

# Arboricultural Appraisal Report

## Subsidence Damage Investigation at:

20 Pinetree Gardens  
Waterlooville  
PO8 8AE



|                 |                         |
|-----------------|-------------------------|
| CLIENT:         | Claims Consortium Group |
| CLIENT REF:     | 268179                  |
| MWA REF:        | SUB211213-9694          |
| MWA CONSULTANT: | Mark Bisley (BSc Hons)  |
| REPORT DATE:    | 23/12/2021              |

## SUMMARY

| Statutory Controls |                        | Mitigation<br>(Current claim tree works) |     |
|--------------------|------------------------|------------------------------------------|-----|
| TPO current claim  | Yes – T1, T2, TG2      | Policy Holder                            | No  |
| TPO future risk    | No                     | Domestic 3 <sup>rd</sup> Party           | Yes |
| Cons. Area         | No                     | Local Authority                          | No  |
| Trusts schemes     | No                     | Other                                    | No  |
| Local Authority: - | Havant Borough Council |                                          |     |

## Introduction

Acting on instructions from Claims Consortium Group, the insured property was visited on 21/12/2021 to assess the potential role of vegetation in respect of subsidence damage.

We are instructed to provide opinion on whether moisture abstraction by vegetation is a causal factor in the damage to the property and give recommendations on what vegetation management, if any, may be carried out with a view to restoring stability to the property. The scope of our assessment includes opinion relating to mitigation of future risk. Vegetation not recorded is considered not to be significant to the current damage or pose a significant risk in the foreseeable future.

This is an initial appraisal report and recommendations are made with reference to the technical reports and information currently available and may be subject to review upon receipt of additional site investigation data, monitoring, engineering opinion or other information.

This report does not include a detailed assessment of tree condition or safety. Where indications of poor condition or health in accessible trees are observed, this will be indicated within the report. Assessment of the condition and safety of third-party trees is excluded and third-party owners are advised to seek their own advice on tree health and stability of trees under their control.

## Property Description

The property comprises a two storey, detached house built in the 1960s with a garage to the rear right. There is a conservatory extension to the left.

External areas comprise gardens to the front and rear. The site is generally level with no adverse topographical features.

## Damage Description & History

The current damage affects the left side of the dwelling with internal damage on both floors but no significant external damage present. It was first noticed in December 2019 and is reported to change seasonally.

At the time of the engineer's inspection (20/05/2021) the structural significance of the damage was found to fall within Category 2 (slight) of Table 1 of BRE Digest 251.

For a more detailed synopsis of the damage please refer to the building surveyor's technical report.

## Site Investigations

Site investigations were carried out by FASTRACK on 10/06/2021, when two trial pits were hand excavated to reveal the foundations, each with a borehole sunk through the base of the trial pit to determine subsoil conditions. A drains survey was also undertaken.

### Foundations:

| Ref | Foundation type | Depth at Underside (mm)        |
|-----|-----------------|--------------------------------|
| TP1 | Concrete        | 1150                           |
| TP2 | Concrete        | 1150 house<br>350 conservatory |

### Soils:

| Ref    | Description                                                                             | Plasticity Index (%) | Volume change potential (NHBC) |
|--------|-----------------------------------------------------------------------------------------|----------------------|--------------------------------|
| TP/BH1 | Silty CLAY to 2.90m. CLAYSTONE to 2.94m. Abandoned at 2.94m due to obstruction.         | 38 – 49              | Medium – High                  |
| TP/BH2 | Silty, sandy CLAY to 1.80m. Silty CLAY to 2.78m. Abandoned at 2.78m due to obstruction. | 37 – 42              | Medium - High                  |

### Roots:

| Ref    | Roots Observed to depth of (mm) | Identification                                     | Starch content |
|--------|---------------------------------|----------------------------------------------------|----------------|
| TP/BH1 | 1150                            | <i>Quercus spp.</i>                                | Present        |
| TP/BH2 | 1500                            | Either <i>Quercus spp.</i> or <i>Castanea spp.</i> | Present        |

*Quercus spp.* are oaks.

*Castanea spp.* includes sweet chestnut.

**Drains:** The drains have been surveyed and defects identified, although leaking drains are concluded not to be a cause of the current damage.

**Monitoring:** Crack and level monitoring are in progress.

## Discussion

Opinion and recommendations are made on the understanding that Claims Consortium Group are satisfied that the current building movement and the associated damage is the result of clay shrinkage subsidence and that other possible causal factors have been discounted.

Site investigations and soil test results have confirmed a plastic clay subsoil susceptible to undergoing volumetric change in relation to changes in soil moisture. A comparison between moisture content and the plastic and liquid limits suggests moisture depletion at the time of sampling in both excavations at depths beyond normal ambient soil drying processes such as evaporation indicative of the soil drying effects of vegetation.

Comparison of soil suction data with Table 1 of BRE Digest 412 suggests very slight to slight desiccation (49.83 – 56.63kPa) in TP/BH1 and slight to severe desiccation (83.77 – 288.98kPa) in TP/BH2.

Roots were observed to a depth of 1150mm bgl in TP/BH1 and recovered samples have been positively identified (using anatomical analysis) as *Quercus spp.*, the origin of which will be T2 or T1, confirming their influence on the soils below the foundations.

Roots were observed to a depth of 1500mm bgl in TP/BH2 and recovered samples have been positively identified (using anatomical analysis) as *Quercus spp.* or *Castanea spp.*, the origin of which will be TG2, confirming its influence on the soils below the foundations.

Irrespective of the identification of recovered root samples, the roots of TG1 are also likely to be present below foundation level in proximity to the area of movement/damage and influencing soil moisture and volumes.

Crack monitoring data for the period 23/06/2021 to 30/11/2021 shows no significant movement.

Level monitoring for the same period shows a pattern of seasonal movement which is strongly indicative of the action of vegetation. The majority of pins show relatively low but still significant movement, whereas Pins 10, 9 and 11 show much greater amplitude with Pin 10 having ~24mm of subsidence despite the recent, relatively wet summer.

The monitoring data would therefore suggest that the greatest influence on the dwelling is to the front, which is supported by soil suction values which show the greatest moisture deficit at the front of the dwelling.

Based on the technical reports currently available, engineering opinion and our own site assessment we conclude the damage is consistent with shrinkage of the clay subsoil related to moisture abstraction by vegetation. Having considered the information currently available, it is our opinion that TG2 and TG1 are the principal cause of or are materially contributing to the current subsidence damage. T2 and T1 are also likely to be affecting the rear of the dwelling but do so to a much lesser degree.

If an arboricultural solution is to be implemented to mitigate the influence of the implicated trees/vegetation we recommend that TG2 is removed and TG1 reduced.

T1 and T2 are already subject to regular pruning including a high crown lift. Given the combination of slight desiccation and relatively low but significant movement in the monitoring data we conclude that these trees could be retained subject to crown reduction.

Recommended tree works may be subject to change upon receipt of additional information. Other vegetation recorded presents a potential future risk to building stability and management is therefore recommended.

## Conclusions

- Conditions necessary for clay shrinkage subsidence to occur related to moisture abstraction by vegetation have been confirmed by site investigations and the testing of soil and root samples.
- Engineering opinion is that the damage is related to clay shrinkage subsidence.
- There is significant vegetation present with the potential to influence soil moisture and volumes below foundation level.
- Roots have been observed underside of foundations and identified samples correspond to vegetation identified on site.
- Replacement planting may be considered subject to species choice and planting location.

**Table 1** **Current Claim - Tree Details & Recommendations**

| Tree No.           | Species     | Ht. (m)                                                                                                                                   | Dia. (mm) | Crown Spread (m) | Dist. to building (m) | Age Classification      | Ownership                                    |
|--------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------|-----------------------|-------------------------|----------------------------------------------|
| T1                 | Turkey Oak  | 20                                                                                                                                        | 500 *     | 12 *             | 10                    | Similar Age to Property | Third Party<br>7 Yew Tree Avenue<br>PO8 8AH  |
| Management history |             | No significant recent management noted.                                                                                                   |           |                  |                       |                         |                                              |
| Recommendation     |             | Reduce height to 18m and crown spread to 9m leaving balanced crown. Prune on a triennial cycle to maintain at broadly reduced dimensions. |           |                  |                       |                         |                                              |
| T2                 | Turkey Oak  | 20                                                                                                                                        | 475 *     | 12 *             | 4.5                   | Similar Age to Property | Third Party<br>9 Yew Tree Avenue<br>PO8 8AH  |
| Management history |             | No significant recent management noted.                                                                                                   |           |                  |                       |                         |                                              |
| Recommendation     |             | Reduce height to 18m and crown spread to 9m leaving balanced crown. Prune on a triennial cycle to maintain at broadly reduced dimensions. |           |                  |                       |                         |                                              |
| TG1                | Hawthorn    | 6 *                                                                                                                                       | 105 Ms *  | 4                | 3                     | Younger than Property   | Third Party<br>11 Yew Tree Avenue<br>PO8 8AH |
| Management history |             | No significant recent management noted.                                                                                                   |           |                  |                       |                         |                                              |
| Recommendation     |             | Reduce height to 2m and crown spread to 2m leaving balanced crown. Prune on an annual cycle to maintain at broadly reduced dimensions.    |           |                  |                       |                         |                                              |
| TG2                | English Oak | 15                                                                                                                                        | 475 *     | 15 *             | 9                     | Older than Property     | Third Party<br>13 Yew Tree Avenue<br>PO8 8AH |
| Management history |             | Subject to past management/pruning - appears regularly pruned.                                                                            |           |                  |                       |                         |                                              |
| Recommendation     |             | Remove (fell) to near ground level. Owner to physically remove any regrowth (no chemical treatment due to translocation risk).            |           |                  |                       |                         |                                              |

Ms: multi-stemmed

\* Estimated value

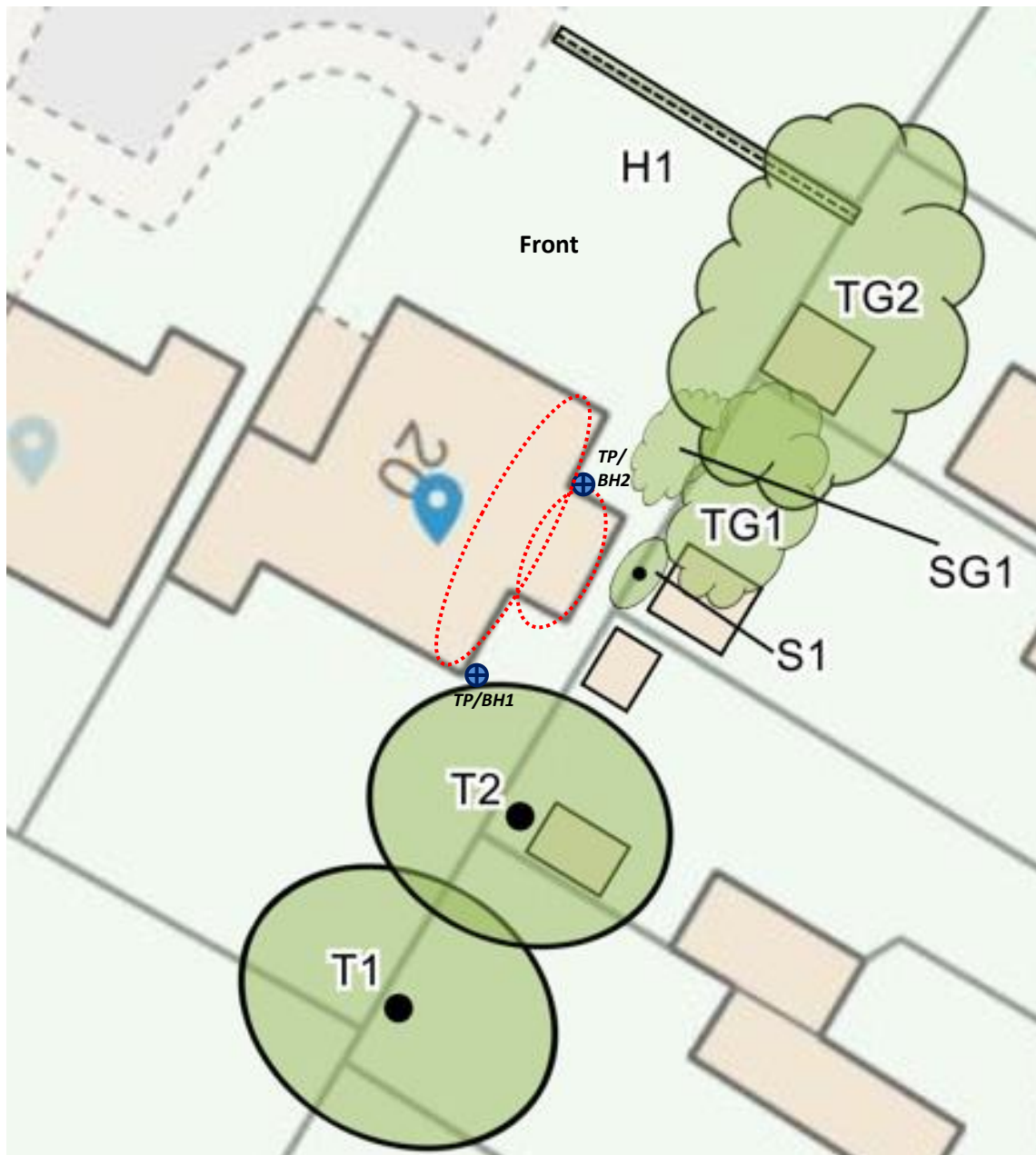
**Table 2** **Future Risk - Tree Details & Recommendations**

| Tree No.           | Species               | Ht. (m)                                                        | Dia. (mm) | Crown Spread (m) | Dist. to building (m) | Age Classification    | Ownership                                                        |
|--------------------|-----------------------|----------------------------------------------------------------|-----------|------------------|-----------------------|-----------------------|------------------------------------------------------------------|
| S1                 | Cherry-laurel         | 4 *                                                            | 100 *     | 5                | 1.5                   | Younger than Property | Third Party<br>11 Yew Tree Avenue<br>PO8 8AH                     |
| Management history |                       | Subject to past management/pruning - appears regularly pruned. |           |                  |                       |                       |                                                                  |
| Recommendation     |                       | Do not allow to exceed current dimensions.                     |           |                  |                       |                       |                                                                  |
| SG1                | Viburnum, Cotoneaster | 2                                                              | 30 Ms *   | 2                | 2                     | Younger than Property | Policy Holder                                                    |
| Management history |                       | Subject to past management/pruning - appears regularly pruned. |           |                  |                       |                       |                                                                  |
| Recommendation     |                       | Do not allow to exceed current dimensions.                     |           |                  |                       |                       |                                                                  |
| H1                 | Beech, Cypress        | 5                                                              | 85 *      | 2                | 8                     | Younger than Property | Boundary<br>Policy Holder &/or<br>29 Pinetree Gardens<br>PO8 8AE |
| Management history |                       | Subject to past management/pruning - appears regularly pruned. |           |                  |                       |                       |                                                                  |
| Recommendation     |                       | Do not allow to exceed current dimensions.                     |           |                  |                       |                       |                                                                  |

Ms: multi-stemmed

\* Estimated value

## Site Plan



Plan not to scale – indicative only

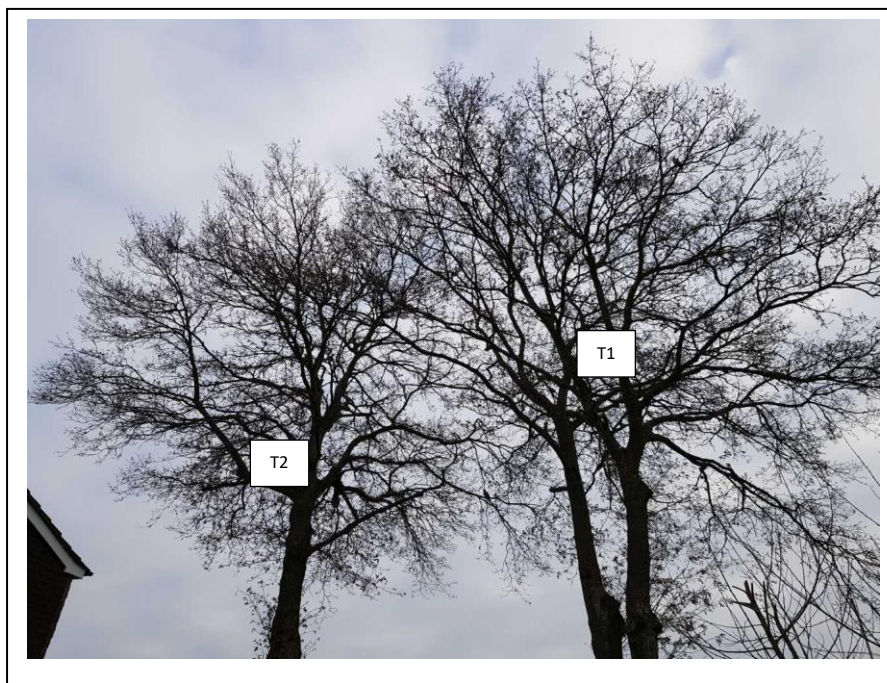


Approximate areas of damage

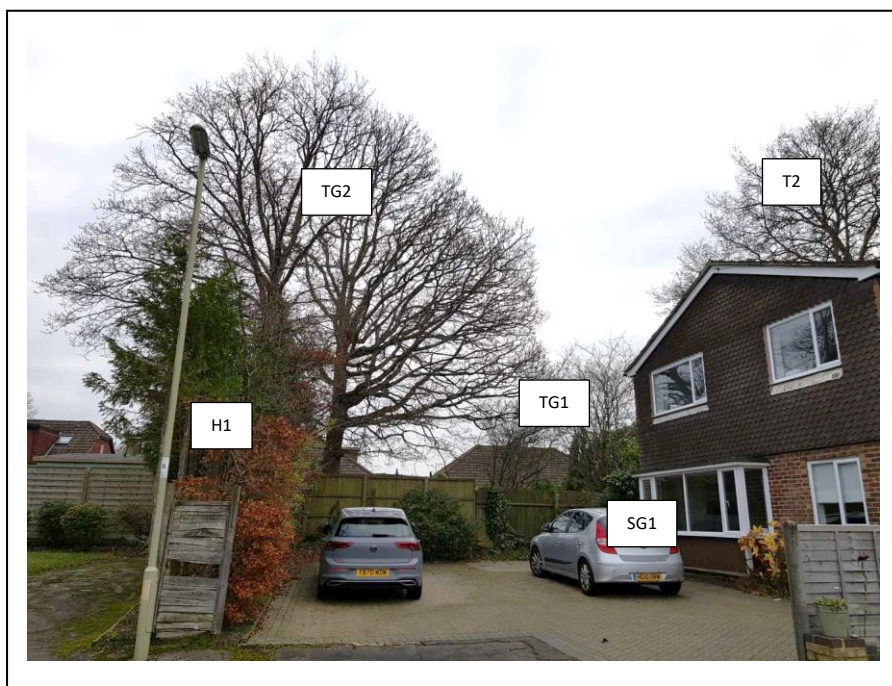
## Images



View of rear left corner of dwelling



View of crowns of T2 and T1



View of front of property



View of TG2