



**Land to the Rear of 1 Brockwell Cottage
Faygate Lane
Horsham
West Sussex**

Geotechnical Assessment Report

Report Beneficiary:
Telbridge Properties Ltd
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Horsham
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EXECUTIVE SUMMARY

The following presents a summary of the main findings of the report. It is emphasised that no reliance should be placed on any individual point until the whole of the report has been read as other sections of the report may put into context the information contained herein.

The proposed development comprises the construction of a new detached single-storey dwelling on land to the rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex. The development proposals also include a soft landscaped garden to the rear and 3 off street parking bays at the front, with the new house facing onto Old Forge Close to the immediate west.

Reference to geological datasets indicates that the site is expected to be underlain by the Weald Clay Formation. The ground investigation confirmed the underlying soils to comprise a shallow thickness of made ground, overlying Weald Clay Formation deposits.

The Weald Clay Formation is classed as Unproductive Stratum. The site does not lie within a SPZ. Groundwater was not encountered during the short period of the intrusive works.

Precautions against shrinkage and heave for any new foundation system should assume a medium volume change potential for the fine-grained Weald Clay Formation soils.

A net allowable bearing capacity of 150kN/m² may be assumed for pad or strip foundations up to 1.00m in breadth that are constructed directly onto the Weald Clay Formation of at least stiff consistency.

Ground floors should be suspended unless the conditions set out within this report can be met.

A DS-1 Design Sulfate Class and an AC-2z ACEC classification should be assumed as a minimum for the design of concrete in contact with the ground.

Infiltration tests indicate that the Weald Clay Formation soils possess negligible infiltration characteristics.

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1. INTRODUCTION

It is proposed to construct a new detached single-storey dwelling on land to the rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex. The development proposals also include a soft landscaped garden to the rear and 3 off street parking bays at the front, with the new house facing out onto Old Forge Close to the immediate west. A copy of the proposed development layout is presented in Appendix A.

Ashdown Site Investigation Ltd was requested to undertake a ground investigation and to provide advice to assist with the structural design.

The specific objectives of the works were to:

- a) Establish the expected geology and hydrogeology at the site;
- b) Investigate the shallow ground and groundwater conditions prevailing at the site; and
- c) Provide advice to assist others in undertaking design of spread foundations, ground floors and soakaways.

The scope of the works covered by this report, and the terms and conditions under which they were undertaken, were set out within the offer letter Q13327, dated 25th August 2023. The instruction to proceed was received on behalf of the client, Telbridge Properties Ltd.

2. SITE CONTEXT

2.1 Site Location

The site comprises an overgrown plot of land to the rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex, and is centred on the approximate Ordnance Survey national grid reference 521753, 134248. The site is largely bound by residential properties, with Old Forge Close to the west. A site location plan and site plan are presented as Figure 1 and Figure 2, respectively.

2.2 Geological and Hydrogeological Data

2.2.1 Expected Geology and Aquifer Designation

The stratigraphic unit that may be expected to underlie the site has been established by reference to British Geological Survey (BGS) mapping and the BGS Lexicon of Named Rock Units. The expected stratigraphy is presented in the following table.

Table 1. Expected Strata and Aquifer Designation

Type	Stratum	Aquifer Designation
Bedrock	Weald Clay Formation	Unproductive Stratum

The Weald Clay Formation forms part of the Wealden Group. The formation is of Hauterivian to Barremian age (126.3 to 133.9 million years old; Early Cretaceous). The Weald Clay Formation comprises dark grey thinly-bedded mudstones (shales) and mudstones with subordinate siltstones, fine to medium grained sandstones, including calcareous sandstone (e.g. Horsham Stone Member), shelly limestones (the so called "Paludina Limestones") and clay ironstones. The formation is recorded by the BGS to range in thickness up to 460m.

2.2.2 Mining and Ground Workings

The geological units of the Wealden Group, including the Weald Clay Formation, were locally mined for iron during the early Roman period, the Medieval period and significantly between the 15th and 18th centuries. The mining activities were associated with hammer and furnace ponds, and forges. The locations of many of the workings are unknown, the works mostly having been dismantled and sites overgrown with woodland. Many of the old ponds in the Weald may be representative of old hammer or furnace ponds.

The historical extraction was mostly from open pits excavated from surface, but during the Medieval period, extraction in the eastern Weald was increasingly from mine pits. These mine pits were typically five metres in diameter and up to twelve metres deep. The pits were worked in sequence with spoil from one pit used to in-fill the one before. In the western part of the Weald, the principal method of extracting iron ore was also the mine pit but smaller in scale; the pits consisted of a vertical shaft up to 2.5 metres in diameter and the base of the shaft would have been widened out.

The British Geological Survey GeoIndex Onshore viewer records the presence of a brick works (Faygate Brick Works) approximately 0.1km to the west of the site in addition to several other historical pits within 1km of the site. A search of the Wealden Iron Research Group database (www.wirgdata.org) revealed 5 records of iron workings within 1km of the site described as

being ore pits. The closest record is Durrants Copse some 370m to the north of the site and the remaining records refer to Budds Copse to the north west, Fullers Shaw to the north east and Faygate Forest (east and north) to the south of the site. The risk posed to the development is considered to be very low.

Further assessment of the natural ground and mining hazards can be undertaken, if required, to provide more detailed comment specific to the site.

2.2.3 *Groundwater Source Protection Zones (SPZ)*

The Environment Agency defines SPZs as those areas where groundwater supplies are at risk from potentially polluting activities and accidental releases of pollutants. SPZs are primarily a policy tool used to control activities close to water supplies intended for human consumption.

The site does not lie within a SPZ.

3. SITE WORKS

3.1 Introduction

The intrusive site works comprised a series of dynamic sampler boreholes, together with accompanying in-situ geotechnical testing. The intrusive work was carried out on 17th October 2023. The exploratory hole locations are shown on Figure 2.

Descriptions of the strata encountered and comments on groundwater conditions are shown in the exploratory hole records given in Appendix B, together with explanatory notes to assist in their interpretation.

3.2 Exploratory Holes

The following table summarises the intrusive works undertaken at the site.

Table 2. Summary of Intrusive Works Undertaken

Designation	Depth (m bgl)	Method
WS01	2.30	Dynamic Sampler
WS02	1.25	Dynamic Sampler
WS03	1.30	Dynamic Sampler
WS04	1.40	Dynamic Sampler
WS05	1.85	Dynamic Sampler

The boreholes could not be progressed below depths of between 1.25m and 2.30m below ground level due to the ground conditions encountered.

3.3 Sampling

Samples of soil were taken from the exploratory holes at the depths shown in the exploratory hole records. The types of samples taken are indicated on the exploratory hole records. Details on the sample types are provided in the explanatory notes.

3.4 In Situ Strength Testing

The positions, types and depths of in situ testing, together with the test results, are either given on the exploratory hole records or are summarised separately in Appendix B. Further details on the in situ testing methods are provided in the explanatory notes.

3.5 In Situ Infiltration Testing

Falling head infiltration tests were undertaken in boreholes WS01 and WS05 in general accordance with Kent County Council guidance¹.

¹ The Soakaway Design Guide published by Kent County Council, 2000.

3.6 Laboratory Testing

Laboratory testing was scheduled by Ashdown Site Investigation Ltd. Results from the laboratory tests are provided in Appendix C.

Geotechnical testing was undertaken by Ashdown Site Investigation Ltd. Chemical testing was undertaken by a laboratory with recognised (UKAS and MCERTS) accreditation for quality control.

4. GROUND CONDITIONS

4.1 Stratigraphy

4.1.1 Surface Covering

No surfacing materials were encountered in any of the dynamic sampler boreholes.

4.1.2 Made Ground

Made ground, generally comprising slightly gravelly silty clay, was recorded to depths of between 0.40m and 0.45m below ground level in each borehole. The gravel fraction comprised variable quantities of brick, ironstone, crystalline rock, clinker-like material, charcoal-like material, ash-like material, organic material, flint and tile.

4.1.3 Weald Clay Formation

Underlying the made ground, the investigation progressed into undisturbed, predominantly slightly gravelly silty clay deposits which became gravelly with depth. The gravel content comprised variable mudstone and ironstone.

Due to the hard/dense nature of the soils, neither the boreholes or dynamic probes could be progressed below depths of between 1.25m and 2.30m below ground level.

These deposits are considered to represent the Weald Clay Formation indicated to underlie the site on BGS geological maps.

4.2 Stability

In general, each of the exploratory holes was recorded to remain stable during the course of drilling.

4.3 Groundwater Conditions

Groundwater was not encountered within any of the boreholes during the intrusive works.

5. GEOTECHNICAL ASSESSMENT

The geotechnical assessment has been prepared in connection with the development proposals shown on the drawings included in Appendix A.

In summary, the proposed development is understood to comprise the construction of a new detached single-storey house with associated garden and parking areas.

At the time of writing, no details were available concerning the specific loads likely to be applied to the foundations.

5.1 Foundations

5.1.1 Soil Shrinkage/Heave Potential

The fine-grained soils of the Weald Clay Formation have been classified as clays, and with plasticity indices in the range of 19% to 31%, the soils may be expected to exhibit a low to medium volume change potential.

It is recommended that the design of precautions against shrinkage and heave for any new foundation system (spread footings, and ground beams etc.) should assume a medium volume change potential for the fine-grained Weald Clay Formation soils and take into account current guidance such as that given by the Building Research Establishment (BRE)² or the National House Builders Council (NHBC)³.

Whilst this report has been prepared to provide advice to assist designers in undertaking detailed design, the report itself does not represent a detailed design statement. Detailed foundation design, including assessment of foundation type, minimum founding depths for spread foundations, and requirements for placement of void formers et cetera, should take into account the findings of this report and the presence of trees (previous, present and proposed). In connection with the latter, it is recommended that an arboricultural survey of the site that identifies the species and maturity of the existing or recently felled trees in the area of the proposed new building should be provided to engineers responsible for the foundation design. Information on proposed planting schemes that may affect foundation design should also be provided.

5.1.2 Spread Foundations

5.1.2.1 Foundation Depths for Spread Foundations

Foundations should be constructed to bear below soils that are likely to be affected by significant soil volume changes caused by seasonal changes in moisture content to avoid damage to foundations that could otherwise arise. In addition, all made ground should be regarded as being variable in nature and state of compaction and, as such, unsuitable as a founding medium for shallow footings. New footings should be constructed so as to bear below made ground/disturbed natural soils and soil subject to seasonal soil volume changes, whichever is the deeper, and onto undisturbed, competent, natural deposits.

² www.bre.co.uk : BRE Digests 240, 241 and 242, Low rise buildings on shrinkable clay soils, parts 1, 2 and 3; and BRE Digest 298 , The influence of trees on house foundations in clay soils and BRE Digest 412, Desiccation in clay soils.

³ <http://www.nhbc.co.uk/> : NHBC Standards, Chapter 4.2.

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Summary guidance on suitable minimum foundation depths to protect against the effects of seasonal soil volume changes is presented in the table below but designers undertaking detailed design of foundations should follow the detailed guidance provided within Chapter 4.2 of the NHBC Standards.

Table 3. Indicative Minimum Foundation Depths

Tree Type	Water Demand of Tree	Tree Distance to Tree Height Ratio (D/H)									
		0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.80	1.00	1.25
		Minimum Foundation Depth Required in Medium Volume Change Potential Soils (m)									
Broad Leaf	High	†			2.50	2.35	2.20	2.00	1.70	1.35	0.90*
	Moderate	2.00	1.85	1.70	1.60	1.45	1.30	1.15	0.90*	0.90*	0.90*
	Low	1.50	1.40	1.30	1.15	1.05	0.90*	0.90*	0.90*	0.90*	0.90*
Coniferous	High	†		2.30	1.95	1.60	1.25	0.90*	0.90*	0.90*	0.90*
	Moderate	2.00	1.70	1.40	1.10	0.90*	0.90*	0.90	0.90*	0.90*	0.90*

* Minimum foundation depth required to protect against soil volume changes.

† Foundations deeper than 2.50m require specialist design to protect against soil volume changes.

Where specialist foundation design is required (foundation depths exceeding the maximum permitted by the guidance) then piled foundations are likely to be needed, though commercial considerations may also dictate that piled foundations may be more economic even in comparison with conventional spread foundations constructed to depths less than the maximum permitted by guidance. Further works including deep boreholes would be required if structural engineers or quantity surveyors decide that piled foundations should be adopted.

Details on the water demand and mature height of common trees is given within Table 3 of Chapter 4.2 of the NHBC standards which should be referred to when assessing minimum foundation depths required for the proposed development. A summary is provided in the table below.

Table 4. Indicative Summary of Water Demand and Mature Height of Common Trees

Tree Type	High Water Demand		Moderate Water Demand		Low Water Demand	
	Tree	Height (m)	Tree	Height (m)	Tree	Height (m)
Broad Leaf	Elm	18 – 24*	Acacia	18	Birch	14
	Oak	16 – 24*	Alder	18	Elder	10
	Poplar	15 – 28*	Apple	10	Fig	8
	Willow	16 – 24*	Ash	11 – 23*	Hazel	8
	Eucalyptus	18	Laurel	10	Holly	12
	Hawthorn	10	Beech	20	Honey Locust	14
			Blackthorn	8	Hornbeam	17
			Cherry	8 – 17*	Laburnum	12
			Chestnut	20 – 24*	Magnolia	9
			Lime	22	Mulberry	9
			Maple	8 – 18*	Tulip Tree	20
			Pear	12		

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Tree Type	High Water Demand		Moderate Water Demand		Low Water Demand	
	Tree	Height (m)	Tree	Height (m)	Tree	Height (m)
			Plane	26		
			Plum	10		
			Sycamore	22		
			Tree of Heaven	20		
			Walnut	18		
			Whitebeam	12		
Coniferous	Cypress	18 – 20*	Cedar	20		
			Douglas Fir	20		
			Larch	20		
			Monkey Puzzle	18		
			Pine	20		
			Spruce	18		
			Wellingtonia	30		
			Yew	12		

* Dependent on particular species.

5.1.2.2 Bearing Capacity for Spread Foundations

For design purposes, a net allowable bearing capacity of 150kN/m² may be assumed for spread (pad or strip) foundations up to 1.00m across bearing within the Weald Clay Formation of at least stiff consistency. The quoted bearing capacity is expected to limit settlement to less than 25mm.

In view of the generic risk associated with the underlying geology at the site for potential mining hazards, it is recommended that all stripped formation levels should be inspected by a suitably qualified person for evidence of historical backfilled shafts as a precaution.

5.2 Ground Floors

In view of the shallow thickness of made ground encountered and presence of soils of medium volume change potential, it is recommended that ground floors should be suspended.

Current guidance⁴ suggests that ground bearing floor slabs may, however, be considered where:

1. All made ground is removed from beneath the building footprint;
2. The depth of foundations required to protect against seasonal soil volume changes close to trees is less than 1.5m; and
3. Further works demonstrate that close to the time of construction, no significant soil desiccation is present.

Where the above criteria cannot be met, ground floors should be suspended.

⁴ <http://www.nhbc.co.uk/> : NHBC Standards, Chapter 4.2.

If ground bearing floors are adopted it is recommended that the potential for differential movement, both between the floor slab and walls and across the floor slab itself, should be anticipated. Such floors should be fully debonded from walls. Formations should be adequately proof rolled and any excessively soft materials excavated and replaced with a suitable, well graded granular fill. The depth of any fill should be limited to a maximum of 600mm unless placed to an engineering specification designed to limit internal settlement of the fill materials to a tolerance to be advised by the designer. The detailing of services through, or under, ground-bearing floors should incorporate flexible connections and, where appropriate, enhanced falls.

5.3 Groundwater

Groundwater was not encountered within the boreholes during the intrusive works. It should be noted that water levels within the exploratory holes may not have equilibrated with the groundwater table at the time the readings were recorded and that groundwater levels should be expected to fluctuate seasonally.

It is possible that heavy precipitation during construction could lead to the ingress of perched groundwater or surface water run-off into excavations. In such circumstances it would be expected that water entering excavations would be adequately managed by pumping from sumps.

5.4 Stability of Excavations

All made ground soils exposed in excavations should be assumed to be unstable, even in the short term. Whilst fine-grained natural soils may remain stable for a short period of time if not subjected to surcharge loads (such as may be imposed by existing foundations, traffic or storage of materials), the stability of these deposits if left unsupported should be assumed to have the potential to deteriorate. All excavations should be suitably supported.

All excavations requiring human entry must be shored as necessary to conform to current best practice, as accepted by the Health and Safety Executive (HSE)⁵. Current legislation requires that where personnel access is required into any excavation a competent person must inspect excavation supports or battering of slopes at the start of the working shift and at other specified times. No work should take place until the excavation is safe. Excavations should also be inspected after any event that may have affected their stability, such as a significant weather event, changes in surcharge loadings imposed by temporary storage of materials or changes in site traffic plans or alteration of support systems. Inspections should be formally recorded and any faults that are found should be corrected immediately.

Particular attention must be paid to ensuring the stability of nearby structures, services and neighbouring sites as well as the road frontages.

5.5 Aggressivity to Concrete

The aggressivity of the soils to concrete has been assessed in accordance with guidance published by the BRE⁶.

⁵ Relevant guidance is given on the HSE website, www.hse.gov.uk

⁶ BRE Special Digest 1:2005 Concrete in Aggressive Ground.

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In consideration of the soils encountered beneath the site it is considered that 'natural ground conditions' may be assumed for the purpose of assessing the aggressivity of the chemical environment for concrete classification (ACEC class). Whilst groundwater was not encountered during the short period of the works, in the absence of long-term monitoring data, 'mobile groundwater' conditions should be conservatively assumed.

The soils present beneath the site may be expected to contain sulphides which if exposed to air and water, and potentially bacterial action, may oxidise and convert into sulphates. The sulphides are significantly more likely to oxidise in ground that has been significantly disturbed, for example by cutting and filling as part of earthworks or by excavation and backfilling. Ground that is not disturbed beyond the cut face (e.g. piling operations or excavation without backfill) would not generally be considered by the guidance as being disturbed ground. Where disturbed ground is likely to result from construction activities a Design Sulfate Class based on the total potential sulphate should be adopted.

The following table summarises the characteristic values indicated from the chemical analysis of the soils present beneath the site.

Table 5. Assessment of the Chemical Analysis of the Soil

	Characteristic Value	Design Sulfate Class	ACEC Classification
pH	5.1	-	-
Water Soluble Sulphate (mg/l as SO₄) *	200	DS-1	AC-2z
Total Potential Sulphate (TPS % SO₄)	No Oxidisable Sulphides	N/A	N/A

Notes: * Characteristic value rounded to nearest 100.

In accordance with the guidance, a DS-1 Design Sulfate Class and an AC-2z ACEC classification should be assumed as a minimum for the design of concrete in contact with the ground.

5.6 Stormwater Infiltration Systems

In-situ infiltration testing⁷ was undertaken in boreholes WS01 and WS05. From the test results, calculations were made to estimate the infiltration rate that could be expected for soakaways constructed to discharge into the underlying soils within the test zone.

The infiltration rates derived from the tests are summarised in the following table.

Table 6. Calculated Infiltration Rates

Exploratory Hole	Test Response Zone Depth (m)		Stratum	Infiltration Rate (f) (m/sec)	Driving Head of Water (m)
	Top	Bottom			
WS01	1.00	2.30	Weald Clay Formation	1.36×10^{-7}	1.60
WS05	1.00	1.85	Weald Clay Formation	7.27×10^{-7}	1.40

⁷ Conducted in accordance with The Soakaway Design Guide, published by Kent County Council, July 2000.

The value 'f' is equivalent to the soil infiltration coefficient 'q' quoted in the Construction Industry Research and Information Association (CIRIA) Report 156.

The results from the infiltration tests should be provided to engineers responsible for the design of the drainage system.

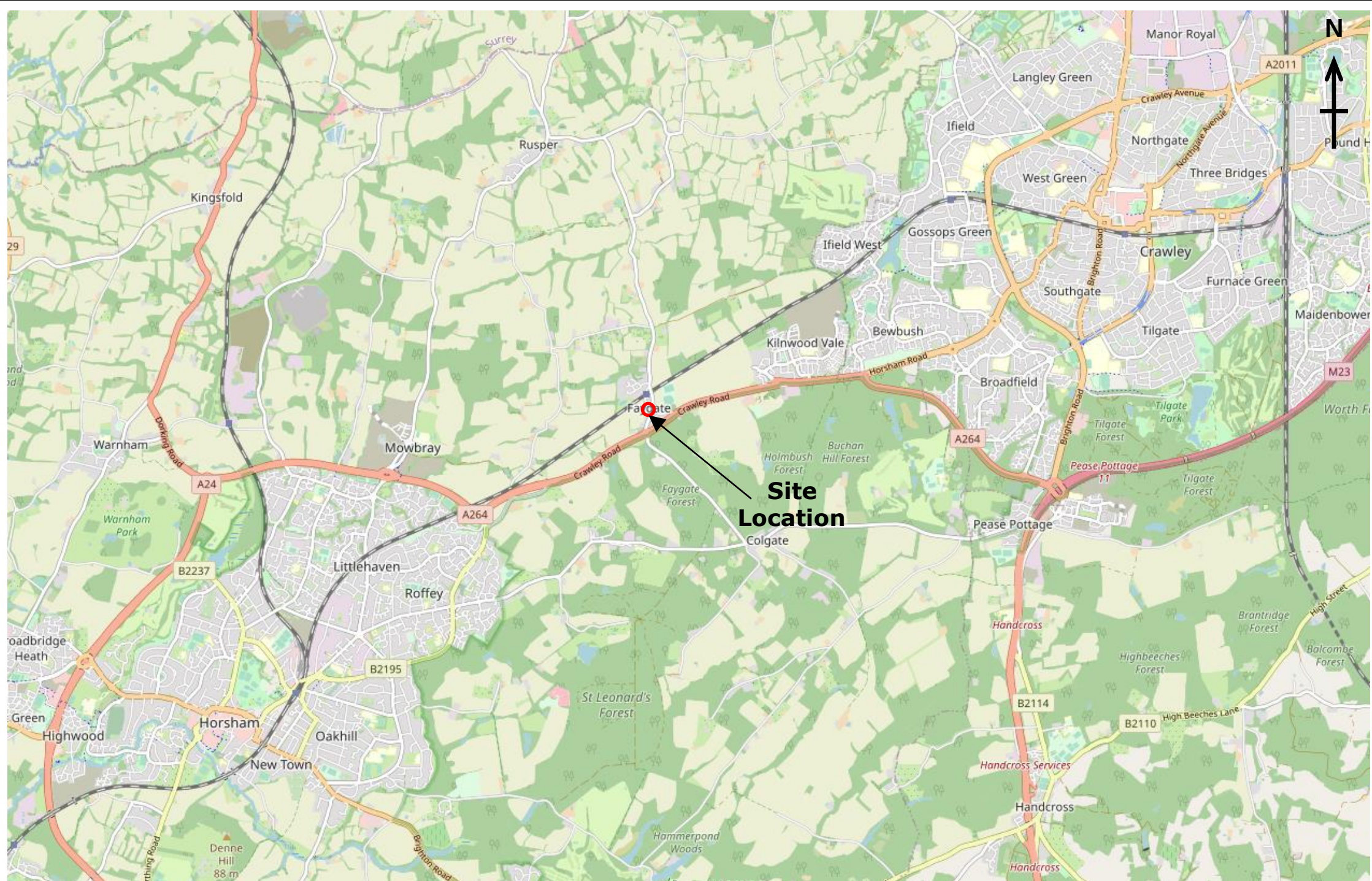
To comply with building regulations⁸, point discharging infiltration systems (conventional ring or trench soakaways), if deemed appropriate, are required to be constructed a minimum of 5.0m away from proposed or existing buildings.

Ashdown Site Investigation Ltd.

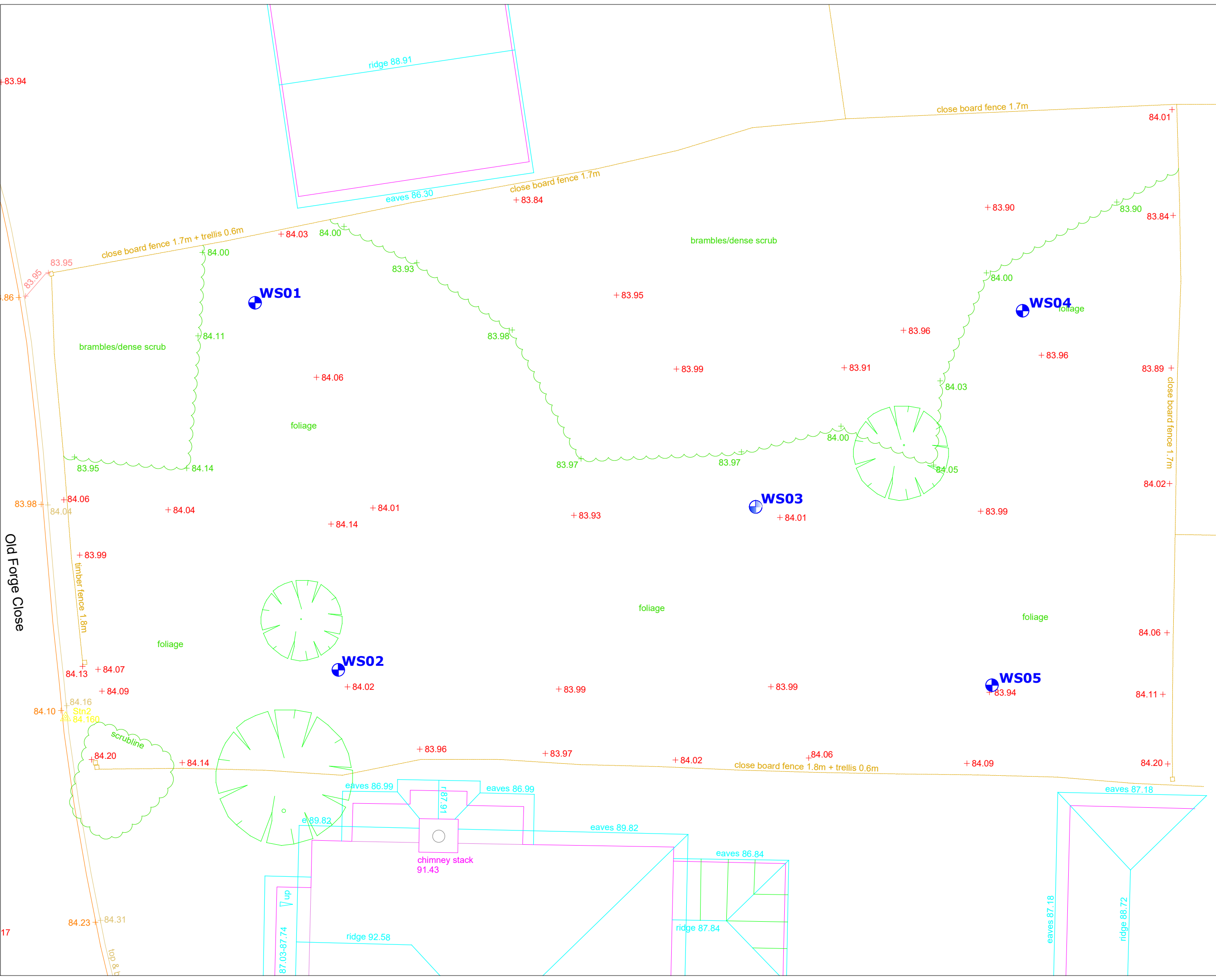
FIGURES

Figure 1 Site Location Plan

Figure 2 Site Plan



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+83.94

.86

Old Forge Close

17



ASHDOWN SITE INVESTIGATION

L · I · M · I · T · E · D

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Site:

Land to the Rear of 1 Brockwell Cottage
Faygate Lane
Horsham
West Sussex

Project Ref:

P16323

Figure No.

2

Drawing Title

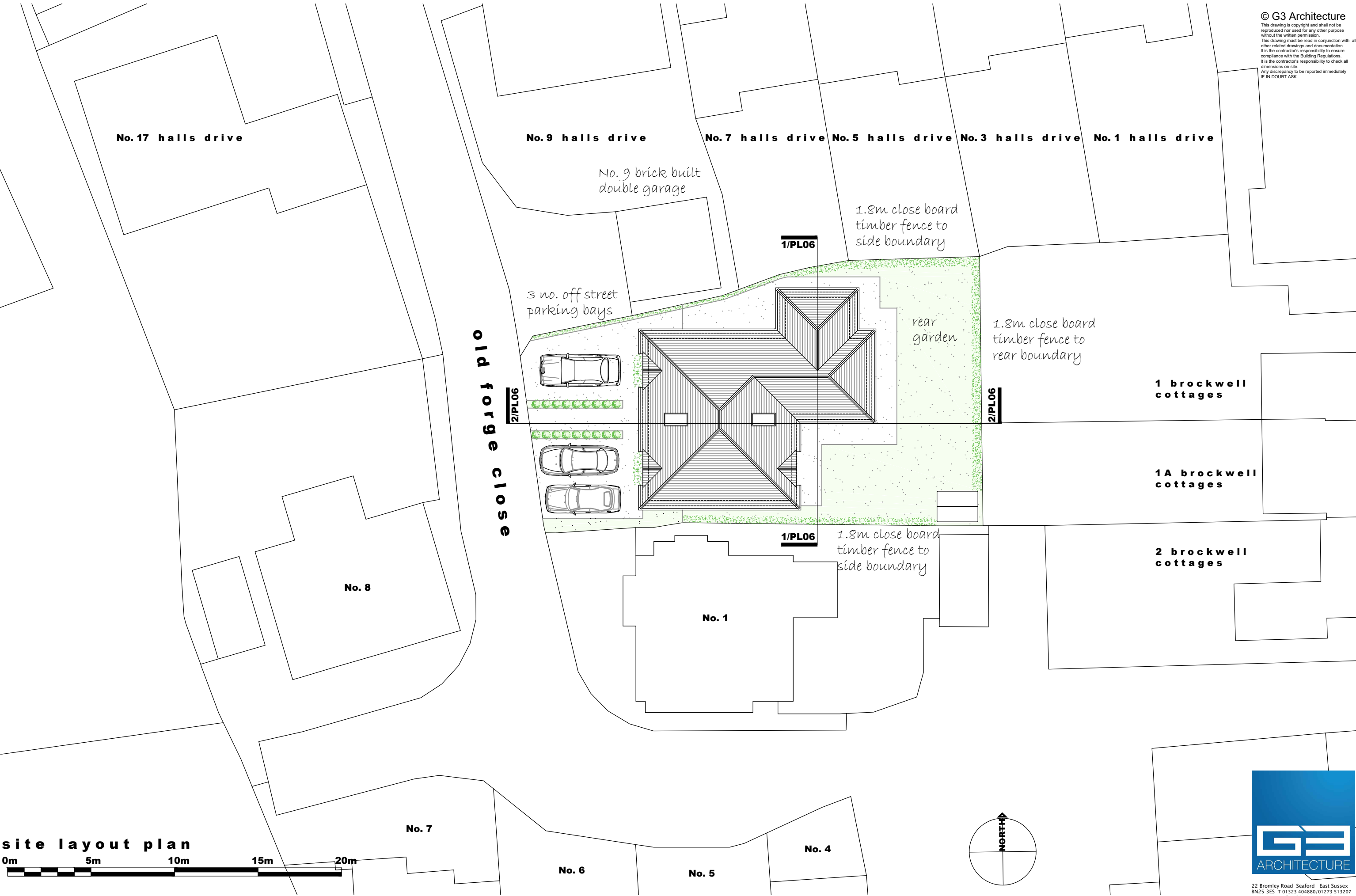
Site Plan

Scale

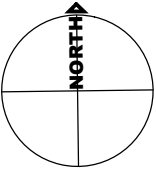
NTS

APPENDIX A

Proposed Development Layout

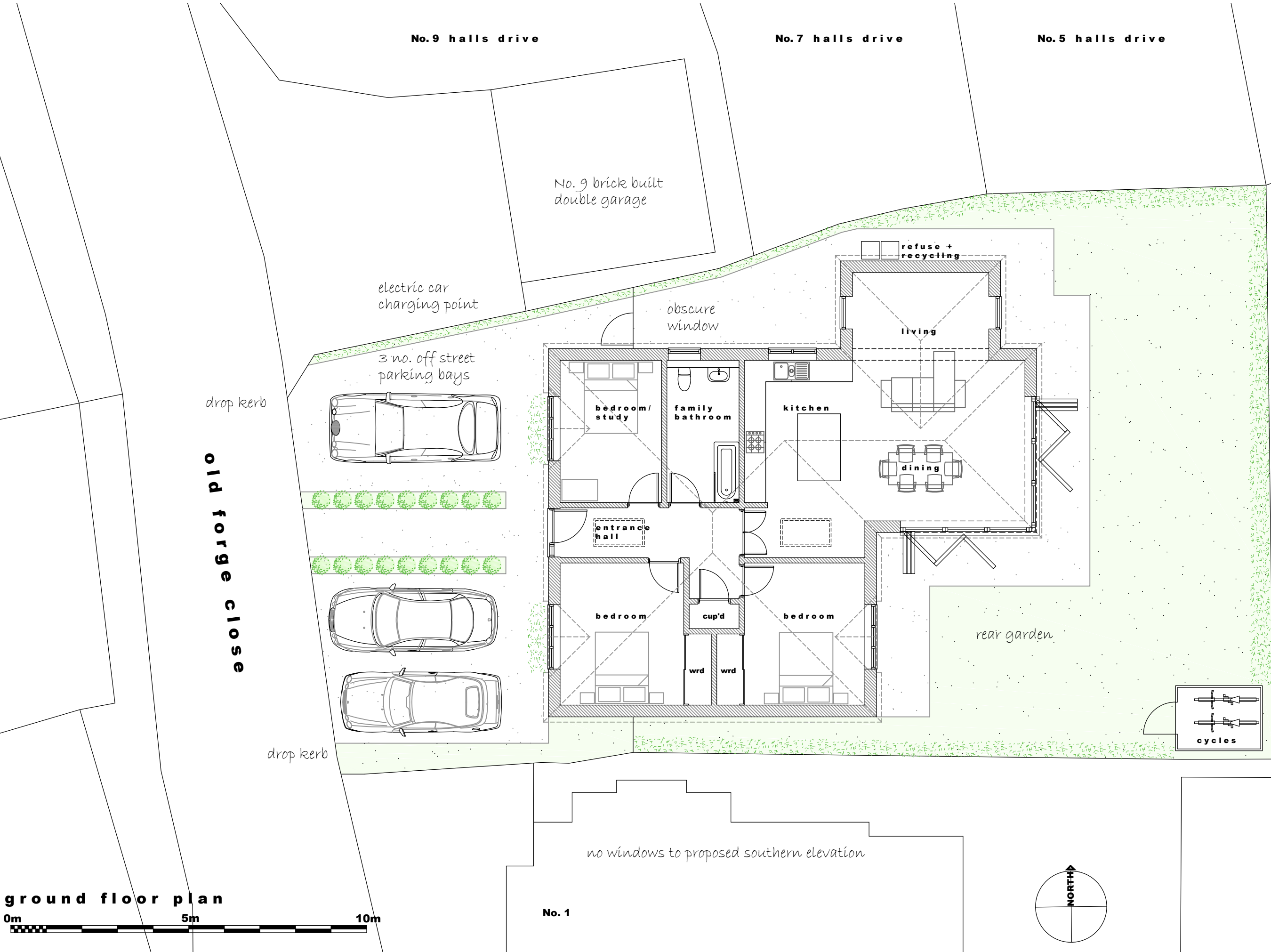


site layout plan



22 Bromley Road Seaford East Sussex
BN25 3ES T 01323 404880/01273 513207
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notes + revisions							client + project	title	scale	number
							Telbridge Properties Ltd	Proposed Site Layout Plan	1 : 200 @ A3	2038.PL01
							Land to rear of 1 Brockwell Cottage		date	status
							Faygate Lane, Horsham		09.02.2021	PLANNING



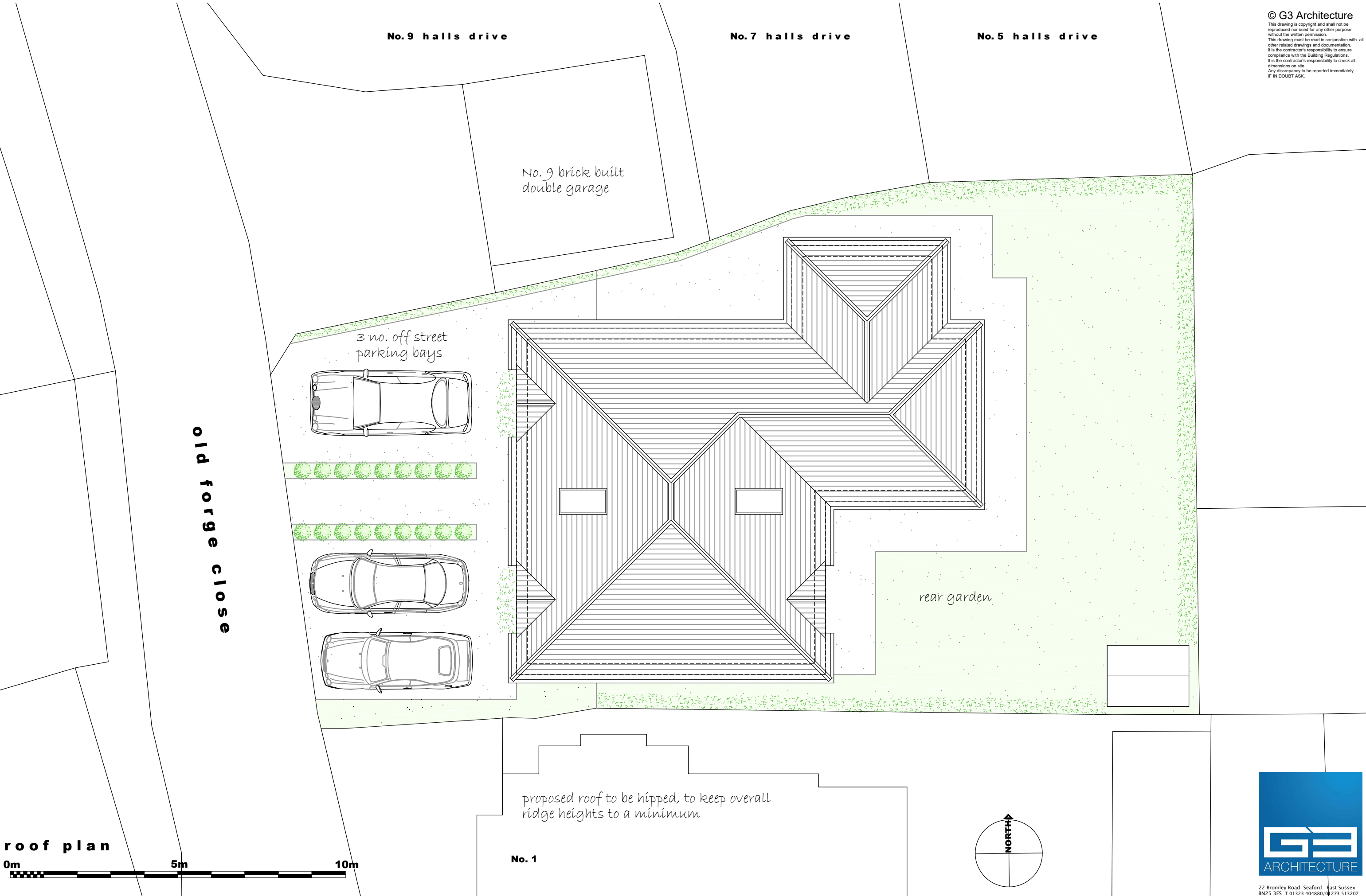
notes + revisions			

client + project
Telbridge Properties Ltd
Land to rear of 1 Brockwell Cottage
Faygate Lane, Horsham

title
Proposed Ground Floor Plan

scale
1 : 100 @ A3
date
09.02.2021

number
2038.PL02
status
PLANNING



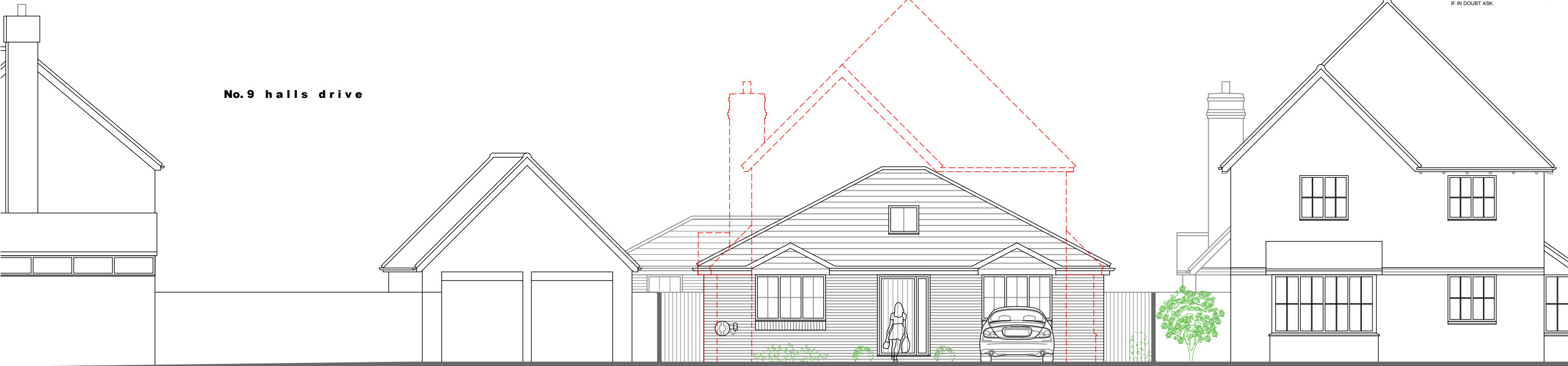
roof plan

notes + revisions				client + project		title		scale		number	
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				Land to rear of 1 Brockwell Cottage				date		status	
				Faygate Lane, Horsham				09.02.2021		PLANNING	

Withdrawn Application Ref DC/17/2200

No.1 old forge close

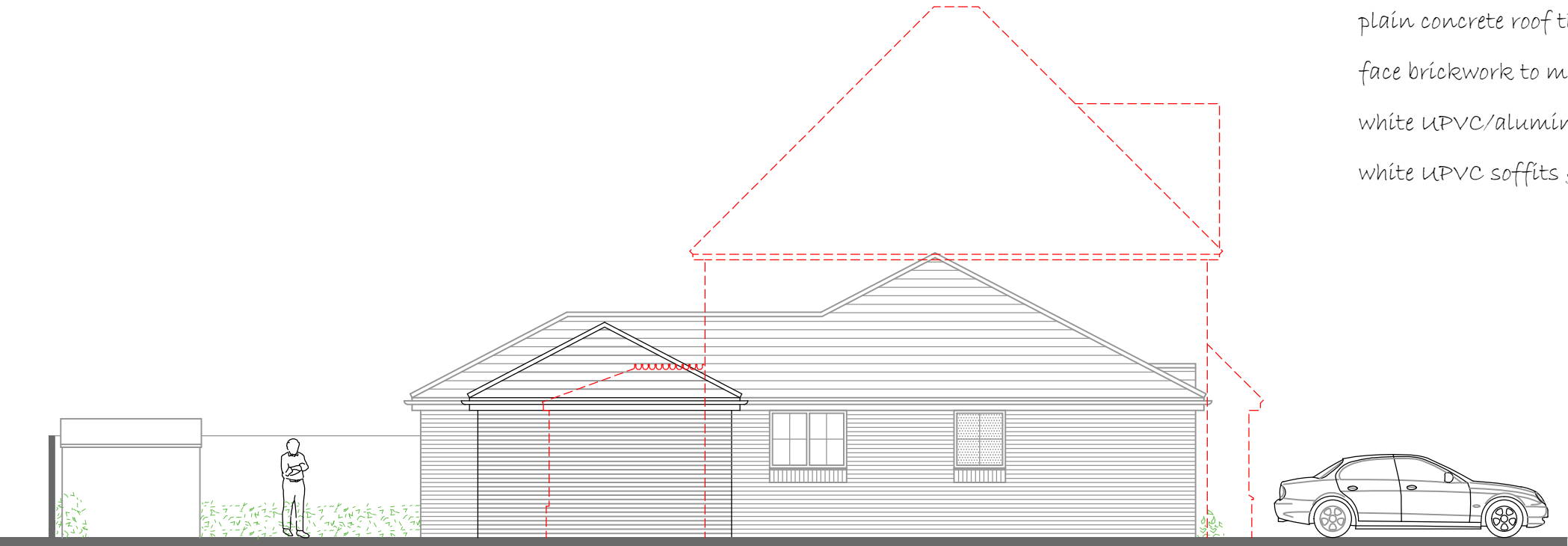
No.9 halls drive



front streetscene elevation
west

electric car
charging point

Withdrawn Application Ref DC/17/2200



side elevation
north

obscure
window

plain concrete roof tiles to match surrounding development
face brickwork to match surrounding development
white UPVC/aluminium fenestration
white UPVC soffits & fascias with black rainwater goods

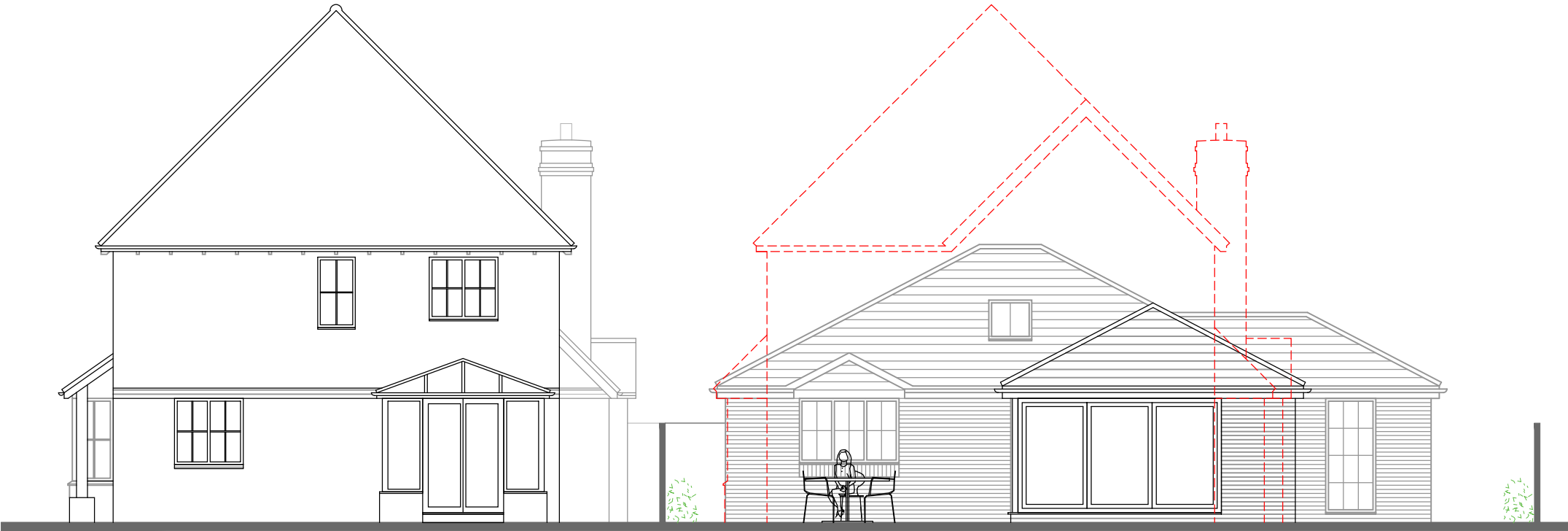


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notes + revisions				client + project		title		scale	number
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				Land to rear of 1 Brockwell Cottage				date	status
				Faygate Lane, Horsham				09.02.2021	PLANNING

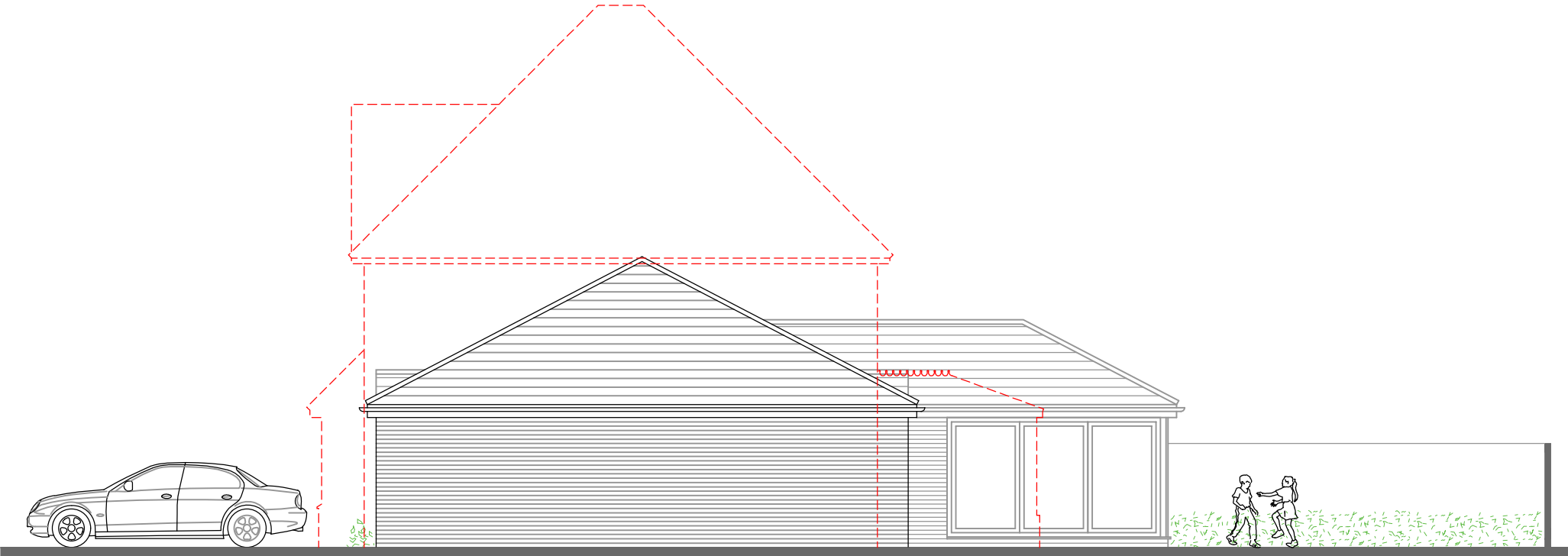
No.1 old forge close

Withdrawn Application Ref DC/17/2200



rear elevation
east

Withdrawn Application Ref DC/17/2200



side elevation
south

plain concrete roof tiles to match surrounding development
face brickwork to match surrounding development
white UPVC/aluminium fenestration
white UPVC soffits & fascias with black rainwater goods



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notes + revisions				client + project		title		scale	number
				Telbridge Properties Ltd				1 : 100 @ A3	2038.PL05
				Land to rear of 1 Brockwell Cottage					
				Faygate Lane, Horsham		Proposed Rear + Side Elevations		09.02.2021	PLANNING

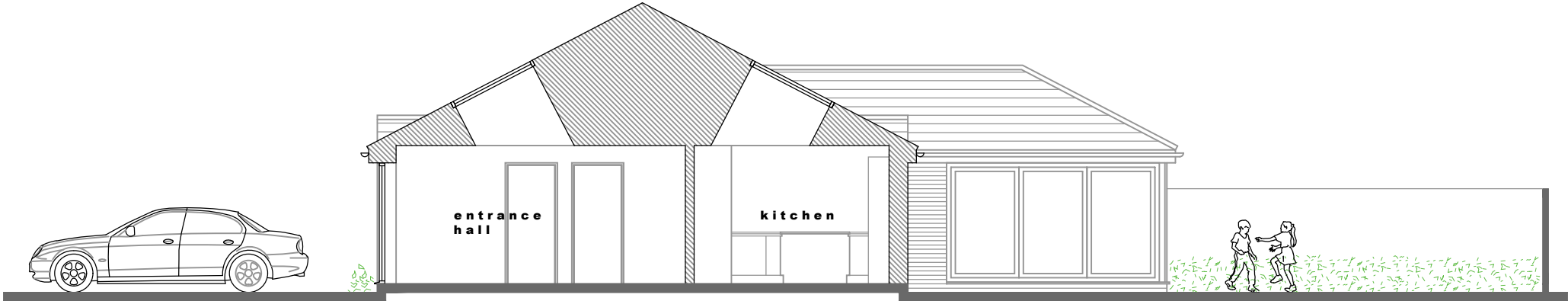
No.1 old forge close

proposed bungalow



section 1-1

rooflights to allow natural lighting



section 2-2



22 Bromley Road Seaford East Sussex
BN25 3ES T 01323 404880/01273 513207
www.g3architecture.co.uk

notes + revisions								client + project	title	scale	number
							Telbridge Properties Ltd	1 : 100 @ A3		2038.PL06	
							Land to rear of 1 Brockwell Cottage	date		status	
							Faygate Lane, Horsham	Proposed Sections		09.02.2021	PLANNING

APPENDIX B

Explanatory Notes

Exploratory Hole Records

DPSH-B Dynamic Probe Records

Borehole In Situ Infiltration Test Results

Explanatory Notes

Symbols and abbreviations on Exploratory Hole Records

Samples

- U 'Undisturbed' Sample: - 100mm diameter by 450mm long. The number of blows to drive in the sampling tube is shown after the test index letter in the SPT column.
- Pi Piston Sample: 'Undisturbed' sample 100mm diameter by 600mm long.
- D Disturbed Sample
- R Root Sample
- B Bulk Disturbed Sample
- W Water Sample
- ES Environmental Suite (on older records may be referenced J T)

In Situ Testing

- S Standard penetration test (SPT): Using the split spoon sampler.
- C Standard Penetration Test (SPT): Using a solid cone instead of the sampler – conducted usually in coarse grained soils or weak rocks.
- V Shear Vane Test: Undrained shear strength (cohesion) (kN/m²) shown within the Vane/Pen Test and N Value column.
- H Hand penetrometer Test: Undrained shear strength (cohesion) (kN/m²) shown within the Vane/Pen Test and N Value column.
- P Perth Penetrometer Test: Number of blows for 300mm penetration shown under Vane/Pen Test and N Value column.

Excavation Method

- CP Cable Percussion Borehole
- RC Rotary Cored Borehole
- WLS Dynamic Sampler Borehole using windowless sampler tubes
- WS Dynamic Sampler Borehole using window sampler tubes
- TP Trial Pit excavated using mechanic excavator
- HDP Trial Pit excavated using hand tools

Soil Description

Description and classification of soils has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of soil, Part 1 Identification and description (BS EN ISO 14688-1) and Part 2 Principles of classification (BS EN 14688-2) as well as the BS5930 code of Practice for Ground Investigations.

Rock Description

Description and classification of rocks has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of rock, Part 1 Identification and classification (BS EN ISO 14689-1) as well as the BS5930 code of Practice for Ground Investigations. TCR – Total Core Recovery, SCR – Solid Core Recovery, RQD – Rock Quality Designation, NI – Non Intact, If – indicative fracture spacing (min/ave/max), FI – Fracture Index.

Chalk Description

Chalk description is based on BS EN ISO 14688, BS EN ISO 14689 and BS5930. The classification of chalk generally follows the guidance offered by the Construction Industry Research and Information Association (CIRIA) C574, 'Engineering in Chalk'. This is based on assessment of chalk density, discontinuity and aperture spacing, and the proportion of intact chalk to silt of chalk.

In Situ Strength Testing

Standard penetration testing (SPT) carried out in accordance with BS EN ISO 22476-3:2005.

Continuous dynamic probe testing conducted using a super heavy DPSH-B (As defined by BS EN ISO 22476-2:2005) probing geometry. The DPSH-B configuration is similar to that of the standard penetration test (SPT); the main differences being that the tip comprises a 90° cone, the driving rods are lighter than those used for SPT testing and the blow counts are recorded over 100mm increments rather than 300mm, as is the case for the SPT.

Perth penetrometer tests carried out in accordance with Australian Standard AS 1289:6.3.3-1997, Method of Testing Soils for Engineering Purposes; no equivalent European or British Standard having been published to date.

Undrained shear strength determinations made in-situ using a Geonor hand shear vane or a hand penetrometer.

Testing to determine the in-situ California Bearing Ratio (CBR) of soils conducted at shallow depths using a hand-held Transport Research Laboratory (TRL) cone penetrometer.

ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119		Site Name: Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex						
Job Number: P16323		Borehole Number: WS01						
Start Date: 17/10/2023		Sheet 1 of 1						
End Date: 17/10/2023								
Standpipe Sample/ Test Type Depth From (m) Depth To (m) Test Result Dynamic Probe Legend Depth Stratum Description								
	D	0.30					0.00	MADE GROUND: Dark brown slightly gravelly silty clay with frequent roots. Gravel is subangular to subrounded fine to coarse organic material, ironstone, clinker-like material, charcoal-like material and brick.
	H	0.50		175			0.45	Stiff to very stiff light brown and orange brown mottled silty CLAY. (Weald Clay Formation) becoming grey below 0.70m depth.
	D	0.90					0.95	Stiff to very stiff orange brown and grey brown silty CLAY. (Weald Clay Formation)
	V	1.00		>130				
	H	1.20		>225				
	D	1.30						
	D	1.70						
	H	1.70		225				
	V	2.00		>130				
	D	2.05						
	H	2.10		125			2.30	with iron staining below 2.20m depth. End of borehole at 2.30m
Remarks Groundwater: Borehole dry on completion. Stability: Borehole cased to 1.00m depth. Borehole stable on completion. Notes: No further progress below 2.30m depth - too hard/ dense.								Excavation Method: WLS Borehole Diameter: Various Made By: GRD

ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119 Site Name: Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex Job Number: P16323 Start Date: 17/10/2023 End Date: 17/10/2023		Borehole Number: WS02 Sheet 1 of 1					
Samples and In Situ Testing Dynamic Probe		Stratum Description					
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth	
	D	0.30				0.00	MADE GROUND: Dark brown slightly gravelly silty clay with occasional roots. Gravel is subangular to subrounded fine to medium brick and rare tile.
	H	0.50		210		0.40	Stiff to very stiff grey brown and light brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse mudstone and ironstone. (Weald Clay Formation)
	D	0.60					
	H	0.80		175			
	D	0.90					
	V	1.00		>130			becoming gravelly below 0.90m depth.
	D	1.20					
	H	1.20		>225		1.25	End of borehole at 1.25m
Remarks Groundwater: Borehole dry on completion. Stability: Borehole stable on completion. Notes: No further progress below 1.25m depth - too hard/ dense.							Excavation Method: WLS Borehole Diameter: Various Made By: GRD

ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119		Site Name: Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex					
		Job Number: P16323					
Start Date: 17/10/2023		Borehole Number: WS03					
End Date: 17/10/2023		Sheet 1 of 1					
Samples and In Situ Testing Dynamic Probe Legend Depth Stratum Description							
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	0 5 10 15 20 25 30	0.00	MADE GROUND: Brown, light brown and dark brown slightly gravelly silty clay with occasional roots. Gravel is subangular to subrounded fine to medium brick, charcoal-like material, ash-like material and rare flint.
	D	0.30				0.40	Stiff to very stiff light brown and orange brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse mudstone and ironstone. (Weald Clay Formation)
	H	0.50		125			
	D	0.70					
	H	0.90		210			
	V	1.00		>130			becoming gravelly and with frequent iron staining between 1.00m and 1.20m depth.
	D	1.20					
	H	1.20		225		1.30	End of borehole at 1.30m
Remarks Groundwater: Borehole dry on completion. Stability: Borehole stable on completion. Notes: No further progress below 1.30m depth - too hard/ dense.							
						Excavation Method: WLS	
						Borehole Diameter: Various	
						Made By: GRD	

ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119		Site Name: Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex				
		Job Number: P16323				
		Start Date: 17/10/2023		Borehole Number: WS04		
End Date: 17/10/2023		Sheet 1 of 1				
Samples and In Situ Testing Dynamic Probe Legend Depth Stratum Description						
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result		
						0.00
						0.40
	H	0.60	200			
	D	0.80				
	H	0.90	200			
	V	1.00	>130			
	H	1.20	175			
	V	1.40	>130			1.40
MADE GROUND: Dark brown slightly gravelly silty clay with occasional rootlets. Gravel is subangular to subrounded fine to medium brick, ironstone, charcoal-like material, tile and crystalline rock.						
Stiff to very stiff light brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to medium mudstone and ironstone. (Weald Clay Formation)						
becoming gravelly and light brown and grey mottled with rare orange brown pockets below 1.30m depth.						
End of borehole at 1.40m						
Remarks						
Groundwater: Borehole dry on completion.						Excavation Method: WLS
Stability: Borehole stable on completion.						Borehole Diameter: Various
Notes: No further progress below 1.40m depth - too hard/ dense.						Made By: GRD

Site Name: Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex

Job Number: P16323

Start Date: 17/10/2023

End Date: 17/10/2023

Borehole Number: **WS05**

Sheet 1 of 1

Standpipe	Sample/ Test Type	Samples and In Situ Testing		Test Result	Dynamic Probe							Legend	Depth	Stratum Description
		Depth From (m)	Depth To (m)		0	5	10	15	20	25	30			
	D	0.30											0.00	MADE GROUND: Dark brown slightly gravelly silty clay with occasional roots. Gravel is subangular to subrounded fine to medium brick, ash-like material and charcoal-like material.
													0.40	
	D	0.90												Stiff to very stiff orange brown, light grey and light brown silty CLAY. (Weald Clay Formation)
	V	1.00		>130										
	H	1.15		175										
	D	1.20												
														becoming gravelly (subangular to subrounded fine to coarse mudstone and ironstone) below 1.20m depth.
	H	1.70		>225										
	D	1.80												
	V	1.85		>130										
													1.85	End of borehole at 1.85m

Remarks	
---------	--

Groundwater: Borehole dry on completion.

Stability: Borehole cased to 1.00m depth.
Borehole stable on completion.

Notes: No further progress below 1.85m depth - too hard/ dense.

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

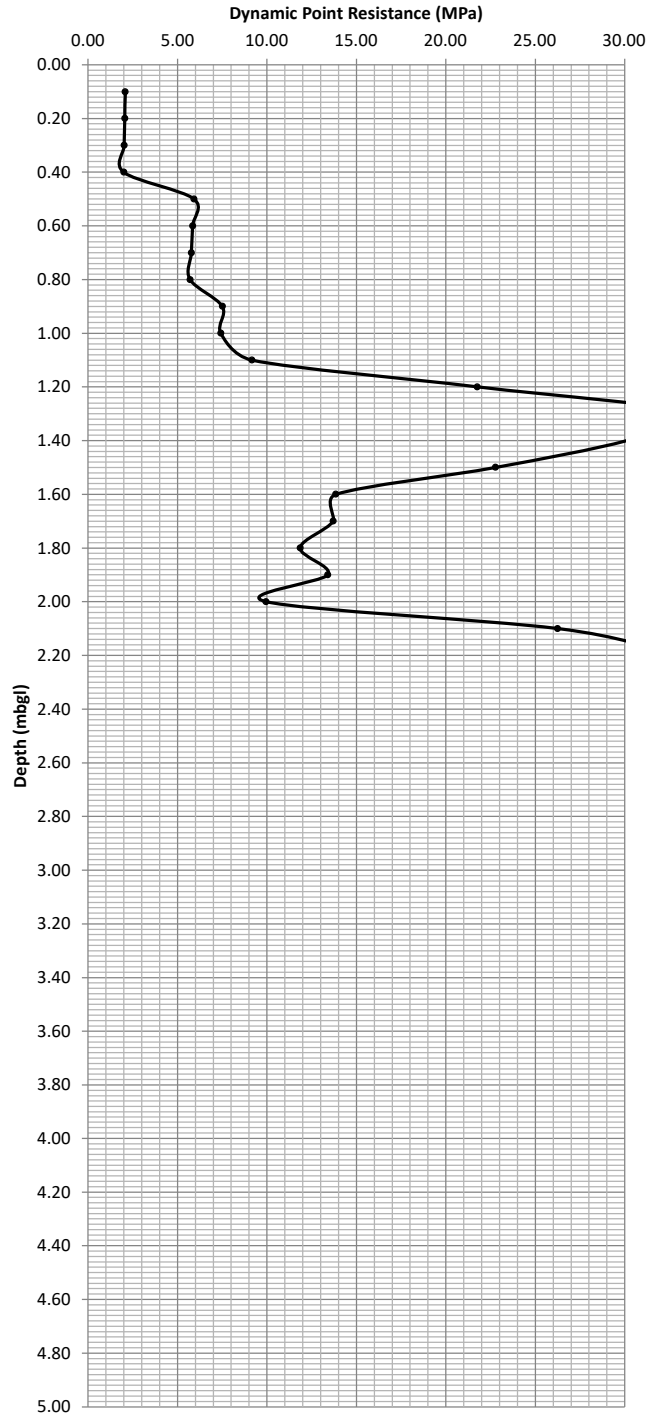
SITE Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex

Report Ref.

P16323

Test Location Reference WS01

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	1	0.10	2.14	2.08
0.20	1	0.10	2.14	2.05
0.30	1	0.10	2.14	2.03
0.40	1	0.10	2.14	2.00
0.50	3	0.03	6.43	5.93
0.60	3	0.03	6.43	5.85
0.70	3	0.03	6.43	5.78
0.80	3	0.03	6.43	5.71
0.90	4	0.03	8.57	7.52
1.00	4	0.03	8.57	7.43
1.10	5	0.02	10.71	9.17
1.20	12	0.01	25.71	21.76
1.30	19	0.01	40.72	34.05
1.40	17	0.01	36.43	30.12
1.50	13	0.01	27.86	22.77
1.60	8	0.01	17.14	13.86
1.70	8	0.01	17.14	13.70
1.80	7	0.01	15.00	11.86
1.90	8	0.01	17.14	13.41
2.00	6	0.02	12.86	9.95
2.10	16	0.01	34.29	26.25
2.20	21	0.00	45.00	34.09
2.30	30	0.00	64.29	48.19
2.40				
2.50				
2.60				
2.70				
2.80				
2.90				
3.00				
3.10				
3.20				
3.30				
3.40				
3.50				
3.60				
3.70				
3.80				
3.90				
4.00				
4.10				
4.20				
4.30				
4.40				
4.50				
4.60				
4.70				
4.80				
4.90				
5.00				



Notes:

No further progress below 2.30m depth - Hammer bouncing.

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.86
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

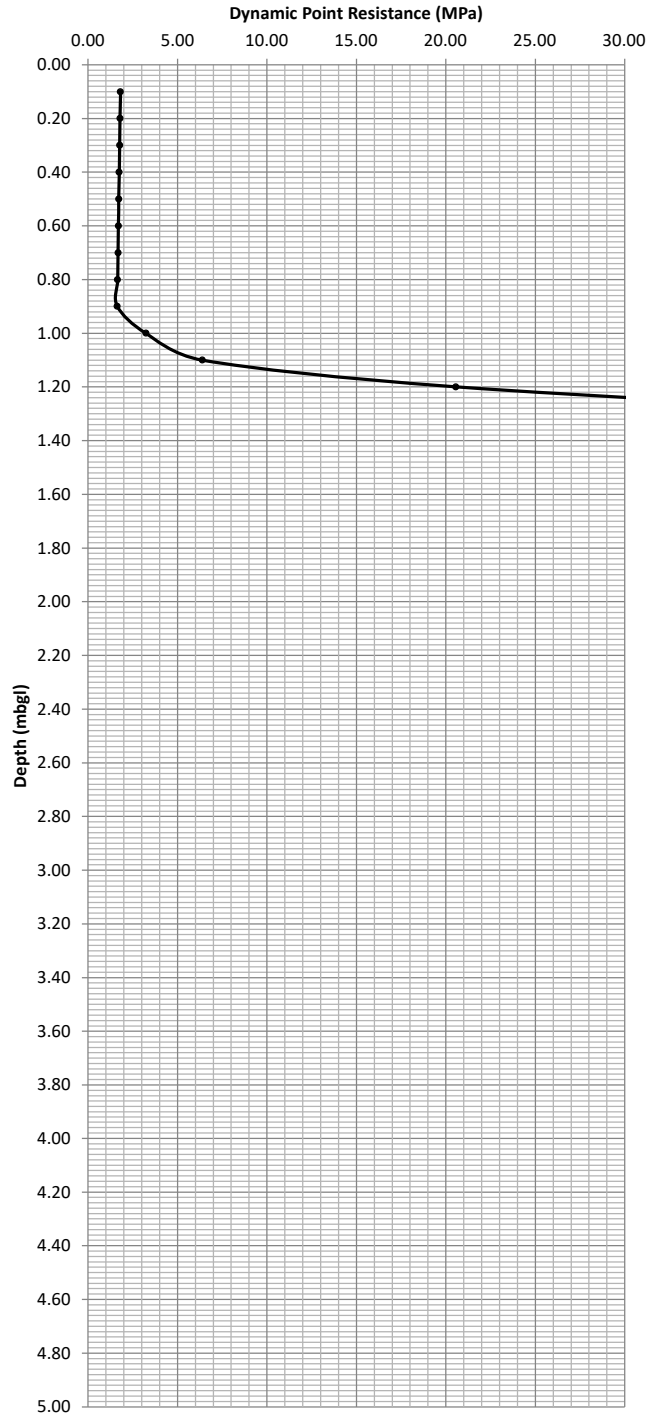
SITE Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex

Report Ref.

P16323

Test Location Reference WS02

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	1	0.10	1.87	1.82
0.20	1	0.10	1.87	1.79
0.30	1	0.10	1.87	1.77
0.40	1	0.10	1.87	1.74
0.50	1	0.10	1.87	1.72
0.60	1	0.10	1.87	1.70
0.70	1	0.10	1.87	1.68
0.80	1	0.10	1.87	1.66
0.90	1	0.10	1.87	1.64
1.00	2	0.05	3.74	3.24
1.10	4	0.03	7.48	6.40
1.20	13	0.01	24.29	20.56
1.30	30	0.00	56.06	46.89
1.40				
1.50				
1.60				
1.70				
1.80				
1.90				
2.00				
2.10				
2.20				
2.30				
2.40				
2.50				
2.60				
2.70				
2.80				
2.90				
3.00				
3.10				
3.20				
3.30				
3.40				
3.50				
3.60				
3.70				
3.80				
3.90				
4.00				
4.10				
4.20				
4.30				
4.40				
4.50				
4.60				
4.70				
4.80				
4.90				
5.00				



Notes:

No further progress below 1.30m depth - Hammer bouncing.

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.75
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

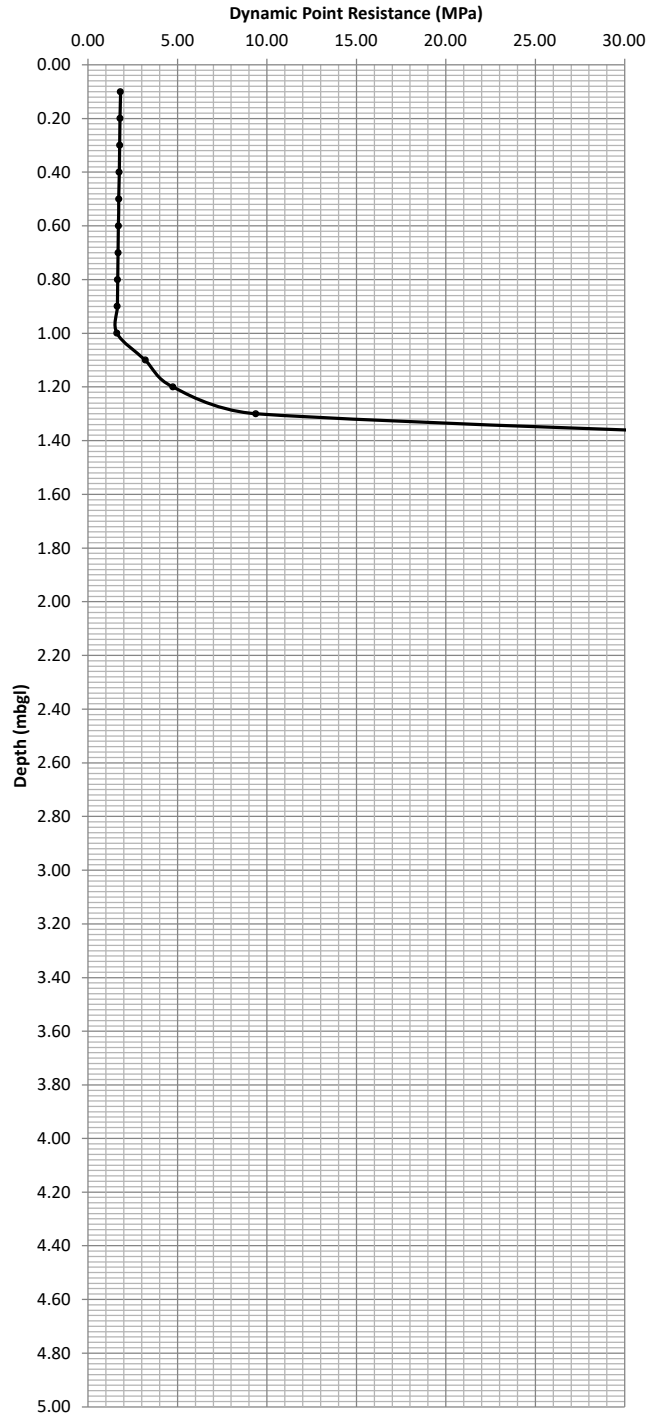
SITE Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex

Report Ref.

P16323

Test Location Reference **WS03**

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	1	0.10	1.87	1.82
0.20	1	0.10	1.87	1.79
0.30	1	0.10	1.87	1.77
0.40	1	0.10	1.87	1.74
0.50	1	0.10	1.87	1.72
0.60	1	0.10	1.87	1.70
0.70	1	0.10	1.87	1.68
0.80	1	0.10	1.87	1.66
0.90	1	0.10	1.87	1.64
1.00	1	0.10	1.87	1.62
1.10	2	0.05	3.74	3.20
1.20	3	0.03	5.61	4.74
1.30	6	0.02	11.21	9.38
1.40	30	0.00	56.06	46.36
1.50				
1.60				
1.70				
1.80				
1.90				
2.00				
2.10				
2.20				
2.30				
2.40				
2.50				
2.60				
2.70				
2.80				
2.90				
3.00				
3.10				
3.20				
3.30				
3.40				
3.50				
3.60				
3.70				
3.80				
3.90				
4.00				
4.10				
4.20				
4.30				
4.40				
4.50				
4.60				
4.70				
4.80				
4.90				
5.00				



Notes:

No further progress below 1.40m depth - Hammer bouncing.

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.75
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

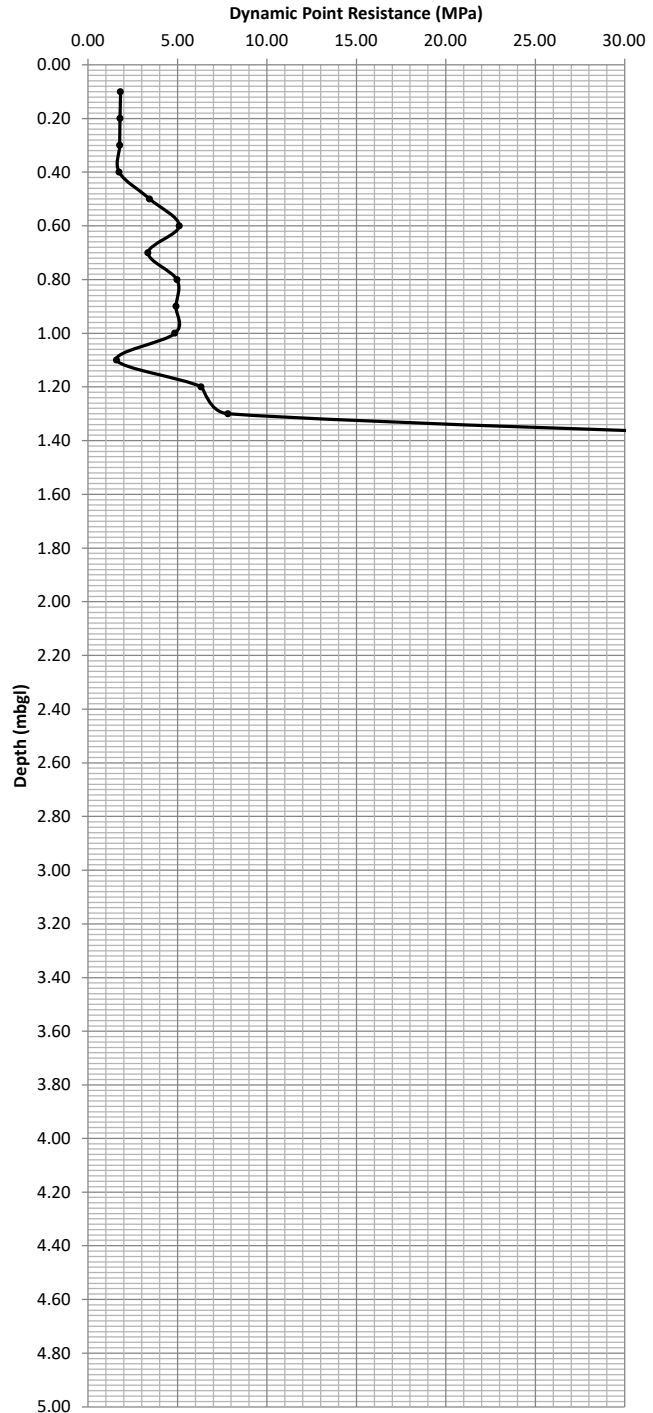
SITE Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex

Report Ref.

P16323

Test Location Reference WS04

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	1	0.10	1.87	1.82
0.20	1	0.10	1.87	1.79
0.30	1	0.10	1.87	1.77
0.40	1	0.10	1.87	1.74
0.50	2	0.05	3.74	3.45
0.60	3	0.03	5.61	5.10
0.70	2	0.05	3.74	3.36
0.80	3	0.03	5.61	4.98
0.90	3	0.03	5.61	4.92
1.00	3	0.03	5.61	4.86
1.10	1	0.10	1.87	1.60
1.20	4	0.03	7.48	6.33
1.30	5	0.02	9.34	7.82
1.40	30	0.00	56.06	46.36
1.50				
1.60				
1.70				
1.80				
1.90				
2.00				
2.10				
2.20				
2.30				
2.40				
2.50				
2.60				
2.70				
2.80				
2.90				
3.00				
3.10				
3.20				
3.30				
3.40				
3.50				
3.60				
3.70				
3.80				
3.90				
4.00				
4.10				
4.20				
4.30				
4.40				
4.50				
4.60				
4.70				
4.80				
4.90				
5.00				



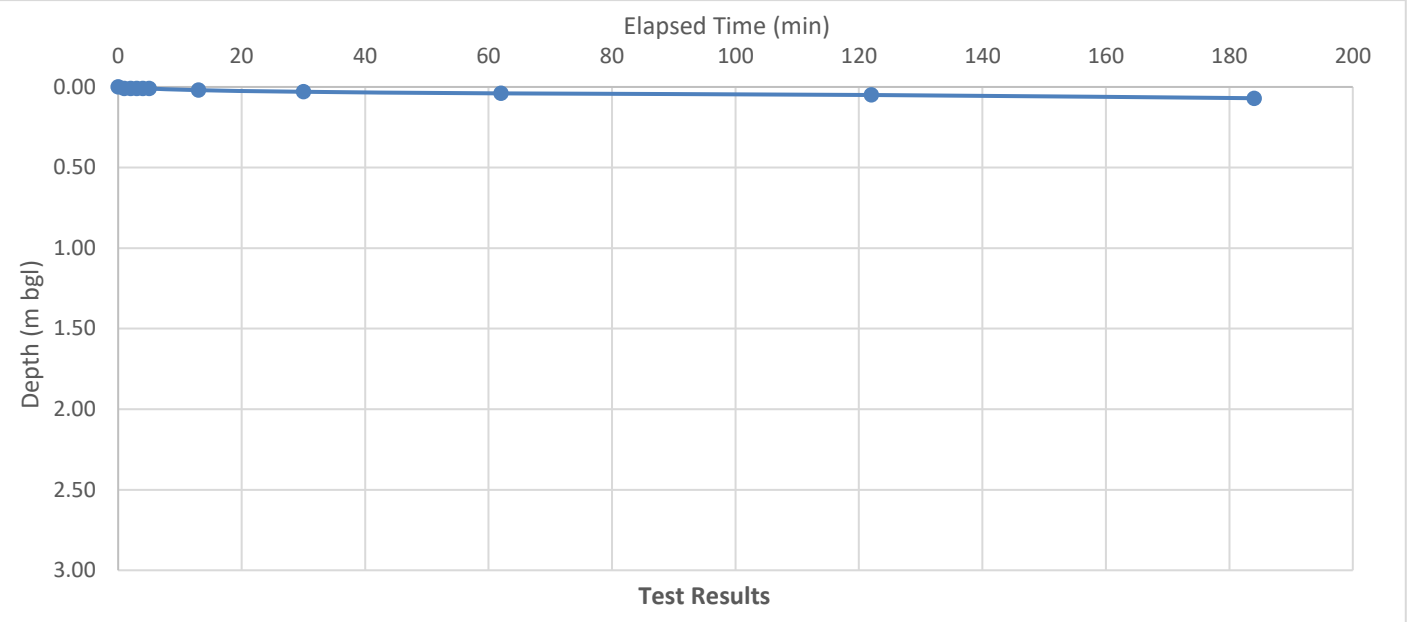
Notes:

No further progress below 1.40m depth - Hammer bouncing.

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.75
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

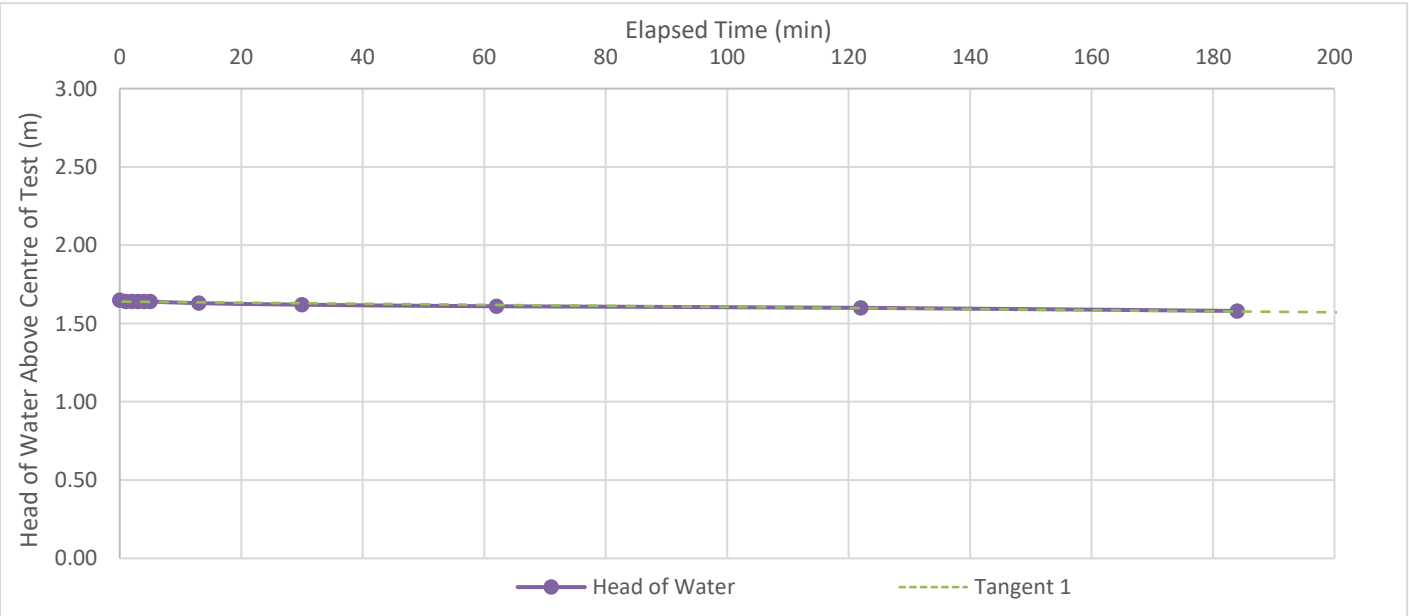
Infiltration Test Results

Test Position	WS01
Test No.	1
Project No.	P16323
Project Name	Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex
Casing Depth	1.00 m bgl
Borehole Depth	2.30 m bgl
Casing Diameter	0.105 m
Average Borehole Diameter	0.089 m



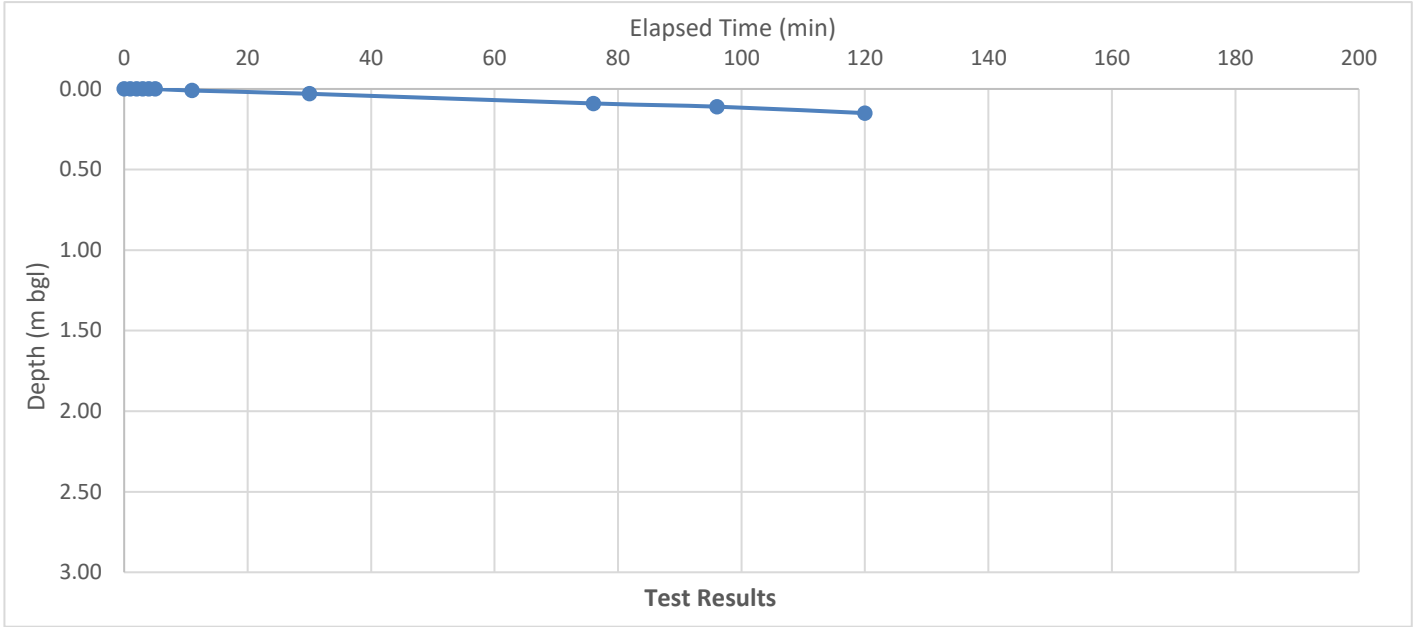
Length of Test Zone	1.30 m	L
Depth to Center of Test Zone	1.65 m	X
Water level at start of test	0.00 m	
Water level at end of test	0.07 m	
Duration of test	184 min	
Average Depth Of Water	2.27 m	
Average Drained Area	0.64 m ²	
Volume of Water Lost	0.00 m ³	

Driving Head	1.6 m
Infiltration rate	1.36E-07 m/sec
Calculation method:	Calculated in accordance with The Soakaway Design Guide, published by Kent County Council, July 2000.



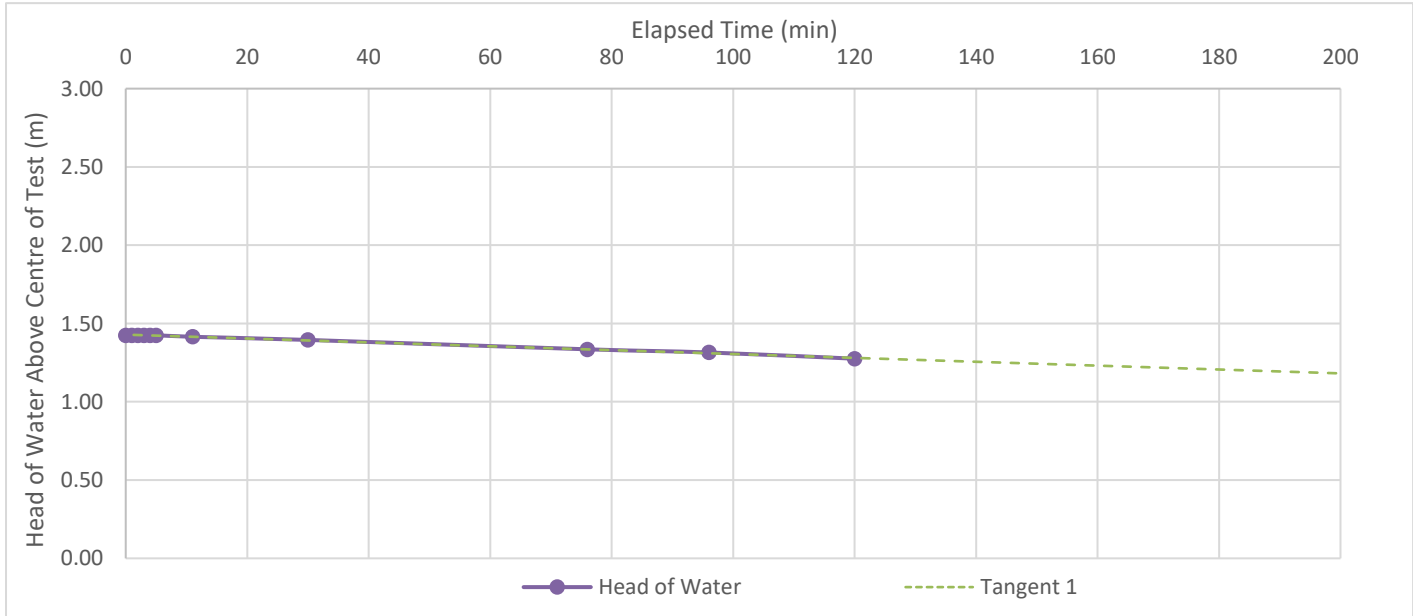
Infiltration Test Results

Test Position	WS05
Test No.	1
Project No.	P16323
Project Name	Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex
Casing Depth	1.00 m bgl
Borehole Depth	1.85 m bgl
Casing Diameter	0.105 m
Average Borehole Diameter	0.092 m



Length of Test Zone	0.85 m	L
Depth to Center of Test Zone	1.43 m	X
Water level at start of test	0.00 m	
Water level at end of test	0.15 m	
Duration of test	120 min	
Average Depth Of Water	1.78 m	
Average Drained Area	0.52 m ²	
Volume of Water Lost	0.00 m ³	

Driving Head	1.4 m
Infiltration rate	7.27E-07 m/sec
Calculation method:	Calculated in accordance with The Soakaway Design Guide, published by Kent County Council, July 2000.



APPENDIX C

Geotechnical Laboratory Test Results

ASHDOWN SITE INVESTIGATION LIMITED

Soil Classification Summary

Site Name:	Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham, West Sussex	Job No:	P16323
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BH/TP No.	Depth (m)	Nat. Moist. Cont. (w %)	Equiv. Moist. Cont. (w _a %)	Atterberg Limits			Class'n	Cons. Index (I _c)	% passing 425 µm sieve	Visual Description of Sample
				W _l %	W _p %	I _p %				
WS01	2.05	18		52	21	31	CIH	1.10*	100	Very stiff orange brown and grey brown silty CLAY.
WS02	0.90	19		41	22	19	CIM	1.16*	90	Very stiff grey brown and light brown slightly gravelly silty CLAY. Gravel is fine mudstone and ironstone.
WS03	1.20	18		40	19	21	CIM	1.05*	90	Very stiff light brown and orange brown slightly gravelly silty CLAY. Gravel is fine mudstone and ironstone.
WS04	0.80	22		44	23	21	CIM	1.05*	97	Very stiff light brown slightly gravelly silty CLAY. Gravel is fine to medium mudstone and ironstone.

Test Method: Classification Tests BS1377: Part 2: 1990: Method 4.4, 5.3 and 5.4	Sheet No. 1
* Consistency index based on natural moisture content and not the equivalent moisture content.	



Alex Bewick
Ashdown Site Investigations Ltd
Unit 3 The Grain Store
Ditchling Common Business Park
Ditchling Common
West Sussex
BN6 8SG

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 23-13119

Site Reference: Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham

Project / Job Ref: P16323 1855

Order No: 11381

Sample Receipt Date: 23/10/2023

Sample Scheduled Date: 23/10/2023

Report Issue Number: 1

Reporting Date: 27/10/2023

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Soil Analysis Certificate					
DETS Report No: 23-13119	Date Sampled	17/10/23	17/10/23	17/10/23	17/10/23
Ashdown Site Investigations Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Land to the Rear of 1 Brockwell Cottage, Faygate Lane, Horsham	TP / BH No	WS01	WS02	WS03	WS04
Project / Job Ref: P16323_1855	Additional Refs	D	D	D	D
Order No: 11381	Depth (m)	1.70	1.20	0.70	1.35
Reporting Date: 27/10/2023	DETS Sample No	681681	681682	681683	681684

Determinand	Unit	RL	Accreditation				
pH	pH Units	N/a	MCERTS	5.1	5.4	6.7	6.8
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	928	471	237	227
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.09	0.05	0.02	0.02
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	199	122	29	40
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.20	0.12	0.03	0.04
Total Sulphur	%	< 0.02	NONE	0.04	< 0.02	< 0.02	< 0.02

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
 Subcontracted analysis (S)



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Soil Analysis Certificate - Sample Descriptions

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DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
681681	WS01	D	1.70	14.5	Brown sandy clay
681682	WS02	D	1.20	12.1	Brown sandy clay
681683	WS03	D	0.70	18.9	Brown sandy clay
681684	WS04	D	1.35	21.2	Brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ¹/5

Unsuitable Sample ¹/5



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Soil Analysis Certificate - Methodology & Miscellaneous Information

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Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 dphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (all: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (all: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried

AR As Received



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List of HWOL Acronyms and Operators	
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Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
—	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym