

Arboricultural Consultancy for Aviva

Note: This report is intended for use between the client, Environmental Services and any parties detailed within the report. It is based on the understanding at the time of visiting the property that Engineers are satisfied that damage is attributable to clay shrinkage subsidence exacerbated by vegetation.

1. Case Details

Insured			
Client	Subsidence Management Services	Contact	Alun Dwyer
ES Ref	SA-247750	Consultant	Lewis Fraser
Report Date	10/03/2021		

Scope of Report: To survey the property and determine significant vegetation contributing to subsidence damage, make recommendation for remedial action and assess initial mitigation and recovery prospects. The survey does not make an assessment for decay or hazard evaluation.

2. Property and Damage Description

The insured structure is a single-storey detached bungalow with various extensions including a conservatory to the left flank. The property occupies a level site with no adverse topographical features.

Damage relates to the front left-hand corner of the insured dwelling. Please refer to the engineers report for a full description of the claim history and damage.

3. Technical Reports

In preparing our report we have had the benefit of the following technical investigations:

Soil Analysis	☒	Drain Report	☒	Foundation Detail	☒
Root Analysis	☒	Borehole Log	☒	Engineers Report	☒

4. Action Plan

Mitigation	
Insured involved?	Yes
Local Authority involved?	No
Other third party Mitigation involved?	Yes
Recovery	
Is there a potential recovery action?	Yes

Treeworks	
Local Authority	Arun District Council
TPO / Conservation Area / Planning Protection Searches	Insured: TPO Adjacent & Adjoining properties: TPO
Additional Comments	
Awaiting Further Instructions.	
A potential recovery action has been identified.	
Engineers should consider focusing investigations to strengthen factual evidence for disclosure to third party tree owners.	

5. Technical Synopsis

This report is based upon our understanding at the time of visiting the property that Subsidence Management Services's engineers are satisfied that damage is due to clay shrinkage subsidence exacerbated by vegetation.

The conditions necessary for clay shrinkage subsidence to manifest have been established by site investigations, whilst roots have been recovered below foundation in Trial Pit/Borehole 1.

Samples of these roots were recovered from underside of foundations and throughout the borehole, these roots were identified (using anatomical analysis) as having emanated from the genus *Pinus* spp. (Pines).

Given the above, vegetation is deemed to retain the capacity to be causal to the current movement/damage.

We have therefore been instructed to advise on the causal vegetation and to deliver management proposals which will provide on-going and long term stability allowing repairs to be undertaken.

Arboricultural Consultancy for Aviva

Our survey of the site identified T2 (Austrian Pine), given its position relative to the damage it is our opinion that the Pinus spp. roots identified will emanate from this vegetation.

However, whilst not directly implicated by positive root analysis, based on our site investigations, and taking account of vegetation location, relative to the focal area of movement/damage, it is our opinion that T1 (Monterey Cypress) retains the capacity to be extending roots below the focal area of movement.

The influence of the above vegetation is determined by the size and proximity of the tree relative to the area of damage, whilst also taking into account species profile and site topography; it is in our opinion that on balance of probability that roots from the above vegetation will also be in proximity to the footings of the insured property.

In assessing the extent of damage, the potential drying influence of the vegetation on site and based on our site investigations, taking account of vegetation location, relative to the focal area of movement/damage, it is our opinion that, T1 & T2 are considered the dominant features, and accordingly we have identified them as the principal cause of the subsidence damage.

Considering engineers conclusions, results of site investigations and our observations on site, vegetation management is considered appropriate with a view to restoring stability.

Please refer to Section 6 for management prescriptions.

Vegetation management in the form of removal and appropriate stump treatment will help to promote the restoration of long-term stability to the insured property.

Whilst we have given consideration to pruning as a means of mitigating the vegetative influence of the above, this has been discounted.

Pruning is generally ineffective and in the context of the current claim we consider the above vegetation is simply too large and/or close for pruning to be effective.

Consequently, removal of T1 and T2 will offer the most certain and reliable Arboricultural solution likely to restore long-term stability.

The extent of vegetation management required to restore and maintain long-term stability at this property is high and its impact acknowledged. However, we consider the impact on the wider public amenity from the proposed tree works is mitigated by the presence of further trees and the scope for replacement planting.

Replacement planting is considered appropriate however due consideration must be given to the ultimate size of the replacement and future management requirements; species selection should be appropriate for the chosen site and ultimate tree height should not exceed 75% of the available distance to built structures.

We recommend the efficacy of the management recommendations be qualified by means of further monitoring to confirm stability.

Please note that the footing of the insured property fall within the anticipated rooting distance of additional vegetation which we believe presents a foreseeable risk of future damage and accordingly we have made recommendations in respect of this.

Is vegetation likely to be a contributory factor in the current damage?	Yes
Is vegetation management likely to contribute to the future stability of the property?	Yes
Is replacement planting considered appropriate?	Yes
Would DNA profiling be of assistance in this case?	No

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6.0 Recommendations

6.1 Current Claim Requirements

These recommendations may be subject to review following additional site investigations.

Tree No.	Species	Age Cat	Approx. Height (m)	Distance to Building (m) *	Ownership	Action	Requirement
T1	Cypress (Monterey)	3	22	6.8	A - Third Party	Remove	Remove close to ground level.
T2	Pine	3	16.5	10.5	A - Third Party	Remove	Note: Austrian Pine. Remove close to ground level.
Age Cat: 1 = Younger than property, 2 = Similar age to the property, 3 = Significantly older than property							

* Estimated

6.2 Future Risk Recommendations

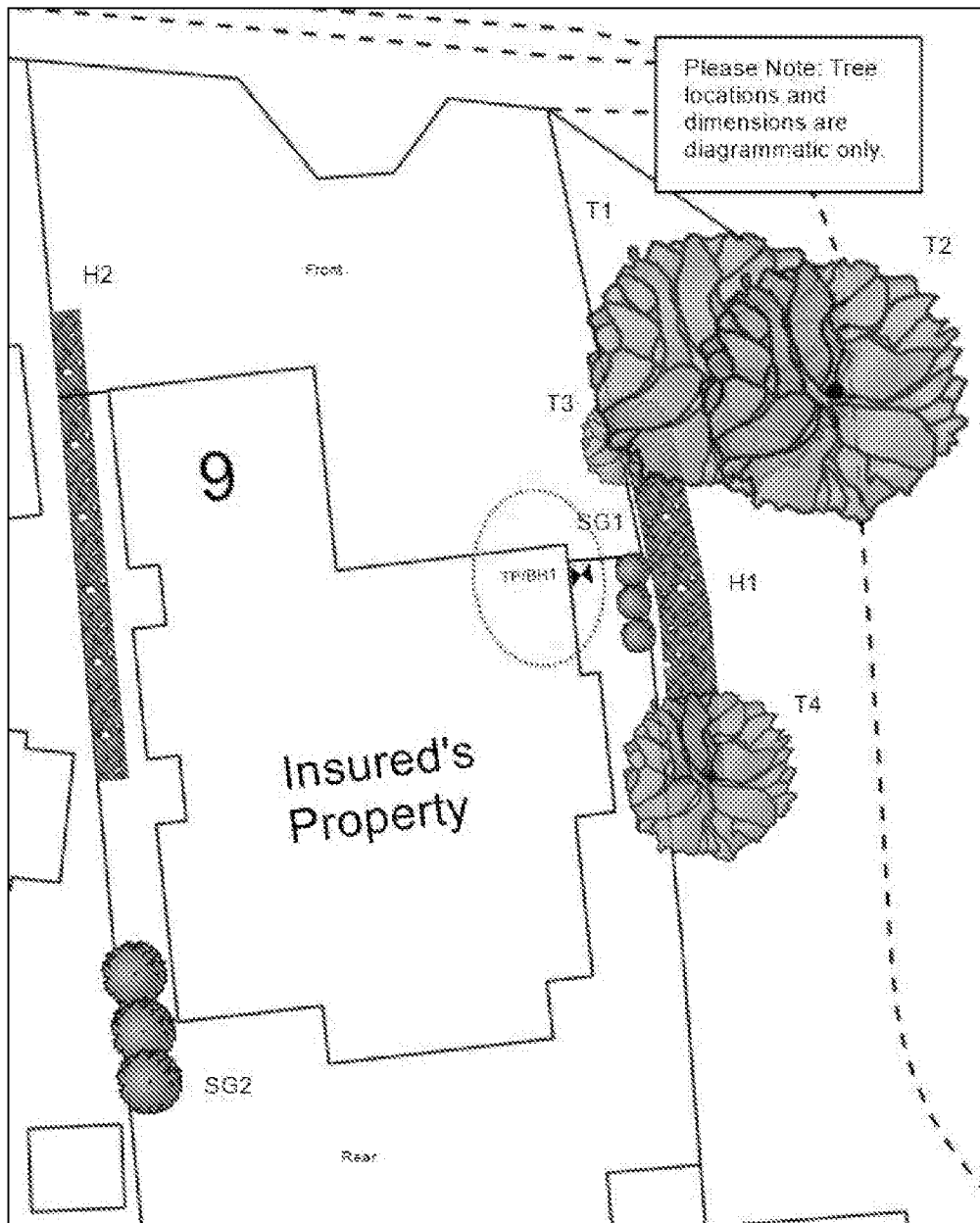
These recommendations may be subject to review following additional site investigations.

Tree No.	Species	Age Cat	Approx. Height (m)	Distance to Building (m) *	Ownership	Action	Requirement
H1	Mixed Species Hedge: including Holm Oak, Holly, Spotted Laurel & Hazel.	1	2.3	2	A - Third Party	Action to avoid future risk	Note: Distance measured to side Conservatory, where hedge stands 2.7m to front left-hand corner. Do not allow to exceed current dimensions by way of regular pruning.
H2	Mixed Species Hedge: including Spotted Laurel, Ornamental Cypress spp. & Aucuba spp.	1	2.5	2	C - Insured	Action to avoid future risk	Reduce hedge to height of 2m and maintain at reduced dimensions by way of regular pruning.
SG1	Mixed species shrubs: including Variegated Griselinia, Hebe & Pyracantha.	1	2	2.8	C - Insured	Action to avoid future risk	Do not allow to exceed current dimensions by way of regular pruning.
SG2	Mixed species shrubs: including Cypress, Cherry Laurel & Japanese Red Cedar.	1	3.6	2	C - Insured	Action to avoid future risk	Reduce Cherry Laurel component to height of 2m and maintain at reduced dimensions by way of regular pruning. Do not allow remaining components to exceed current dimensions by way of regular pruning.
T3	Oak (Holm)	1	4	5	A - Third Party	Action to avoid future risk	Do not allow to exceed current dimensions by way of regular pruning.
T4	Birch (Silver)	3	9.5	3.2	A - Third Party	Action to avoid future risk	Remove close to ground level and treat stump to inhibit regrowth.
Age Cat: 1 = Younger than property, 2 = Similar age to the property, 3 = Significantly older than property							

* Estimated

Third party property addresses should be treated as indicative only, should precise detail be required then Environmental Services can undertake Land Registry Searches

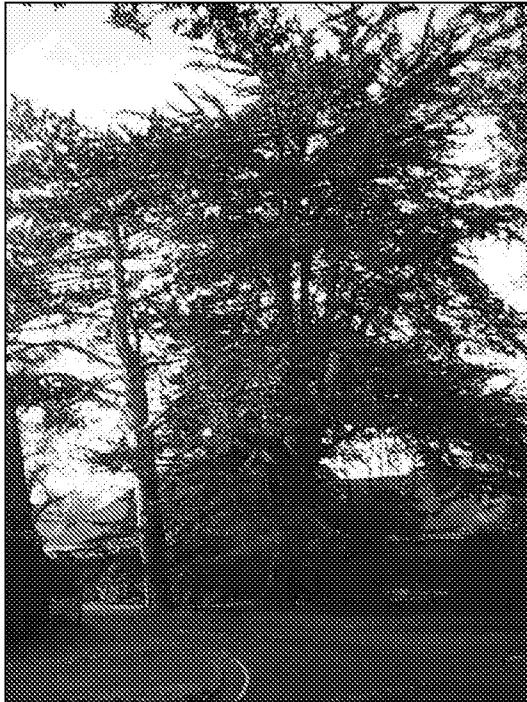
7. Site Plan



Please note that this plan is not to scale. OS Licence No. 100043218

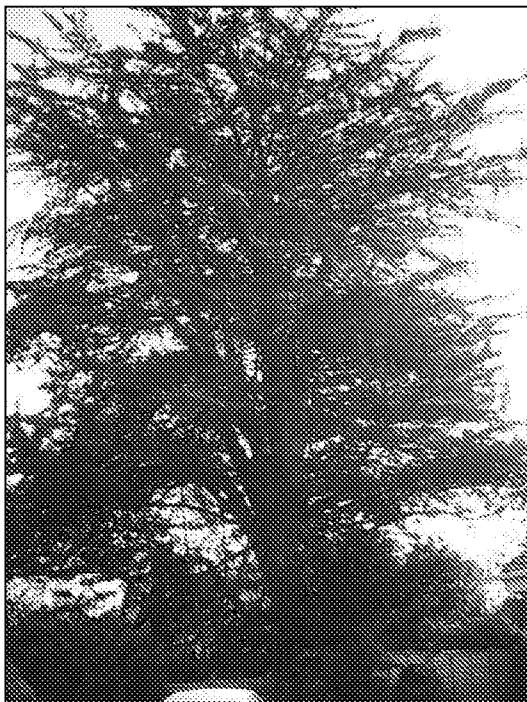
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8. Photographs



General Site

T1 - Monterey Cypress (Right) & T2 - Austrian Pine (Left); observed from Sea Lane

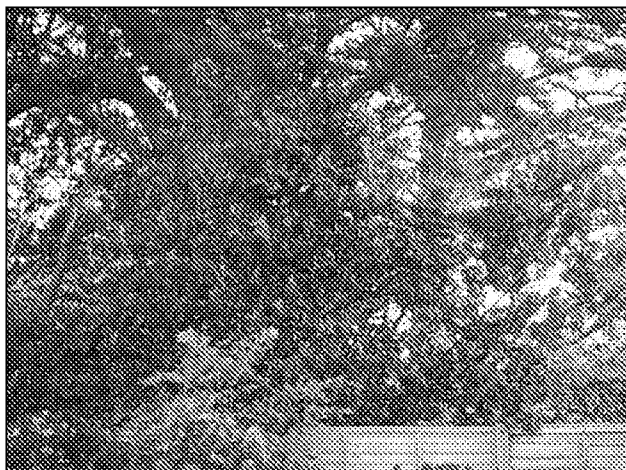


T1 - Cypress (Monterey)



T1 & T2 (Stems on domestic third party land)

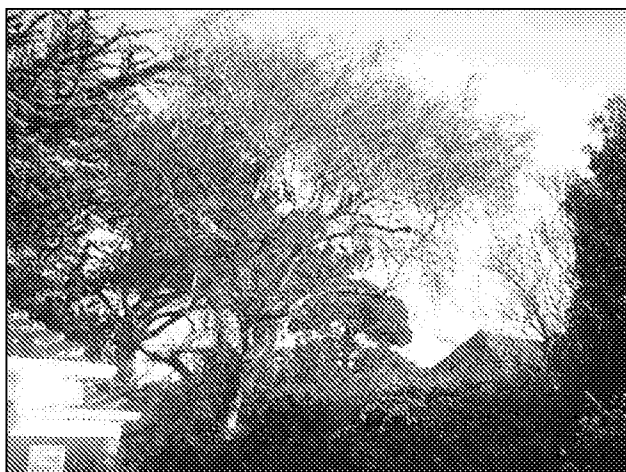
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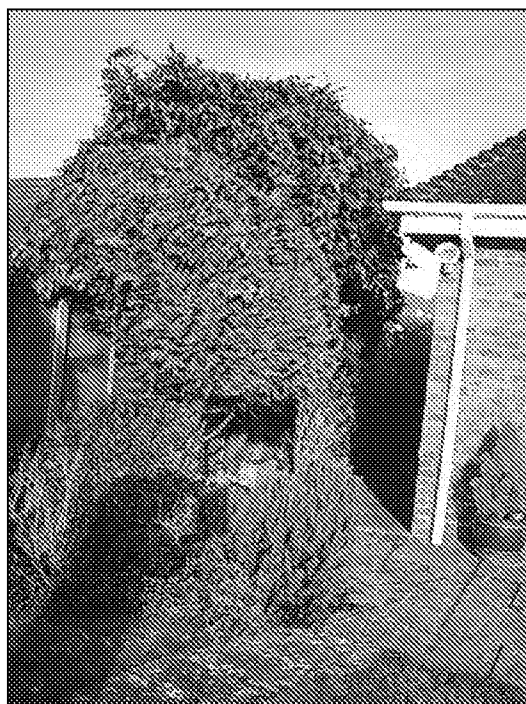
T3 - Oak (Holm)



SG1 - Mixed species shrubs



T4 - Birch (Silver)



SG2 - Mixed species shrubs

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H2 - Mixed species hedge



General Site

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Date: 10/03/2021

Property: 6 Sea Lane, Ferring, Worthing, BN12 5DS

9. Tree Works Reserve - Does not include recommendations for future risk.

Insured Property Tree Works	
Third Party Tree Works	
Provisional Sum	

- The above prices are based on works being performed as separate operations.
- The above is a reserve estimate only.
- Ownerships are assumed to be correct and as per Section 6.
- A fixed charge is made for Tree Preservation Order/Conservation Area searches unless charged by the Local Authority in which case it is cost plus 25%.
- Should tree works be prevented due to statutory protection then we will automatically proceed to seek consent for the works and Appeal to the Secretary of State if appropriate.
- All prices will be subject to V.A.T., which will be charged at the rate applying when the invoice is raised.
- Trees are removed as near as possible to ground level, stump and associated roots are not removed or included in the price.
- Where chemical application is made to stumps it cannot always be guaranteed that this will prevent future regrowth. Should this occur we would be pleased to provide advice to the insured on the best course of action available to them at that time. Where there is a risk to other trees of the same species due to root fusion, chemical control may not be appropriate.

10. Limitations

This report is an appraisal of vegetation influence on the property and is made on the understanding that that engineers suspect or have confirmed that vegetation is contributing to clay shrinkage subsidence, which is impacting upon the building. Recommendations for remedial tree works and future management are made to meet the primary objective of assisting in the restoration of stability to the property. In achieving this, it should be appreciated that recommendations may in some cases be contrary to best Arboricultural practice for tree pruning/management and is a necessary compromise between competing objectives.

Following tree surgery we recommended that the building be monitored to establish the effectiveness of the works in restoring stability.

The influence of trees on soils and building is dynamic and vegetation in close proximity to vulnerable structure should be inspected annually.

The statutory tree protection status as notified by the Local Authority was correct at the time of reporting. It should be noted however that this may be subject to change and we therefore advise that further checks with the Local Authority MUST be carried out prior to implementation of any tree works. Failure to do so can result in fines in excess of £20,000.

Our flagging of a possible recovery action is based on a broad approach that assume all third parties with vegetation contributing to the current claim have the potential for a recovery action (including domestic third parties). This way opportunities do not "fall through the net"; it is understood that domestic third parties with no prior knowledge may be difficult to recover against but that decision will be fully determined by the client.

A legal Duty of Care requires that all works specified in this report should be performed by qualified, arboricultural contractors who have been competency tested to determine their suitability for such works in line with Health & Safety Executive Guidelines. Additionally all works should be carried out according to British Standard 3998:2010 "Tree Work. Recommendations".

GEOTECHNICAL

for Subsidence Management Services

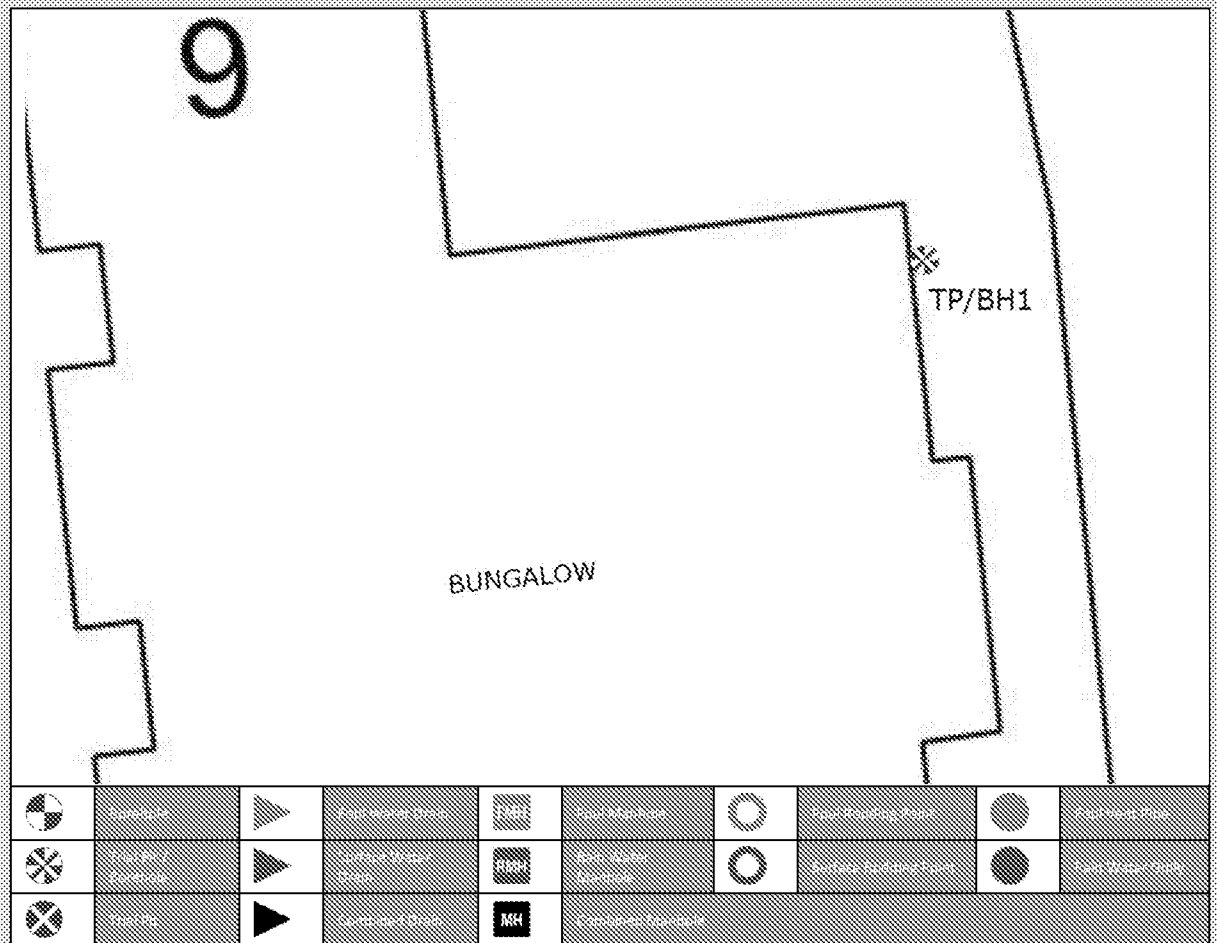
6 Sea Lane, Ferring, Worthing, BN12 5DS

Client: Subsidence Management Services

Client Contact: Alun Dwyer



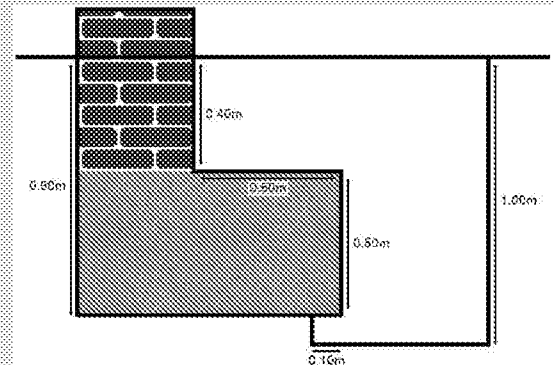
Site Plan



TP/BH1 Foundation Detail and Borehole Log

Foundation Detail

House foundation comprised of brick wall to 400mm bgl, bearing on concrete to 900mm bgl, with a total projection of 500mm from the elevation. Underside of foundation (USF) was exposed to 100mm back from the face of the foundation and probed 500mm back from the face of the foundation.



No.	Sample		Test		Depth	Log	Soil Description and Observations
	Type	Depth (m)	Type	Depth (m)			
					0.0		Surface level
					0.5		SUB-BASE resembling M27/D1p Type 1.
					0.5		Soft dark brown very sandy CLAY
					1.0		Soft dark brown very sandy CLAY with rare fine flint.
					1.5		Soft dark brown very sandy CLAY with rare fine flint.
					2.0		Soft dark brown very sandy slightly gravelly CLAY with rare fine flint.
					2.5		Soft dark brown mottled orange very sandy slightly gravelly CLAY with occasional fine to medium flint.
					3.0		Soft dark brown mottled orange very sandy slightly gravelly CLAY with occasional fine to medium flint.
					3.5		Soft dark brownish grey mottled orange very sandy slightly gravelly CLAY with occasional fine to medium flint.
					4.0		End of borehole at 4.00m.

Top of excavated to 1.00m bgl. Borehole completed by mesh window sampler.

Site Observations

GENERAL:

Site Investigation works (TP/BH 1) undertaken on 30 January 2021 during moderate rain.

HEALTH AND SAFETY:

Negative signal obtained in Power and Radio mode on the Cable Avoidance Tool (CAT) (TP/BH1).

FOUNDATIONS:

House foundation was exposed and the underside of foundation (USF) recorded to be 0.9m bgl (TP/BH 1).

ROOTS:

Roots encountered to 2m bgl (TP/BH 1).

IN SITU TESTING:

Hand Shear Vane (SV) undertaken at 1m bgl (TP/BH 1) within the window sample borehole and thereafter in the window sample borehole at maximum 0.1m intervals.

WATER STRIKES:

No water strikes (NWS) encountered (TP/BH 1).

ROOT IDENTIFICATION

for Subsidence Management Services

6 Sea Lane, Ferring, Worthing, BN12 5DS

Client: Subsidence Management Services
Client Contact: Alun Dwyer



Intec
Parc Menai, Bangor,
Gwynedd, North Wales
LL57 4FG

Sub Sample	Species Identified	Root Diameter	Starch
TP/BH1:			
1-2m	<i>Pinus</i> spp.	1	2 mm
			Abundant

Comments:

1 - Plus 3 others also identified as *Pinus* spp.

Pinus spp. are pines.

Signed: R J Shaw

Unless we are otherwise instructed in writing, the above sample material will normally be disposed of 6 years after the date of this report.

SubsNetuk



Drainage Investigation Report

For Subsidence Management Services

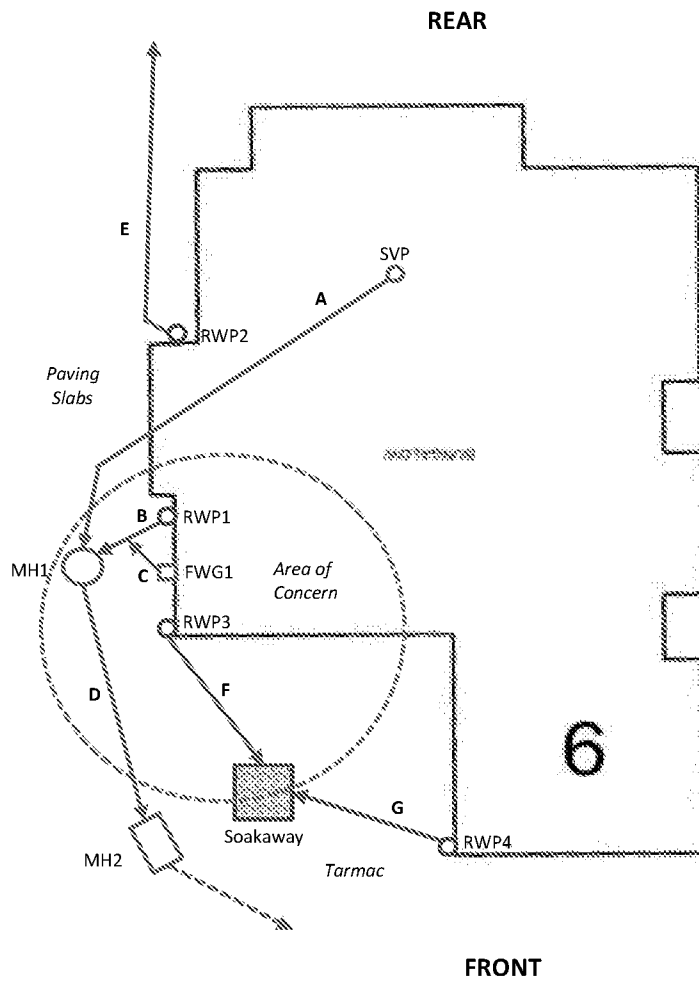
Visit Date: 1st February 2021

Our Reference: C58978 D19802

Report Date: 06/02/2021

Report Content:

- Front Page
- Site Plan
- CCTV Coding
- Drain Overview
- Photographs
- Quote



Key

	Tree		Building		Combined Drains		Unsurveyed Drains
	Shrubs		Water Supply		Foul Drains		Storm Drains
	Bushes		Launch Pit		WC		Excavation
	Boundary		Stop Valve		Exploratory Hole		Area of Concern
			Soak-Away		Bore Hole		

Notes:

Address:

6 Sea Lane, Worthing, BN12 5DS

RUN	Start From :	MH1	Finish at :	SVP	Pipe Ø:	100mm
A	Invert Level (m):	0.6	Invert Level (m):	N/A	Material:	Plastic
FOUL	Condition grade:	A	Direction:	Upstream	Responsibility:	Home Owner
Distance	Code	Hydraulic Test - Not Tested				
0.00	SN	Start Node from MH1				
0.00	WL	Water Level 0%				
0.08	LR	Line of drain deviates right °				
5.70	LU	Line of drain deviates up 90°				
5.85	FN	Finish Node at SVP				
RUN	Start From :	MH1	Finish at :	RWP1	Pipe Ø:	100mm
B	Invert Level (m):	0.6	Invert Level (m):	N/A	Material:	Plastic
COMBINED	Condition grade:	A	Direction:	Upstream	Responsibility:	Home Owner
Distance	Code	Hydraulic Test - Pass				
0.00	SN	Start Node from MH1				
0.00	WL	Water Level 0%				
0.08	JN	Junction at 3 o'clock to FWG1				
0.42	LU	Line of drain deviates up 90°				
1.03	FN	Finish Node at RWP1				
RUN	Start From :	FWG1	Finish at :	RUN B	Pipe Ø:	100mm
C	Invert Level (m):	N/A	Invert Level (m):	N/A	Material:	Plastic
FOUL	Condition grade:	A	Direction:	Downstream	Responsibility:	Home Owner
Distance	Code	Hydraulic Test - Pass				
0.00	SN	Start Node from FWG1				
0.00	WL	Water Level 0%				
1.16	FN	Finish Node at Run B				
RUN	Start From :	MH1	Finish at :	MH2	Pipe Ø:	100mm
D	Invert Level (m):	0.6	Invert Level (m):	N/A	Material:	Plastic
COMBINED	Condition grade:	B	Direction:	Downstream	Responsibility:	Home Owner
Distance	Code	Hydraulic Test - Pass				
0.00	SN	Start Node from MH1				
0.00	WL	Water Level 0%				
8.02	MC	Material of drain changes at this point to Clay				
8.02	JDM	Joint Displaced (Medium)				
9.01	FN	Finish Node at MH2				
RUN	Start From :	RWP2	Finish at :	BEYOND AOC	Pipe Ø:	100mm
E	Invert Level (m):	0.6	Invert Level (m):	N/A	Material:	Plastic
STORM	Condition grade:	A	Direction:	Downstream	Responsibility:	Home Owner
Distance	Code	Hydraulic Test - Not Tested				
0.00	SN	Start Node from RWP2				
0.00	WL	Water Level 0%				
0.73	LR	Line of drain deviates right °				
7.47	FN	Finish Node - Beyond Area of Concern				

Address:

6 Sea Lane, Worthing, BN12 5DS

Following the receipt of your instruction, we attended site to carry out a CCTV survey.

The CCTV survey was undertaken in general accordance with the Manual of Sewer Classification and the WRc Drain Repair Book.

All runs were cleaned by high pressure water jetting prior to the CCTV survey.

The following presents a summary of the findings with recommendations to repair and/ or return the drains to a serviceable state, where necessary.

Drain Run A: MH1 U/S TO SVP

Pipe Diameter: 100mm

Responsibility: Home Owner

Hydraulic Pressure Test: Not Tested, No upstream access

CCTV Survey Result: No structural damage

Recommended Repair:

No repairs have been recommended as the drain line was found to be free from defects.

Drain Run B: MH1 U/S TO RWP1

Pipe Diameter: 100mm

Responsibility: Home Owner

Hydraulic Pressure Test: Pass

CCTV Survey Result: No structural damage

Recommended Repair:

No repairs have been recommended as the drain line was found to be free from defects.

Drain Run C: FWG1 D/S TO RUN B

Pipe Diameter: 100mm

Responsibility: Home Owner

Hydraulic Pressure Test: Pass

CCTV Survey Result: No structural damage

Recommended Repair:

No repairs have been recommended as the drain line was found to be free from defects

Drain Run D: MH1 D/S TO MH2

Pipe Diameter: 100mm

Responsibility: Home Owner

Hydraulic Pressure Test: Pass

CCTV Survey Result: Structural damage, Joint displacement between UPVC and clay materials

Recommended Repair:

- Cover area in protective sheeting
- To prepare the drain line and insert 1x resin patch liner to cover defects

Address:

6 Sea Lane, Worthing, BN12 5DS

Drain Run E: RWP2 D/S TO BEYOND AREA OF CONCERN**Pipe Diameter:** 100mm**Responsibility:** Home Owner**Hydraulic Pressure Test:** Not tested, no downstream access**CCTV Survey Result:** No structural damage**Recommended Repair:**

No repairs have been recommended as the drain line was found to be free from defects

Drain Run F: RWP3 D/S TO SOAKAWAY**Pipe Diameter:** 100mm**Responsibility:** Home Owner**Hydraulic Pressure Test:** Not tested, no downstream access**CCTV Survey Result:** No structural damage**Recommended Repair:**

No repairs have been recommended as the drain line was found to be free from defects

Drain Run G: RWP4 D/S TO SOAKAWAY**Pipe Diameter:** 100mm**Responsibility:** Home Owner**Hydraulic Pressure Test:** Not tested, no downstream access**CCTV Survey Result:** No structural damage, Root mass intrusion at 4.30m**Recommended Repair:**

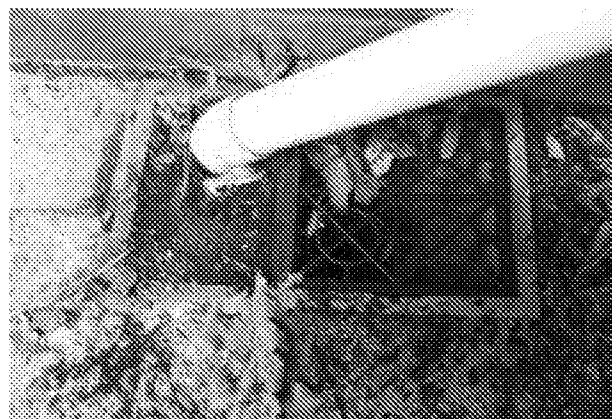
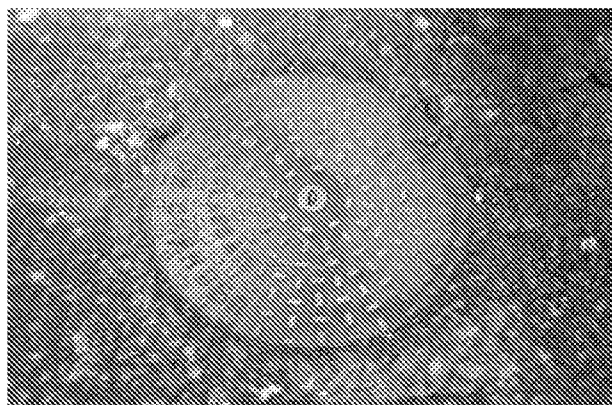
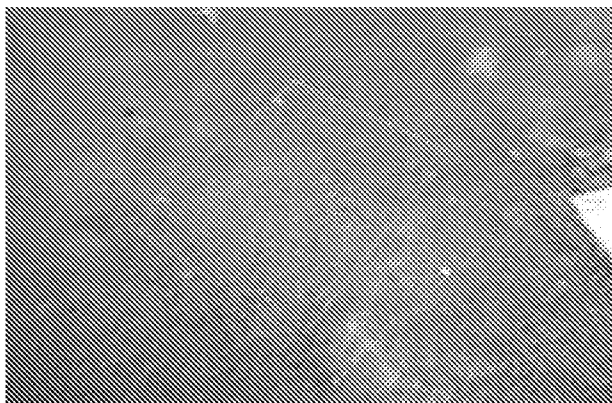
If covered for roots

- Cover area in protective sheeting
- To carry out an isolated excavation on the pipe at 4.30m
- Mechanical root cutting to remove roots from pipe
- To carry out a further look-see CCTV survey and report findings
- Bed new pipe, compact, back fill and reinstate tarmac

Water Main Test	Result	Acoustic Test
	PASS	No noise could be heard which indicates that there is no leak

Address:

6 Sea Lane, Worthing, BN12 5DS



Address:

6 Sea Lane, Worthing, BN12 5DS

RUN / LOCATION: RUN D

Repair Item	Description	Unit	Quantity
UK1180	Patch Lining. Up to 0.6m x 100mm	nr	1.00
UK1133	Van pack HPWJ & CCTV in preparation of lining	nr	1.00
UK0025	Protection Temporary works to floors, 1000 gauge	m2	2.00
			Total (Excl VAT)

RUN / LOCATION: RUN G

Repair Item	Description	Unit	Quantity
UK0561	Mechanical Root Cutting	m	4.00
*	CCTV survey of underground drainage & report	nr	1.00
UK1055	Removal, disposal and reinstatement of tarmac path / kerbside drainage 100mm thick	m2	1.00
UK0605	Excavate & remove isolated length. Replace in new 110mm PVCu. Bed removed. Backfill new 1000mm	nr	1.00
UK0880	Short Radius Bend. Remove existing item and replace with new 110mm PVCu	nr	2.00
UK1060	Extra over pipework for surrounding drain run in 100mm thick separate	m	1.00
UK0025	Protection Temporary works to floors, 1000 gauge	m2	2.00
UK8120300	Hardcore Filling to excavations over 250 mm average thick	m	1.00
UK2050005	Disposal by hand excavated contaminated/saturated material off site	m3	1.00
			Total

REPAIR ESTIMATE TOTALS:

Run / Location

RUN D

RUN G

Address:

6 Sea Lane, Worthing, BN12 5DS