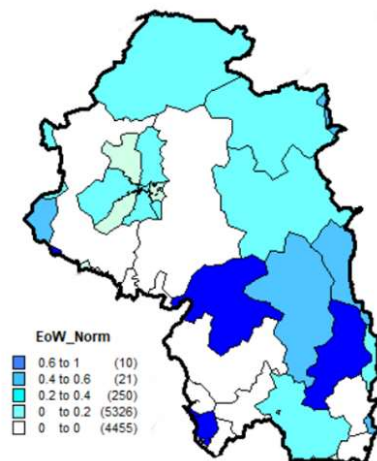
The maps below show the seasonal difference from the sample used. Combining the risk maps by season and reviewing the table on page 11 is perhaps the most useful way of assessing the potential liability, likely cause and geology using the values listed.



The 'claim by cause' distribution and the risk posed by the soil types is illustrated at the foot of the following page. A high frequency risk can be the product of just a few claims in an area with a low housing density of course and claim count should be used to identify such anomalies.



WINCHESTER - Subsidence Risk Relative to UK

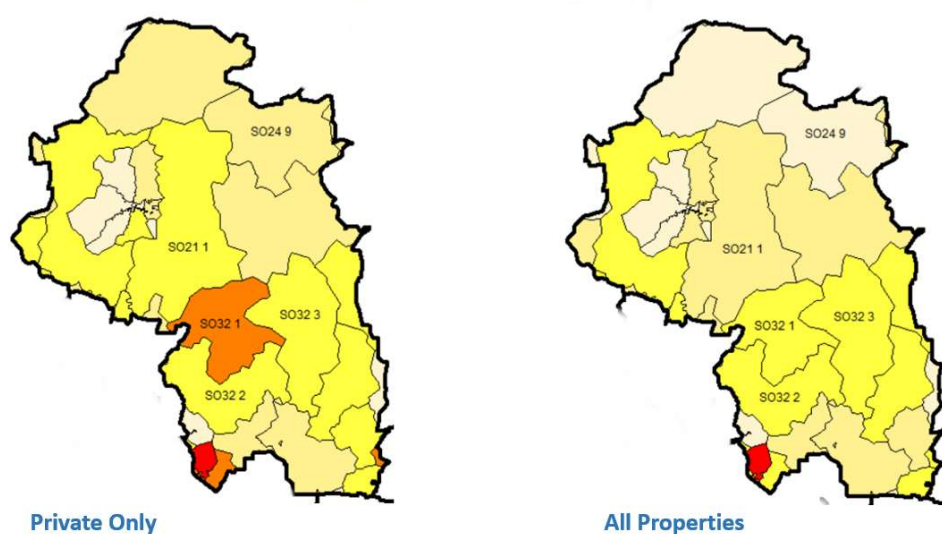


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Winchester - Frequencies & Probabilities

Below, mapping the risk of subsidence by ownership. Claims frequency that includes council and housing association properties delivers a misleading value of risk as they tend to self-insure. The following show the normalised risk, taking account of the private housing population – that is, the rating compared with the average value for each category.

WINCHESTER - Sector Risk Compared with UK Average



On a general note, a reversal of rates for valid-v-declined by season is a characteristic of the underlying geology. For clay soils, the probability of a claim being declined in the summer is usually low, and in the winter, it is high.

Valid claims in the summer have a higher probability of being due to clay shrinkage, and in the winter, escape of water. For non-cohesive soils, sands, gravels etc., the numbers tend to be fairly steady throughout the year.

Liability by Season - WINCHESTER

District	valid summer clay	valid summer EoW	Repudiation Rate (summer)	valid winter clay	valid winter EoW	Repudiation Rate (winter)
Winchester	0.631	0.131	0.238	0.08	0.37	0.55

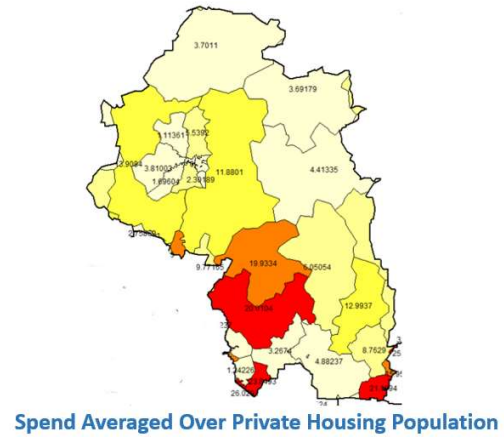
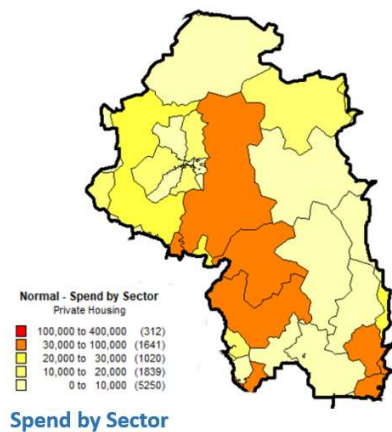


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Aggregate Subsidence Claim Spend by Postcode Sector and Household in Normal & Surge Years

The maps below show the aggregated claim cost from the sample per postcode sector for both normal (top) and surge (bottom) years. The figures will vary by the insurer's exposure, claim sample and distribution of course.

NORMAL YEAR SPEND – WINCHESTER



It will also be a function of the distribution of vegetation and age and style of construction of the housing stock. The images to the left in both examples (above and below) represent gross sector spend and those to the right, sector spend averaged across private housing population to derive a notional premium per house for the subsidence peril.

The figures can be distorted by a small number of high value claims. The absence of any distinct difference between surge and normal years reflects the geology.

SPEND in SURGE – WINCHESTER

