Former Howard Kent Storage Yard
5 Brighton Road
Shoreham-by-Sea
West Sussex

Combined Geotechnical and Ground Contamination Risk Assessment

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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.

It is proposed to redevelop the former Howard Kent storage yard site at 5 Brighton Road, Shoreham-by-Sea, West Sussex. The proposed mixed-use development will be between 3 and 8 storeys in height and is to comprise 21 townhouses, a block of 24 flats, and commercial units. A new riverside walk, children's play area, and areas of communal and decorate landscaping are also proposed. The plans do not include any areas of private garden.

Reference to geological datasets indicates that the site is expected to be underlain by Storm Beach Deposits/Beach and Tidal Flat Deposits overlying the White Chalk Subgroup, with Made Ground also shown underlying the western part of the site. The ground investigation confirmed the underlying soils to comprise a variable thickness of made ground, overlying Beach and Tidal Flat Deposits and, in turn, White Chalk Subgroup deposits.

Both the Storm Beach Deposits and Beach and Tidal Flat Deposits are classed as Secondary Undifferentiated Aquifers. The White Chalk Subgroup is classed as a Principal Aquifer. The site does not lie within a SPZ. The groundwater table beneath the site is tidally influenced, with water levels recorded to rise with each high tide and returning to a water table depth of around 3m below ground level. Peak groundwater depths of close to 1m were also recorded.

Precautions against shrinkage and heave for any new foundation system should assume a low volume change potential for the fine-grained Beach and Tidal Flat Deposits soils. The coarse-grained Beach and Tidal Flat Deposits and underlying White Chalk Subgroup are not susceptible to volume change.

In view of the highly variable nature and potential significant depth of made ground soils, and the generally loose relative density of the underlying Beach and Tidal Flat Deposits, it is considered that the construction of shallow spread foundations are unlikely to be a viable option for this site.

It is understood further ground investigation works, including deep cable percussion boreholes, are proposed in order to provide suitable information to enable detailed piled foundation design.

In view of the variable thickness of made ground and the presence of soils of low volume change potential underlying the site, it is recommended that ground floors should be suspended.

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

Design equilibrium California bearing ratios and moduli of subgrade reaction are presented in the report. The subgrade is likely to be susceptible to frost heave.

Infiltration testing within the Beach and Tidal Flat Deposits soils recorded infiltration rates ranging between 1.0×10^{-4}m/sec and 7.5×10^{-5}m/sec.

The preliminary contamination risk assessment identified potential pollutant linkages relating to proposed end users of the site.

The ground investigation recorded the underlying made ground to contain concentrations of lead and PAH compounds that are considered to pose an unacceptable risk to end users of the site. In addition, the concentrations of petroleum hydrocarbons and BTEX compounds recorded will likely require the use of barrier pipe for new water supply runs.

The remediation works ultimately adopted should be detailed within a separate remediation strategy, along with a verification plan. This should be produced once this risk assessment report has been reviewed and approved by the appropriate authority.

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1. INTRODUCTION

It is proposed to redevelop the former Howard Kent storage yard site at 5 Brighton Road, Shoreham-by-Sea, West Sussex. The proposed mixed-use development will be between 3 and 8 storeys in height and is to comprise 21 townhouses, a block of 24 flats, as well as commercial units. A new riverside walk, children's play area, and areas of communal and decorate landscaping are also proposed. The plans do not include any areas of private garden. A copy of the proposed development layout, obtained from the local planning portal, is presented in Appendix A.

In association with Phlorum, Ashdown Site Investigation Ltd was requested to undertake a ground investigation, provide advice to assist with the structural design and undertake a ground contamination risk assessment to assist with the discharge of related planning conditions.

The specific objectives of the works were to:

a) Establish the expected geology, hydrogeology at the site;
b) Investigate the shallow ground and groundwater conditions in the area of the proposed development;
c) Provide advice to assist others in undertaking design of spread foundations, ground floors, road pavements and soakaways;
d) Test for the presence of contaminants identified by the preliminary conceptual model; and
e) Develop a quantitative conceptual model of the site, refining the preliminary model to identify any pollutant linkages that may be present.

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 Q13756/Rev2, dated 15th April 2024. The instruction to proceed was received on behalf of the client.

The Ground Contamination Risk Assessment sections of this report should be read in conjunction with the Land Contamination Preliminary Risk Assessment prepared by Phlorum Ltd in March 2021[1].

Ashdown Site Investigation Ltd previously installed two groundwater monitoring standpipes on site in December 2023, under project reference P16388. The borehole records and long-term groundwater monitoring results have been included in this report for completeness.

[1] Phlorum Project No. 10500 Rev0, dated 22nd March 2021.

2. SITE CONTEXT

2.1 Site Description

The site is located at 5 Brighton Road, Shoreham-by-Sea, West Sussex, and is centred on the approximate Ordnance Survey national grid reference 523324, 104938. A site location plan and site plan are presented as Figure 1 and Figure 2, respectively.

The site comprises an irregular shaped plot of land on the southern side of Brighton Road, bounded by a site currently under redevelopment to the west and by the Shoreham Rowing Club and RNLI Lifeboat Station to the east. The southern boundary of the site faces directly out onto the River Adur at the point it joins with Shoreham Harbour. A large storage/warehouse building, formerly covering the western part of the site, has now been demolished. This has left an entirely open site, predominantly surfaced with large concrete slabs, but also with some areas of rough ground.

2.2 Geological and Hydrogeological Data

2.2.1 Expected Geology and Aquifer Designation

The stratigraphic succession 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
Artificial	Made Ground	N/A
Superficial	Storm Beach Deposits	Secondary Undifferentiated Aquifer
	Beach and Tidal Flat Deposits (Undifferentiated)	Secondary Undifferentiated Aquifer
Bedrock	Tarrant Chalk Member	Principal Aquifer

The BGS mapping shows an area of Made Ground underlying the western half of the site. Made Ground is an area where the pre-existing (natural or artificial) land surface is raised by artificial deposits. The purpose of the made ground is unspecified.

The mapping shows superficial Storm Beach Deposits to be underlying the eastern part of the site and records similar undifferentiated Beach and Tidal Flat Deposits underlying the western part.

Storm Beach Deposits typically comprise well rounded to sub-angular fine to coarse gravel and cobbles of flint with small fractions of sand. The deposits may be expected to be well sorted, but will be laterally and vertically variable.

Beach Deposits comprise deposits of shingle, sand, silt and clay which may be bedded or chaotic. Beach deposits may be in the form of dunes, sheets or banks. Tidal Flat Deposits comprise commonly silt and clay with sand and gravel layers, and possible peat layers, from the tidal zone. The undifferentiated Beach and Tidal Flat Deposits comprise a composite of both of the above.

The Tarrant Chalk Member forms part of the Culver Chalk Formation, which in turn forms part of the White Chalk Subgroup. The Culver Chalk Formation is of Campanian age (72.1 to 83.6 million years old; Late Cretaceous) and comprises white chalk with flint seams. The flints are generally large and, in the upper part, tabular. The stratum is relatively marl free. The formation is recorded by the BGS to range in thickness up to 90m.

2.2.2 Natural Ground Subsidence

The chalk can be expected to have a deeply convoluted upper surface as a result of solution weathering and erosion. The presence of natural cavities in the chalk is very rare and solution features, if present, can be expected to be infilled with Quaternary Superficial Deposits. The infill material may be significantly weaker than the surrounding chalk. Solution features can comprise pipes extending to several metres deep into the chalk or conical depressions and basin shaped structures.

The British Geological Survey GeoSure 5km hex grid indicates the generalised area of the site has a significant susceptibility from soluble rocks. However, the information within the Land Contamination Preliminary Risk Assessment[2] indicated no natural cavities are recorded within 500m of the site.

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

2.2.3 Mining and Ground Workings

Historically, chalk deposits were often mined locally. Most commonly historical mines characteristically comprise a narrow shaft with a number of chambers radiating from the base. These structures are colloquially known as "deneholes", "chalk-wells" or "chalkangles".

The depth of the features reflects the depth to the underlying chalk bedrock. The shaft width was commonly in the order of 2m to 3m, widening out into galleries at depth. The chalk was extracted for soil improvement and was usually applied directly to fields though sometimes the chalk was processed, typically by burning in kilns where the chalk was used to produce quicklime (calcium oxide).

Once they had reached their limits the mines were commonly capped. Various capping techniques were used; examples include the use of upturned trees or brick arching. Records pertaining to the distribution of these localised mines are incomplete, usually being limited to features marked as shafts or the occurrence of circular depressions on historic Ordnance Survey maps. In the field they are most likely to be visible as shallow depressions, if at all.

The preliminary risk assessment[3] information indicates there are numerous surface ground workings as well as BritPits within 250m of the site, generally associated with wharfs and gravel and sand pits. The chalk mining risk was identified as being sporadic and that underground mining of restricted extent may have occurred and potential difficult ground conditions are at a level where they do not need to be considered. The British Geological Survey GeoIndex Onshore viewer records also confirm the nearest mines and quarries records are mainly associated with wharf sites as well as gravel pits. The BGS data also records two ceased brick fields: Shoreham Beach Brick Field some 720m to the west and Kingston by Sea Brick Field some 950m to the north-west. A search of the Chelsea Speleological Society records revealed no relevant records

[2] Phlorum Project No. 10500 Rev0, dated 22nd March 2021.

within 1km of the site. Whilst the risk posed to the development from underground mining is considered to be very low to low, surface ground working may have occurred.

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

2.2.4 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 recent intrusive site works comprised a series of dynamic sampler boreholes and a single mechanically dug trial pit, together with accompanying in-situ geotechnical testing. The intrusive work was carried out between 2nd and 3rd May 2024. 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
WS101	5.00	Dynamic Sampler
WS102	3.00	Dynamic Sampler
WS103	1.20	Dynamic Sampler
WS104a	3.00	Dynamic Sampler
WS105	5.00	Dynamic Sampler
WS106	2.00	Dynamic Sampler
WS107	3.50	Dynamic Sampler
WS108	2.00	Dynamic Sampler
WS109	5.00	Dynamic Sampler
WS110	2.00	Dynamic Sampler
TP201	1.53	Mechanically Dug Pit

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.

Where appropriate, samples were stored in cool boxes with cooling blocks to maintain temperatures below 4°C until transferred to refrigerators upon return to the office and subsequently forwarded to the external accredited chemical testing laboratory.

3.4 In Situ Strength Testing

The 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 soakage testing was undertaken in a single trial pit in general accordance with the test methodology given by BRE guidance[3].

3.6 Installations

Gas and groundwater monitoring standpipes were installed to depths of between 1.85m and 3.00m in four of the boreholes. Descriptions of the installations are shown on the exploratory hole records.

The concentrations of gases and depths to groundwater were recorded within the standpipes on six occasions between 8th May 2024 and 4th June 2024. The readings are presented in Appendix B.

In December 2023 Ashdown Site Investigation Ltd drilled two dynamic sampler boreholes, designated WS01 and WS02, and installed standpipes within the boreholes to depths of 4.90m and 3.90m respectively (project ref. P16388). Groundwater data loggers were installed within the standpipes constructed within the boreholes on the 4th December 2023 and collected on the 4th June 2024. The data loggers were programmed to collect readings at 60-minute intervals. Exploratory hole records for the two boreholes and results of the groundwater monitoring are included within Appendix B.

3.7 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.

[3] Section 3.2.3 of Building Research Establishment (BRE) Digest 365, 2016.

4. GROUND CONDITIONS

4.1 Stratigraphy

4.1.1 Surface Covering

With the exception of borehole WS103, where a surface cover of crystalline rock some 200mm thick was recorded, each of the exploratory holes was excavated through a surface cover of concrete or concrete paving some 150mm to 350mm in thickness.

4.1.2 Made Ground

Made ground, generally comprising sandy gravel and/or gravelly sandy clay, was recorded to the full depth of borehole WS103 (1.20m) and to depths of between 0.50m and 1.50m below ground level below ground level and within the remaining exploratory holes, including the December 2023 groundwater monitoring boreholes. The gravel fraction comprised variable quantities of flint, chalk, concrete, brick, charcoal-like material, sandstone, asphalt, crystalline rock and shell fragments.

It is noted that it may be difficult to distinguish between the made ground soils and disturbed Beach and Tidal Flat Deposits, particularly in wharf areas where reclaimed soils may have been utilised to create level areas adjacent to the river, and as such deeper made ground soils may be present locally.

4.1.3 Beach and Tidal Flat Deposits

Underlying the made ground, the investigation progressed into undisturbed typically loose sandy, locally clayey, gravel deposits with occasional soft varying firm and locally stiff gravelly sandy clay soils. Locally the coarse-grained soils were recorded to be of medium dense to dense relative density.

These soils have been recorded to the full depth of the majority of the exploratory holes and to depths of between 3.10m and 4.10m below ground level within boreholes WS101, WS105 and WS107.

Whilst these deposits are considered to represent either the Storm Beach Deposits or the Beach and Tidal Flat Deposits indicated to underlie the site on BGS geological maps, for the purposes of the report they have been denoted as being the Beach and Tidal Flat Deposits.

4.1.4 White Chalk Subgroup

Beneath the Beach and Tidal Flat Deposits, dynamic sampler boreholes WS101, WS105 and WS107 encountered chalk deposits which continued to the full depth of the investigation. It is noted that due to very poor recovery of soil samples, the exact depth the chalk deposits were encountered at could not be determined.

These deposits are considered to represent the White Chalk Subgroup indicated to underlie the Beach and Tidal Flat Deposits on BGS geological maps.

4.2 Stability

Instability was recorded locally within the made ground and coarse-grained soils encountered.

4.3 Groundwater Conditions

Whilst each of the exploratory holes was noted to be dry during drilling/excavation, during subsequent monitoring visits groundwater was recorded at various depths. Groundwater monitoring standpipes were also installed in December 2023 on site. Unfortunately, due to saltwater corrosion, the data cannot be retrieved from one of the dataloggers installed.

The following table summarises the groundwater data obtained during various phases of works.

Table 3. Summary of Groundwater Data

	Depth to Groundwater (m bgl)						
Date	04/12/2023	08/05/2024	13/05/2024	22/05/2024	24/05/2024	28/05/2024	04/06/2024
Time	~1:30-3:30	~13:00	~11:00	~10:30	~9:30	~12:00	~12:30
WS01	3.51#	-	-	-	-	-	2.59
WS02*	3.69#	2.37	3.28	3.15	3.28	3.28	2.67
WS102	-	2.10	Dry at 3.00m	Dry at 3.00m	Dry at 3.00m	2.62	1.30
WS104	-	2.05	Dry at 3.00m	2.95	Dry at 3.00m	2.97	2.35
WS106	-	Dry at 1.85m	Dry at 1.85m	Dry at 1.85m	Dry at 1.85m	Dry at 1.85m	Dry at 1.85m
WS107	-	2.15	Dry at 3.00m	2.90	Dry at 3.00m	2.97	2.57

Reading likely to not have reached equilibrium with the water table at time taken.
* Readings obtained/interpolated from groundwater chart included in Appendix B. Groundwater readings recorded within borehole WS02 varied between 1.08m and 3.34m below ground level, showing both neap and spring tides.

Based on the groundwater data obtained the groundwater table is tidally influenced, but there is a permanent groundwater table at around 3m below ground level. It also appears that groundwater depths are higher towards the river to the south, typically by some 0.20m-0.40m, although it is noted that the groundwater readings recorded within borehole WS102 appeared to be rising during the most recent visits.

5. GEOTECHNICAL ASSESSMENT

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

It is understood that a mixed-use development is to be constructed comprising three-storey townhouses, an eight-storey block of flats, commercial units, new riverside walk, play area, parking and areas of soft communal landscaping.

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 Beach and Tidal Flat Deposits have been classified as clays, and with modified plasticity indices in the range of 5% to 13%, the soils may be expected to exhibit up to a low volume change potential.

It is recommended that the design of precautions against shrinkage and heave for any new foundation system (spread footings, piles, pile caps and ground beams etc.) should assume a low volume change potential for the fine-grained Beach and Tidal Flat Deposits soils and take into account current guidance such as that given by the Building Research Establishment (BRE)[4] or the National House Builders Council (NHBC)[5].

The coarse grained Beach and Tidal Flat Deposits and underlying White Chalk Subgroup may be considered to be non-plastic and hence non-shrinkable.

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, requirements for sleeving or reinforcing of piled 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).

5.1.2 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 and any soils disturbed by the construction or removal of any previously existing foundations or services 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.

[4] 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.
[5] http://www.nhbc.co.uk/ : NHBC Standards, Chapter 4.2.

In connection with the made ground soils it is noted that the BGS mapping data indicated that made ground soils used to raise levels would be expected beneath the western part of the site. As discussed in Section 4.1.2, it can be difficult to distinguish between made ground soils and possibly reworked Beach and Tidal Deposits used to create level areas and as such locally deeper made ground soils may be present, particularly in the vicinity of the sea wall.

Beneath the made ground the investigation encountered generally loose sandy clayey gravels, locally with horizons of soft varying firm, and locally stiff, gravelly sandy clays.

In view of the highly variable nature and potential significant depth of made ground soils, and the generally loose relative density of the underlying Beach and Tidal Flat Deposits, it is considered that the construction of shallow spread foundations are unlikely to be a viable option for this site.

5.1.3 Piled Foundations

Whilst assessment of ground conditions for the purpose of providing information for piled foundation design was beyond the brief of this current report, consideration will need to be given to supporting the proposed structure on piled foundations as an alternative to deep spread foundations. It is understood further ground investigation works, including deep cable percussion boreholes, are proposed in order to provide suitable information to enable detailed piled foundation design.

5.2 Ground Floors

In view of the variable thickness of made ground and the presence of soils of low volume change potential underlying the site, it is recommended that ground floors should be suspended.

Current guidance[6] 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.

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.

[6] http://www.nhbc.co.uk/ : NHBC Standards, Chapter 4.2.

5.3 Groundwater

The groundwater table beneath the site is tidally influenced, with water levels recorded to rise with each high tide and returning to a water table depth of around 3m below ground level. Peak groundwater depths of close to 1m were also recorded, possible coinciding with a spring tide and possibly a heavy rainfall event.

Designers will need to carefully consider the tidal influence of groundwater table present beneath the site, particularly given the presence of coarse grained soils. The timing of any deep excavations works will likely need to be undertaken during low and/or neap tide periods.

5.4 Stability of Excavations

All made ground or coarse-grained natural 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. Where stable excavations are required, excavations should either be suitably supported or, where space permits, side slopes could be battered back to a safe angle of repose.

All excavations requiring human entry must be shored or battered as necessary to conform to current best practice, as accepted by the Health and Safety Executive (HSE)[7]. 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 (including sea wall), 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 BRE[8].

In consideration of the soils encountered beneath the site and its historical usage it is recommended that 'brown field conditions' should be assumed for the purpose of assessing the aggressivity of the chemical environment for concrete classification (ACEC class). Given the noted occurrence of groundwater, 'mobile groundwater' conditions should also be 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)

[7] Relevant guidance is given on the HSE website, www.hse.gov.uk
[8] BRE Special Digest 1:2005 Concrete in Aggressive Ground.

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 4. Assessment of the Chemical Analysis of the Soil

	Characteristic Value	Design Sulfate Class	ACEC Classification
pH	8.1	-	-
Water Soluble Sulphate (mg/l as SO4) *	300	DS-1	AC-1
Total Potential Sulphate (TPS % SO4)	No Oxidisable Sulphides	N/A	N/A
Magnesium (mg/l) *	0	-	-
Water Soluble Sulphate including mineral acids (mg/l as SO4) *	N/A as pH >5.5	-	-

Notes: * Characteristic value rounded to nearest 100.

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

5.6 Pavement Design

Current guidance[9] suggests that pavement design should be based on the design subgrade surface modulus, determined as being equal to the lower of the short-term subgrade modulus and the long-term subgrade modulus. The subgrade surface modulus can be related to California bearing ratio using the formula, $E = 17.6(CBR)^{0.64}$, where E is the subgrade modulus expressed in MPa.

Cone penetrometer tests were undertaken to establish the California bearing ratio (CBR) of the in situ soils at the time of the investigation. The range of values determined is presented on the test result records within Appendix B, and the table and graphs contained within Appendix D. A summary of the in situ test data is presented below. It is noted that in situ CBR values are, in part, dependent on the moisture content of the tested soils and are consequently subject to seasonal variation.

Table 5. In Situ CBR Values (At Time of Ground Investigation Works)

	CBR (%)	Modulus of Subgrade Reaction E (MPa)
Minimum	2.3	30.2
Average	33.5	146.6
Maximum	238.5	585.0

[9] Highways England Design Manual for Roads and Bridges CD 225 Rev1; Design for new pavement foundations.

	CBR (%)	Modulus of Subgrade Reaction E (MPa)
10%ile	6.1	56.1
20%ile	10.1	77.1
50%ile (Median)	17.3	108.9

Equilibrium CBR values can be derived from knowledge of soil classification data (plasticity index for soils exhibiting cohesion (clay type) and particle size distribution for granular soils) and pavement thickness. Historical guidance[10] suggests the following design equilibrium CBR values would be applicable to the Beach and Tidal Flat Deposits soils for the construction of pavement. The subgrade moduli calculated from these design equilibrium CBR values can be reasonably considered to be representative of long-term subgrade modulus using the formula given above.

Table 6. Long-term CBR Values

Stratum	Design Equilibrium CBR Value (%)			†Modulus of Subgrade Reaction E (MPa)
		Thin Road* Pavement	Thick Road* Pavement	
Fine grained Beach and Tidal Flat Deposits	**Minimum**	1.0	1.0	17.6
	Average	2.5	3.1	30.7
	Maximum	3.8	4.8	41.4
Coarse Grained Beach and Tidal Flat Soils		20	20	119.7

* Thin pavement being 300mm sub-base, thick pavement being 1200mm sub-base. †Modulus based on average of all calculated moduli based on CBR values for thin sub-base.

Designers will need to select an appropriate design equilibrium CBR value / modulus of subgrade reaction taking account of proposed pavement thickness, expected winter groundwater conditions, the standard to which pavement is to be designed and any local authority or other regulatory/warrantor requirements together with construction conditions likely to prevail at the time of construction.

The subgrade should be assumed to be susceptible to frost heave.

5.7 Stormwater Infiltration Systems

In-situ infiltration testing[11] was carried out in trial pit TP201. From the test results calculations were made to determine the infiltration rate that could be expected for infiltration systems constructed into the underlying Beach and Tidal Flat Deposits soils.

For each test the soil infiltration rate (f) was calculated by dividing the volume of water lost between 75% and 25% of the initial test depth by the sum of the average surface area of the sides of the trial pit in contact with the water during the test monitoring period, and its base area. This figure was then divided by the test duration (time taken for the water level to fall between 75% and 25% of the initial test depth) to give the soil infiltration rate in metres per second.

The following infiltration rates were derived from the tests:

[10] Highways England Design Manual for Roads and Bridges Interim Advice Note 73/09 Rev1; now withdrawn.
[11] Conducted in general accordance with the requirements of BRE 365, Soakaway Design.

Table 7. Calculated Infiltration Rates

Exploratory Hole	Test Response Zone Depth (m)		Stratum	Infiltration Rate (f) (m/sec)
	Top	Bottom		
TP201 – Test 1	1.10	1.53	Beach and Tidal Flat Deposits	1.02×10^{-4}
TP201 – Test 2	1.10	1.53	Beach and Tidal Flat Deposits	8.59×10^{-5}
TP201 – Test 3	1.12	1.53	Beach and Tidal Flat Deposits	7.54×10^{-5}

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 regulations[12], point discharging infiltration systems (conventional ring or trench soakaways) are required to be constructed a minimum of 5.0m away from proposed or existing buildings. However, CIRIA guidance[13] recommends that where soakaways are to be sited on chalk deposits, they should be constructed a minimum of 10m away from buildings or, where dissolution features are known to be prevalent, at least 20m away from any foundations.

[12] The Building Regulations 2010; Part H; Drainage and Waste Disposal
[13] CIRIA C574: Engineering in Chalk

6. QUANTITATIVE CONTAMINATION ASSESSMENT

6.1 Introduction

The risk assessment for the site considers the sources of contamination identified, the receptors that may be present in view of the development proposals and the contaminant pathways by which these may be linked.

A complete pollutant linkage is only deemed to exist where all three are present and a site is considered suitable for use where no complete pollutant linkages are identified.

Where a complete pollutant linkage is considered to be present, an assessment of the level of risk associated with the pollutant linkage has been carried out in line with published guidance[14].

The level of risk is determined using the risk matrix presented in the following table. Classifications of probability, consequence and risk are presented in Appendix E.

Table 8. Risk Assessment Matrix

		Probability			
		Very Low	**Low**	**Moderate**	**High**
Consequence	**Very Minor**	Negligible	Very Low	Low	Low/Moderate
	Minor	Very Low	Low	Low/Moderate	Moderate
	Moderate	Low	Low/Moderate	Moderate	High
	Severe	Low/Moderate	Moderate	High	Very High

6.2 Assessment Strategy

A copy of the preliminary conceptual model is presented in Appendix F. The ground investigation comprised testing a number of shallow samples from both the made ground and Beach and Tidal Flat Deposits, for the range of contaminants associated with the potential sources identified in the preliminary conceptual model.

The identified potential sources may have resulted in diffuse contamination being present anywhere on the site, and therefore the non-targeted spread of sampling positions undertaken is considered appropriate to inform an assessment of the level of risk present.

6.3 Analysis of Contamination Test Results

6.3.1 Method of Assessment

For the assessment of risk to end users, comparison of the results of the laboratory testing has been made against published soil screening values (SSV) comprising the 'Suitable For Use Levels' (S4UL)[15] or, in lieu of an S4UL being developed for lead, the Category 4 Screening Level (C4SL)[16].

[14] Contaminated Land Risk Assessment: A guide to good practice, CIRIA C552, 2001.
[15] Nathanail, C.P, et al., The LQM/CIEH S4ULs for Human Health Risk Assessment, 2015, Land Quality Press, Nottingham. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3071.
[16] SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. Final Project Report, published by DEFRA, 2014.

In view of the development proposals, the SSV utilised in this assessment are those calculated for the generic "Residential without homegrown produce" land use.

For the assessment of risk to controlled waters a qualitative assessment has been undertaken based upon the concentrations of contaminants recorded within the soil samples and the information obtained about the sensitivity of the underlying strata or nearby surface water receptors.

6.3.2 Heavy Metals & Polycyclic Aromatic Hydrocarbon (PAH) Compounds

The following table summarises the SSV along with the maximum and minimum concentrations of the heavy metals and PAH compounds tested for.

Table 9. Summary of Test Results – Heavy Metals and PAH Compounds

Contaminant	SSV (mg/kg)	No. of Samples	Minimum Concentration (mg/kg)	Maximum concentration (mg/kg)	Limit of Detection (mg/kg)	No of exceedances
Arsenic	40	8	8	20	< 2	0
Water Soluble Boron	11000	8	<LOD	2.1	< 1	0
Cadmium	85	8	<LOD	0.5	< 0.2	0
Chromium	910	8	6	18	< 2	0
Hexavalent Chromium	6	8	<LOD	<LOD	< 2	0
Copper	7100	8	19	89	< 4	0
Lead	310	8	23	906	< 3	3
Mercury	56	8	<LOD	11.8	< 1	0
Nickel	180	8	7	32	< 3	0
Selenium	430	8	<LOD	<LOD	< 3	0
Zinc	40000	8	78	357	< 3	0
Naphthalene	2.3	8	<LOD	0.31	< 0.1	0
Acenaphthylene	2900	8	<LOD	0.72	< 0.1	0
Acenaphthene	3000	8	<LOD	0.71	< 0.1	0
Fluorene	2800	8	<LOD	1.7	< 0.1	0
Phenanthrene	1300	8	0.14	32	< 0.1	0
Anthracene	31000	8	<LOD	4.68	< 0.1	0
Fluoranthene	1500	8	0.24	57.6	< 0.1	0
Pyrene	3700	8	0.22	48.3	< 0.1	0
Benz(a)anthracene	11	8	<LOD	37	< 0.1	1
Chrysene	30	8	0.12	29.8	< 0.1	0
Benzo(b)fluoranthene	3.9	8	0.12	9.04	< 0.1	3
Benzo(k)fluoranthene	110	8	<LOD	6.86	< 0.1	0
Benzo(a)pyrene	3.2	8	<LOD	27.9	< 0.1	3
Indeno(123-cd)pyrene	45	8	<LOD	6.98	< 0.1	0
Dibenz(ah)anthracene	0.31	8	<LOD	1.86	< 0.1	3
Benzo(ghi)perylene	360	8	<LOD	5.55	< 0.1	0

Multiple samples of the made ground recorded Lead, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenzo(ah)anthracene at concentrations above their respective SSV. The made ground soils are therefore considered to pose an unacceptable risk to end users and remedial works will be necessary within areas of proposed soft landscaping.

At the concentrations recorded, none of the heavy metals or PAH compounds would be expected to exhibit significant mobility within the soils and are therefore not considered to pose an unacceptable risk to controlled waters beneath the site.

6.3.3 Asbestos

No suspected asbestos materials were noted within any of the exploratory holes undertaken at the site.

Nine samples of the made ground were screened for the presence of asbestos. None of the samples recorded the presence of any asbestos materials.

There is not considered to be an unacceptable risk to end users from asbestos materials within soils. Due to the heterogeneity of made ground, there will always remain the potential for localised asbestos materials to be encountered during construction works, though the likelihood of this is considered to be very low. All workers at the site should be made aware of what actions to take in the event that suspected asbestos materials are identified at any time during the development works.

6.3.4 Petroleum Hydrocarbons & BTEX Compounds

The following table lists the SSV for petroleum hydrocarbon equivalent carbon weight fractions and BTEX compounds calculated for 1% organic content. The testing for BTEX compounds was undertaken as part of the testing for volatile organic compounds (VOC), but are discussed here.

Table 10. SSV for petroleum hydrocarbon equivalent carbon weight fractions

Petroleum Hydrocarbon Fraction	SSV (mg/kg)	Petroleum Hydrocarbon Fraction	SSV (mg/kg)
Aliphatic EC 5-6	42	Aromatic EC 5-7	370
Aliphatic EC >6-8	100	Aromatic EC >7-8	560
Aliphatic EC >8-10	27	Aromatic EC >8-10	47
Aliphatic EC >10-12	130	Aromatic EC >10-12	250
Aliphatic EC >12-16	1100	Aromatic EC >12-16	1800
Aliphatic EC >16-35	65000	Aromatic EC >16-21	1900
Aliphatic EC >35-44	65000	Aromatic EC >21-35	1900
		Aromatic EC >35-44	1900
Compound	**SSV (mg/kg)**	**Compound**	**SSV (mg/kg)**
Benzene	0.38	Ethylbenzene	83
Toluene	880	*p*-Xylene[1]	79

[1] Xylene has three structural isomers, the SSV presented is for *p*-Xylene, which has the most conservative SSV.

Whilst full speciation of the concentrations of petroleum hydrocarbons by aromatic and aliphatic fractions was not undertaken, the results of the testing undertaken can still be compared with the more stringent of the screening values for the respective equivalent carbon weight fraction and, where the concentration recorded is found to be lower, it can be reasonably concluded that no significant risk is present.

Although several samples of the made ground and undisturbed Beach and Tidal Flat Deposits recorded detectable concentrations of petroleum hydrocarbons and BTEX compounds, none of the concentrations recorded exceeded the respective SSV for a residential land use without plant uptake.

In view of the concentrations recorded, the absence of any potential point sources of contamination and in the absence of any visual or olfactory evidence of widespread contamination from petroleum hydrocarbons or BTEX compounds, there is not considered to be an unacceptable risk to proposed end users of the site.

Given the very low concentrations of petroleum hydrocarbons and BTEX compounds recorded, these are not considered to pose an unacceptable risk to controlled waters beneath the site.

Comparison of the test results for petroleum hydrocarbons and BTEX compounds has been undertaken with the threshold value for PE water supply pipework[17].

Concentrations exceeding the threshold value have been recorded and protective pipework (e.g. barrier pipe) is likely to be required by the local water supply company.

It is strongly recommended that designers consult with the local water supply company to determine the specific water supply pipe material to be used, or whether they require further laboratory testing and assessment specific to proposed routes of services.

6.3.5 Monohydric Phenols and Cyanide

Eight samples of the made ground and undisturbed Beach and Tidal Flat Deposits were tested for the presence of monohydric phenols and cyanide. No detectable concentrations of either contaminant were recorded to be present.

6.3.6 Volatile Organic Compounds (VOC)

Excepting the BTEX compounds discussed above, the only other VOC recorded above the limit of detection were 1,2,4-Trimethylbenzene and trans-1,3-Dichloropropene.

A GAC[18] has been calculated for 1,2,4-Trimethylbenzene. For residential without plant uptake the screening value is 0.41m/kg. Both the samples that recorded concentrations of 1,2,4-Trimethylbenzene were below the GAC and therefore no unacceptable risk is considered to be present.

There are no screening values for trans-1,3-Dichloropropene. However, only one sample recorded a detectable concentration, and that was just 8µg/kg, compared with the limit of detection of the test of 5µg/kg.

As with the discussion of petroleum hydrocarbons, given the very low concentrations recorded, the absence of any potential point sources of contamination and in the absence of any visual or olfactory evidence of suspected contamination, there is not considered to be an unacceptable risk to either end users or controlled waters from VOC contamination within the shallow soils.

[17] Set out within Table 3.1 of the Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, UK Water Industry Research, 2010.
[18] CL:AIRE, Soil Generic Assessment Criteria for Human Health Risk Assessment, January 2010

6.4 Analysis of Ground Gas Monitoring Results

Monitoring of the gas concentrations within the standpipes in the four boreholes was initially carried out on three occasions. An additional three visits were then undertaken to attempt to provide data from a wider range of atmospheric pressure readings. Atmospheric pressures varied between 1005mb and 1028mb during the monitoring period, with readings taken during periods of both rising and falling atmospheric pressure.

Assessment of the results of the monitoring has been carried out in general accordance with current guidance[19]. The guidance provides a methodology for assessing the risk from ground gases by the calculation of site-specific gas screening values (GSV) for carbon dioxide and methane. These are calculated by multiplying the concentration (percentage/volume) of a gas by a gas flow rate (l/hr).

Where no detectable gas concentrations or flow rates are recorded, the GSV are calculated assuming values equal to the limit of detection of the instrument are present.

The peak concentration of carbon dioxide recorded was 0.3% by volume. No detectable concentrations of methane were recorded. The assessment has been undertaken assuming a maximum concentration equal to the limit of detection of the instrument is present.

With the exception of one visit from the standpipe at WS102, with a flow rate of 3.3l/hr, which lapsed to 0.0l/hr after 15 seconds, no detectable gas flow rates were recorded. This is not considered to be representative of long-term gas flow below the site. In the absence of any other detectable gas flows, the assessment has been undertaken assuming that a flow rate equal to the limit of detection of the instrument is present.

The following table summarises the calculated GSV:

Table 11. Calculated GSV for Carbon Dioxide and Methane

Gas	GSV
Carbon Dioxide	0.001 x 0.3 = 0.0003
Methane	0.001 x 0.1 = 0.0001

For sites that do not fall within the definition of "typical" 2 storey housing, Table 8.5 of the CIRIA document sets out a series of "Characteristic Situations" for different GSV, with Table 8.6 providing guidance on the degree of protection required for each situation.

The calculated GSV place the site within Characteristic Situation 1. No specific gas protection measures are required for this situation.

[19] CIRIA document C665, Assessing risks posed by hazardous ground gases to buildings, 2007.

6.5 Quantitative Contamination Risk Assessment

6.5.1 Contaminant Pathways Identified

Pathways associated with gas and vapour intrusion into the new buildings are considered to be valid, along with direct contact and dust related pathways due to the presence of soft landscaping. However, pathways associated with the consumption of home grown produce are not considered to be valid.

Should the proposed development plans be altered, a revised risk assessment may be required.

The site is expected to be underlain by the White Chalk Subgroup which is classed as a Principal Aquifer. Although the site is not located within a SPZ, and is located within an urban area, pathways relating to controlled waters may be reasonably considered to be present.

6.5.2 Contamination Sources Identified

The following sources of contamination have been identified by the quantitative contamination risk assessment:

- Made ground containing elevated concentrations of lead and PAH compounds.
- Concentrations of petroleum hydrocarbons and BTEX above the threshold for PE and PVC water supply pipework.

6.5.3 Quantitative Conceptual Model

The quantitative conceptual model for the proposed development is presented in Appendix G.

In the absence of any complete pollutant linkages being identified, no remedial measures or further contamination risk assessment works are considered to be necessary.

6.6 Risks to Other Potential Receptors

All construction workers must undertake their own risk assessment, based upon the works to be carried out and the proposed method by which this will be achieved, in accordance with current health and safety legislation. Their assessment should take into account all available information about the site, including that present within this report.

Appropriate working procedures and PPE should be adopted to ensure the health and safety of the site operatives. Instruction should be given in the recognition of potentially hazardous materials. All site personnel should be appropriately briefed on the discovery strategy, presented below, and what actions they must take in the event that further evidence of contamination is identified or suspected.

6.7 Recommendations

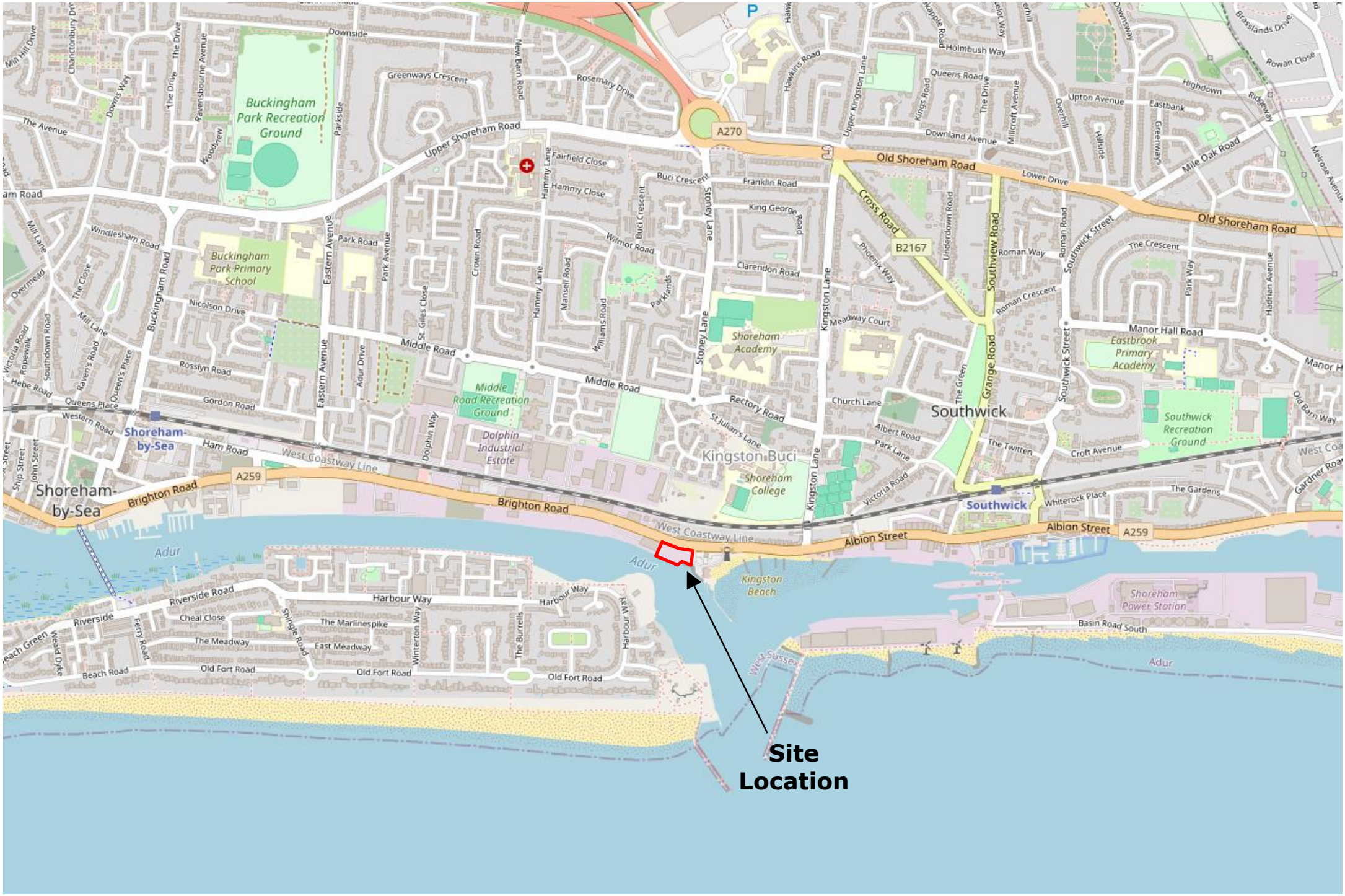
As complete pollutant linkages relating to end users have been identified at the site, it is considered that remedial measures will be required as part of the proposed development.

The remediation works ultimately adopted should be detailed within a separate remediation strategy, along with a verification plan. This should be produced once this risk assessment report has been reviewed and approved by the appropriate authority.

Ashdown Site Investigation Ltd.

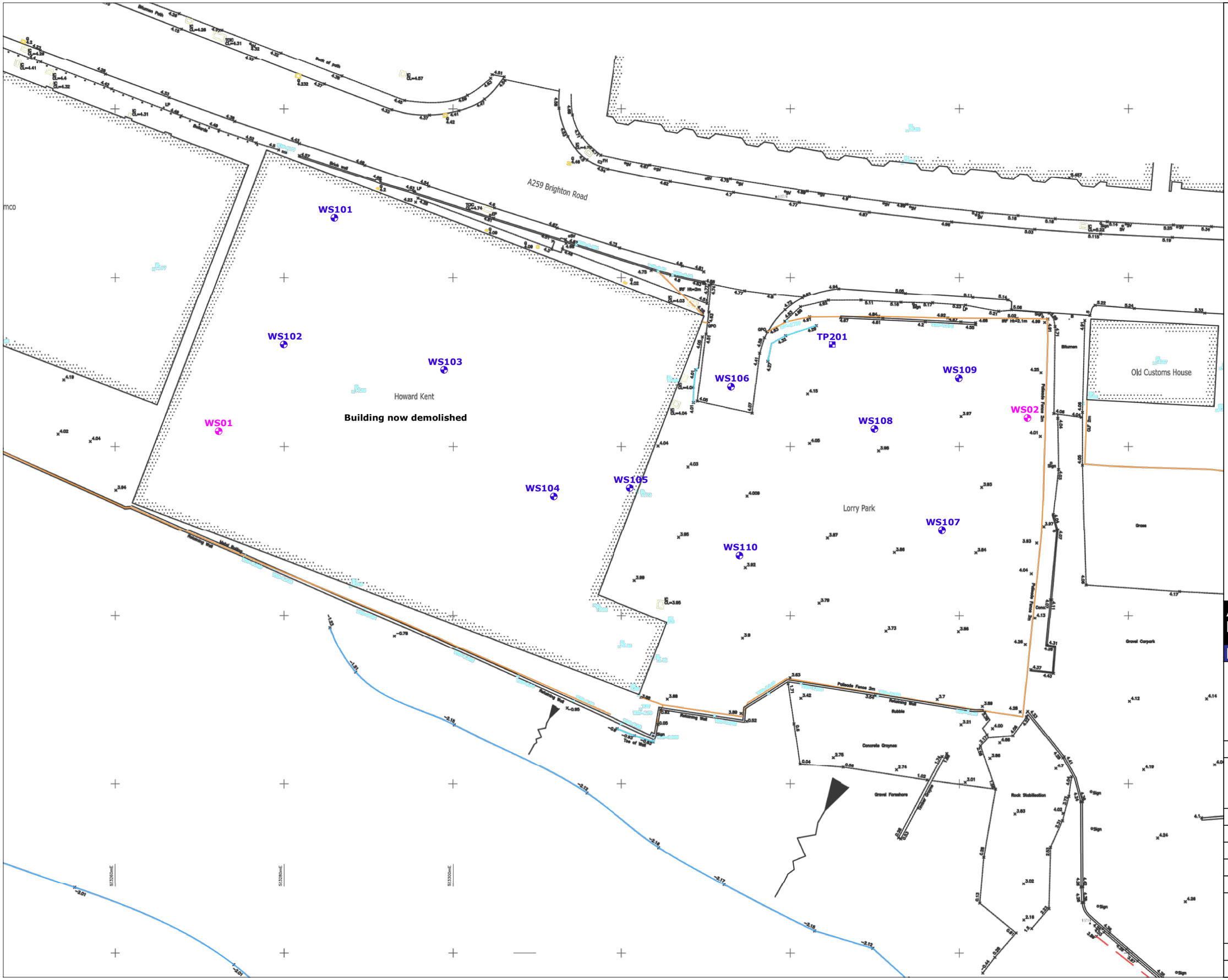
FIGURES

Figure 1 Site Location Plan
Figure 2 Site Plan



© OpenStreetMap contributors, CC BY-SA

ASHDOWN SITE INVESTIGATION LIMITED	Site Location Plan	Site Name	Figure No.	Project Reference
		Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex	1	P16596



ASHDOWN SITE INVESTIGATION
L•I•M•I•T•E•D

Unit 3
The Old Grain Store
Ditchling Common Business Park
Ditchling
East Sussex
BN6 8SG
01273 483119
contact@ashdownsi.co.uk

Site:

Former Howard Kent Storage Yard
5 Brighton Road
Shoreham-by-Sea
West Sussex

Project Ref:

P16596

Figure No.

2

Drawing Title

Site Plan

Scale

NTS

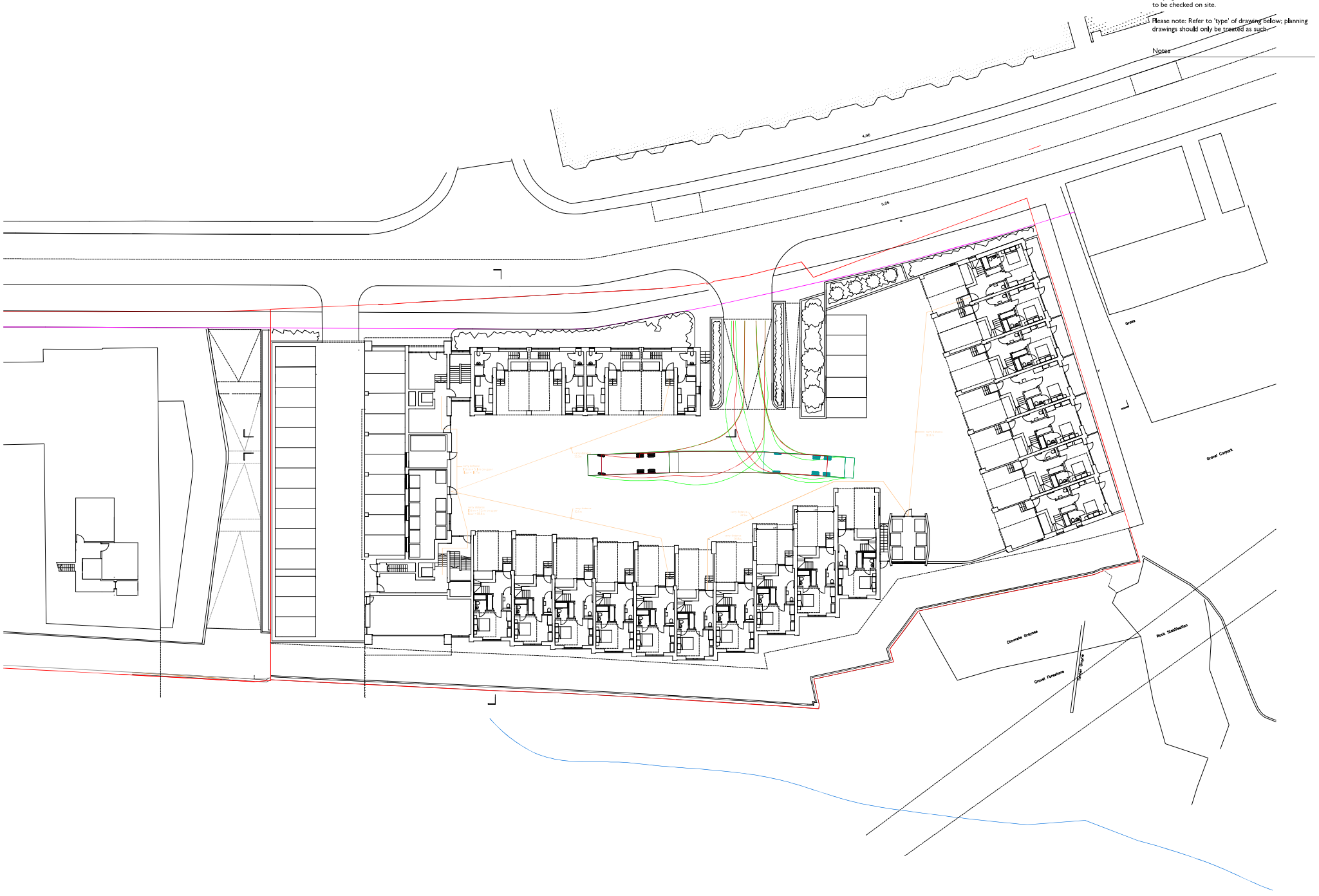
APPENDIX A

Proposed Development Layout

Only figured dimensions are to be used. All dimensions to be checked on site.

Please note: Refer to 'type' of drawing below; planning drawings should only be treated as such.

Notes



DO NOT SCALE FROM THIS DRAWING. THIS DRAWING IS COPYRIGHT ©

Only figured dimensions are to be used. All dimensions to be checked on site.

Please note: Refer to 'type' of drawing below; planning drawings should only be treated as such.

Notes

Habitable rooms on the north elevation facing the A259 and parts of the east & west elevations will require enhanced double glazing



+EL South elevation, riverside - scale 1: 200 at A1

Scale in Metres

0 1 2 3 4 5 10 15 20



+SX Section A-A - scale 1: 200 at A1

Scale in Metres

0 1 2 3 4 5 10 15 20

APPLICATION FOR DETAILED
PLANNING CONSENT

LRA-R RETINUE

01273 446 890 WWW.LRA-RETINUE.CO.UK

J O B FORMER HOWARD KENT SITE 5 BRIGHTON ROAD SHOREHAM	CHECKED LRA
	DRAWN MC
CLIENT CAYUGA DEVELOPMENTS LTD	DATE 11:22
	SCALE 1:200 @ A1 1:400 @ A3
DRAWING SOUTH ELEVATION RIVERSIDE & SECTION A-A	REVISION
	NUMBER 2088-PA-020

24 Windlesham Road, Brighton, East Sussex BN1 3AG. UK
LRA-Retinue registered in England and Wales 12353276

Only figured dimensions are to be used. All dimensions to be checked on site.

Please note: Refer to 'type' of drawing below; planning drawings should only be treated as such.

Notes



+PL Ground floor plan - scale 1: 200 at A1

Scale in Metres

0 1 2 3 4 5 10 15 20

N

APPLICATION FOR DETAILED
PLANNING CONSENT

LRA-R RETINUE

01273 446 890 WWW.LRA-RETINUE.CO.UK

J O B FORMER HOWARD KENT SITE 5 BRIGHTON ROAD SHOREHAM	CHECKED LRA
	DRAWN MC
CLIENT CAYUGA DEVELOPMENTS LTD	DATE 11-22
	SCALE 1:200 @ A1 1:400 @ A3
DRAWING Ground floor plan with flood gate positions, river walk width & section lines for perimeter sections highlighted	REVISION
	NUMBER 1545 PA 041

24 Windlesham Road, Brighton, East Sussex BN1 3AG, UK
LRA-Retinue registered in England and Wales 12353276

APPENDIX B

Explanatory Notes
Exploratory Hole Records (Reference P16388 & P16596)
DPSH-B Dynamic Probe Records
In-situ TRL Cone Penetrometer (CBR) Test Results
Trial Pit In Situ Infiltration Test Results
Gas Concentration and Groundwater Monitoring Results
Groundwater Monitoring Results (reference P16388)

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/m^2) shown within the Vane/Pen Test and N Value column.
H Hand penetrometer Test: Undrained shear strength (cohesion) (kN/m^2) 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 LIMITED
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex

Job Number: P16388

Start Date: 04/12/2023

End Date: 04/12/2023

Borehole Number: **WS01** Sheet 1 of 1

Standpipe	Sample/ Test Type	Samples and In Situ Testing: Depth From (m)	Depth To (m)	Test Result	Dynamic Probe 0 5 10 15 20 25 30	Legend	Depth	Stratum Description
							0.00	Concrete.
							0.40	
							0.50	MADE GROUND: Black and dark grey sandy subangular to subrounded fine to coarse gravel of flint, crystalline rock and asphalt.
	D	0.70						MADE GROUND: Grey and orange brown sandy clayey subangular to subrounded fine to coarse gravel of flint, crystalline rock and chalk.
							1.00	Brown and grey brown very sandy subangular to subrounded fine to coarse GRAVEL of flint. (Beach and Tidal Deposits)
	D	1.40						
								becoming clayey below 2.10m depth.
	D	2.60						
	D	3.20						with gravel of chalk below 3.50m depth.
	D	4.40					4.05	Dark grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium flint. (Beach and Tidal Deposits)
	D	4.90					4.80	Light brown slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium chalk. (Beach and Tidal Deposits)
							5.00	End of borehole at 5.00m

Remarks

Groundwater: Groundwater recorded at 3.51m depth on completion.

Stability: Borehole stable on completion.

Borehole cased to 4.00m depth.

Notes: Standpipe installed to 4.90m depth; 4.90m to 1.90m slotted pipe with gravel surround; 1.90m to ground level plain pipe with bentonite seal; completed with end cap and security cover concreted flush with ground surface.

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

ASHDOWN SITE INVESTIGATION LIMITED
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex

Job Number: P16388

Start Date: 04/12/2023

End Date: 04/12/2023

Borehole Number: **WS02** Sheet 1 of 1

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Dynamic Probe 0 5 10 15 20 25 30	Legend	Depth	Stratum Description
							0.00	MADE GROUND: Orange brown gravelly sand. Gravel is subangular to subrounded fine to coarse brick, plastic and breeze block.
							0.40	MADE GROUND: Grey brown and light brown sandy subangular to subrounded fine to medium gravel of flint with occasional plastic.
	D	0.70					1.00	Orange brown and brown very sandy subangular to subrounded fine to coarse GRAVEL of flint. (Beach and Tidal Deposits)
	D	1.60						
	D	2.30						
	D	3.90					3.30	Brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to coarse flint. (Beach and Tidal Deposits) with a band of flint gravel at 3.60m depth.
							3.90	End of borehole at 3.90m

Remarks

Groundwater: Groundwater recorded at 3.69m depth on completion of borehole.

Stability: Borehole cased to 3.00m depth.

Notes: No further progress below 3.90m depth - too hard/ dense.

Standpipe installed to 3.90m depth; 3.90m to 1.90m slotted pipe with gravel surround; 1.90m to ground level plain pipe with bentonite seal; completed with end cap and security cover concreted flush with ground surface.

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

ASHDOWN SITE INVESTIGATION LIMITED
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Tel: 01273 483119

Site Name: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex

Job Number: P16596

Start Date: 03/05/2024

End Date: 03/05/2024

Borehole Number: **WS101** Sheet 1 of 1

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Dynamic Probe 0 5 10 15 20 25 30	Legend	Depth	Stratum Description
							0.00	Concrete.
							0.20	MADE GROUND: Brown gravelly sandy clay. Gravel is subangular to subrounded fine to coarse flint, concrete and rare brick.
	ES	0.50						
	D	0.60						
							0.70	Medium dense light brown and brown sandy subangular to subrounded fine to coarse GRAVEL of flint. (Beach and Tidal Flat Deposits)
	ES	0.80						
	D	1.10						becoming dense below 1.00m depth.
								becoming very dense below 1.20m depth.
	ES	1.40					1.35	Stiff brown gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse flint. (Beach and Tidal Flat Deposits)
	D	1.80						
	H	1.90		90				
							2.10	Stiff light brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to medium chalk and occasional flint. (Beach and Tidal Flat Deposits)
	ES	2.20						
	D	2.30						becoming orange brown below 2.50m depth.
	H	2.40		115				
	D	2.90						poor/no recovery of soil sample between 3.00m and 4.00m depth.
	H	2.95		150				
								exact depth of strata change unknown due to poor sample recovery - conservatively assumed to be 4.00m.
							4.00	Off white CHALK. (White Chalk Subgroup)
	D	4.10						
	D	4.70						
	ES	4.90						
							5.00	End of borehole at 5.00m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole collapsed to 3.40m depth on completion.

Notes: n/a

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

ASHDOWN SITE INVESTIGATION LIMITED
E-mail: contact@ashdownsi.co.uk
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Site Name: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex

Job Number: P16596

Start Date: 02/05/2024

End Date: 02/05/2024

Borehole Number: **WS102**

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result (Dynamic Probe 0 5 10 15 20 25 30)	Legend	Depth	Stratum Description
						0.00	Concrete.
	ES	0.25				0.20	MADE GROUND: Black sandy subangular to subrounded fine to coarse gravel of charcoal-like material.
	ES	0.35				0.30	
	ES	0.45				0.40	MADE GROUND: Brown gravelly sandy clay. Gravel is subangular to subrounded fine to coarse chalk, flint and rare shell fragments.
	ES	0.60				0.50	MADE GROUND: Brown sandy slightly clayey subangular to subrounded fine to coarse gravel of flint and rare charcoal-like material.
						1.00	Stiff brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse chalk and flint. (Beach and Tidal Flat Deposits) with a band of brown sandy gravel between 0.60m and 0.65m depth.
	D	1.20					Loose brown and orange brown sandy slightly clayey subangular to subrounded fine to coarse GRAVEL of flint and rare shell fragments. (Beach and Tidal Flat Deposits)
	ES	1.50					becoming medium dense below 1.50m depth.
	D	1.80					
	D	2.20					
	ES	2.50					becoming dense below 2.70m depth.
	D	2.80					
						3.00	End of borehole at 3.00m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole unstable below 2.60m depth on completion.

Notes: Standpipe installed to 3.00m depth; 3.00m to 1.00m slotted pipe with gravel surround; 1.00m to ground level plain pipe with bentonite seal; completed with gas tap and security cover concreted flush with ground surface.

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

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Tel: 01273 483119

Site Name: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex

Job Number: P16596

Start Date: 02/05/2024

End Date: 02/05/2024

Borehole Number: **WS103**

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Dynamic Probe 0 5 10 15 20 25 30	Legend	Depth	Stratum Description
							0.00	MADE GROUND: Grey subangular to subrounded subrounded fine to coarse gravel of crystalline rock.
							0.20	MADE GROUND: Grey brown sandy clayey subangular to subrounded fine to coarse gravel of flint and occasional crystalline rock.
	ES	0.30						
	ES	0.40					0.45	MADE GROUND: Light grey sandy subangular to subrounded fine to coarse gravel of flint and rare concrete.
	D	0.90						
	ES	1.00						
	D	1.20					1.20	End of borehole at 1.20m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole collapsed to 0.80m depth on completion.

Notes: No further progress below 1.20m depth - too dense/obstruction.

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

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Site Name: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex

Job Number: P16596

Start Date: 03/05/2024

End Date: 03/05/2024

Borehole Number: **WS104a**

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result (Dynamic Probe 0 5 10 15 20 25 30)	Legend	Depth	Stratum Description
						0.00	Concrete.
						0.20	MADE GROUND: Black sandy subangular to subrounded fine to coarse gravel of flint and charcoal-like material.
							depth of stratum boundary approximate only due to poor sample recovery.
						1.00	Loose brown subangular to subrounded fine to coarse GRAVEL of flint. (Beach and Tidal Flat Deposits)
							depth of stratum boundary approximate only due to poor sample recovery.
						1.30	Loose brown sandy clayey subangular to subrounded fine to coarse GRAVEL of flint with occasional pockets of chalk gravel. (Beach and Tidal Flat Deposits)
	D	1.50					
	ES	1.80					
	ES	2.10					
	D	2.60					
	ES	2.80					
	D	2.95					with a pocket of very gravelly clay below 2.95m depth.
						3.00	End of borehole at 3.00m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole cased to 3.00m depth.

Notes: Borehole WS04 progressed to 3.00m on 02/05/2024, but with no recovery of sample apart from a single ES sample taken between 0.20m and 0.30m. Borehole WS04a re-drilled adjacent to original position using casing to facilitate sample recovery. Standpipe installed to 3.00m depth; 3.00m to 1.00m slotted pipe with gravel surround; 1.00m to ground level plain pipe with bentonite seal; completed with gas tap and security cover concreted flush with ground surface.

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

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Site Name: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex

Job Number: P16596

Start Date: 03/05/2024

End Date: 03/05/2024

Borehole Number: **WS105**

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result (Dynamic Probe 0 5 10 15 20 25 30)	Legend	Depth	Stratum Description
						0.00	Concrete.
						0.25	
	ES	0.35					MADE GROUND: Black sandy subangular to subrounded fine to coarse gravel of flint, concrete and charcoal-like material.
						0.40	depth of stratum boundary approximate only due to poor sample recovery.
							MADE GROUND/REWORKED: Grey sandy subangular to subrounded fine to coarse gravel of flint.
							depth of stratum boundary approximate only due to poor sample recovery.
						1.50	Firm brown gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse flint. (Beach and Tidal Flat Deposits)
	ES	1.90	2.00				no recovery of soil sample between 2.00m and 3.00m depth.
	D	3.10	4.00				with occasional gravel of chalk between 3.00m and 4.00m depth.
							depth of stratum boundary approximate only due to poor sample recovery.
						3.50	Firm dark brown gravelly sandy CLAY. Gravel is subangular to subrounded fine to coarse flint. (Beach and Tidal Flat Deposits)
							depth of stratum boundary approximate only due to poor sample recovery.
						4.10	Off white CHALK. (White Chalk Subgroup)
	ES	4.90	5.00				
						5.00	End of borehole at 5.00m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole cased to 3.00m depth.
Borehole collapsed to 3.80m depth on completion and further collapsed to 0.40m depth after casing removed.

Notes: Extremely poor recovery of sample throughout borehole.

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

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Site Name: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex

Job Number: P16596

Start Date: 02/05/2024

End Date: 02/05/2024

Borehole Number: **WS106**

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result (Dynamic Probe 0 5 10 15 20 25 30)	Legend	Depth	Stratum Description
						0.00	Concrete.
	ES	0.35				0.25	MADE GROUND: Brown grey sandy subangular to subrounded fine to coarse gravel of flint and concrete with occasional brick and charcoal-like material.
	ES	0.80					
	ES	0.95				0.95	
	ES	1.10				1.00	Soft to firm brown very gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse flint. (Beach and Tidal Flat Deposits)
	D	1.20					Loose yellow brown and light brown very sandy clayey subangular to subrounded fine to coarse GRAVEL of flint. With occasional cobbles of flint. (Beach and Tidal Flat Deposits)
							becoming dense below 1.50m depth.
	D	1.80					
	ES	1.90					
						2.00	End of borehole at 2.00m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole instable below 0.70m depth on completion.

Notes: Standpipe installed to 1.85m depth; 1.85m to 0.85m slotted pipe with gravel surround; 0.85m to ground level plain pipe with bentonite seal; completed with gas tap and security cover concreted flush with ground surface.

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

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Site Name: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex

Job Number: P16596

Start Date: 03/05/2024

End Date: 03/05/2024

Borehole Number: **WS107**

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Dynamic Probe 0 5 10 15 20 25 30	Legend	Depth	Stratum Description
							0.00	Concrete.
							0.20	MADE GROUND: Red brown sandy subangular to subrounded fine to coarse gravel of brick, flint and concrete.
	ES	0.40					0.50	MADE GROUND: Recovered as gravel of concrete.
	ES	0.80					0.70	Loose light brown very sandy subangular to subrounded fine to coarse GRAVEL of flint with occasional pockets of very gravelly clay. (Possibly Reworked/Beach and Tidal Flat Deposits)
	D	1.40						
	ES	1.70					1.60	Loose dark brown sandy subangular to subrounded fine to coarse GRAVEL of flint with occasional pockets of very gravelly clay. (Beach and Tidal Flat Deposits)
	D	2.00						
							2.20	Loose brown sandy clayey subangular to subrounded fine to coarse GRAVEL of flint. (Beach and Tidal Flat Deposits)
								becoming medium dense between 2.50m and 2.70m depth.
							2.90	Loose to medium dense brown gravelly clayey SAND. Gravel is subangular to subrounded fine to coarse flint. (Beach and Tidal Flat Deposits)
	D	3.00					3.10	Off white CHALK. (White Chalk Subgroup)
	ES	3.20						
	D	3.40					3.50	End of borehole at 3.50m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole unstable in coarse grained soils.

Notes: Standpipe installed to 3.00m depth; 3.00m to 1.00m slotted pipe with gravel surround; 1.00m to ground level plain pipe with bentonite seal; completed with gas tap and security cover concreted flush with ground surface.

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

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Site Name: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex

Job Number: P16596

Start Date: 02/05/2024

End Date: 02/05/2024

Borehole Number: **WS108**

Standpipe	Samples and In Situ Testing: Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Dynamic Probe 0 5 10 15 20 25 30	Legend	Depth	Stratum Description
							0.00	Concrete.
							0.25	MADE GROUND: Grey sandy subangular to subrounded fine to coarse gravel of flint and concrete.
	ES	0.35					0.40	MADE GROUND: Black and grey brown sandy subangular to subrounded fine to coarse gravel of flint and shell fragments with rare chalk and brick. with pockets of very sandy gravelly clay from 0.40m to 1.00m depth. Gravel is subangular to subrounded fine to coarse flint, chalk and rare brick.
	ES	0.50						
	ES	0.85					1.00	Loose orange brown slightly sandy subangular to subrounded fine to coarse GRAVEL of flint. (Beach and Tidal Flat Deposits)
	ES	1.30						becoming medium dense between 1.40m and 1.70m depth.
	D	1.50						
	ES	1.70						becoming very sandy towards base.
	D	1.90					2.00	End of borehole at 2.00m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole collapsed to 1.10m depth on completion.

Notes: n/a

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

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Site Name: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex

Job Number: P16596

Start Date: 03/05/2024

End Date: 03/05/2024

Borehole Number: **WS109**

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Dynamic Probe 0 5 10 15 20 25 30	Legend	Depth	Stratum Description
							0.00	Concrete paving.
							0.15	MADE GROUND: Black and yellow brown very sandy subangular to subrounded fine to coarse gravel of concrete and sandstone with rare brick and concrete.
	ES	0.25					0.40	MADE GROUND: Dark brown gravelly slightly sandy clay. Gravel is subangular to subrounded fine to coarse flint, chalk, shell fragments and charcoal-like material.
	ES	0.50						
	D	0.85					1.00	Loose brown subangular to subrounded fine to coarse GRAVEL of flint. (Beach and Tidal Flat Deposits)
	ES	2.10						becoming sandy and clayey below 2.00m depth. becoming dense between 2.00m and 2.10m depth. becoming medium dense below 2.20m depth.
	D	2.55					2.55	Firm light brown gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse flint, chalk and rare shell material. (Beach and Tidal Flat Deposits)
	H	2.60		65				
	ES	2.70						
	D	2.90						
	H	2.90		140				locally becoming stiff with depth.
							3.10	Firm orange brown slightly gravelly sandy CLAY with frequent pockets of sand. Gravel is subangular to subrounded fine to coarse flint and chalk. (Beach and Tidal Flat Deposits)
	D	3.50						
	H	3.50		75				locally becoming stiff with depth.
	D	4.10						
	ES	4.50						
	D	4.90						with a chalk clast at base.
	H	4.90		40			5.00	End of borehole at 5.00m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole collapsed to 2.10m depth on completion.

Notes: n/a

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

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Site Name: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex

Job Number: P16596

Start Date: 03/05/2024

End Date: 03/05/2024

Borehole Number: **WS110** Sheet 1 of 1

Standpipe	Samples and In Situ Testing: Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Dynamic Probe 0 5 10 15 20 25 30	Legend	Depth	Stratum Description
							0.00	Concrete.
	ES	0.30					0.25	MADE GROUND: Grey, black, and brown subangular to subrounded fine to coarse gravel of concrete, charcoal-like material, flint and brick.
	ES	0.60					0.50	MADE GROUND: Brown and yellow brown slightly gravelly very sandy clay. Gravel is subangular to subrounded fine to coarse flint, brick, concrete and chalk.
	ES	1.20					1.05	Medium dense brown sandy clayey subangular to subrounded fine to coarse GRAVEL of flint and rare chalk. (Beach and Tidal Flat Deposits)
	D	1.30						becoming loose to medium dense below 1.60m depth.
	D	1.80					2.00	End of borehole at 2.00m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole collapsed to 1.00m depth on completion.

Notes: n/a

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

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Site Name: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex

Job Number: P16596

Start Date: 03/05/2024

End Date: 03/05/2024

Trial Pit Number: **TP201**

Sample/ Test Type	Samples and In Situ Testing: Depth From (m)	Depth To (m)	Test Result	Legend	Depth/ Reduced Level	Stratum Description
					0.00	Concrete.
					0.35	MADE GROUND: Black sandy subangular to subrounded fine to coarse gravel of flint, charcoal-like material, asphalt and rare brick.
					0.60	Orange brown, dark brown and brown sandy subangular to subrounded fine to coarse GRAVEL of flint and occasional chalk. (Beach and Tidal Flat Deposits)
D	0.90					
ES	1.00					with occasional pockets of brown clay below 1.00m depth.
D	1.30					
ES	1.50				1.53	End of trial pit at 1.53m

Remarks

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: TP

Pit Length: 1.49m

Pit Width: 0.59m

Made By: GRD

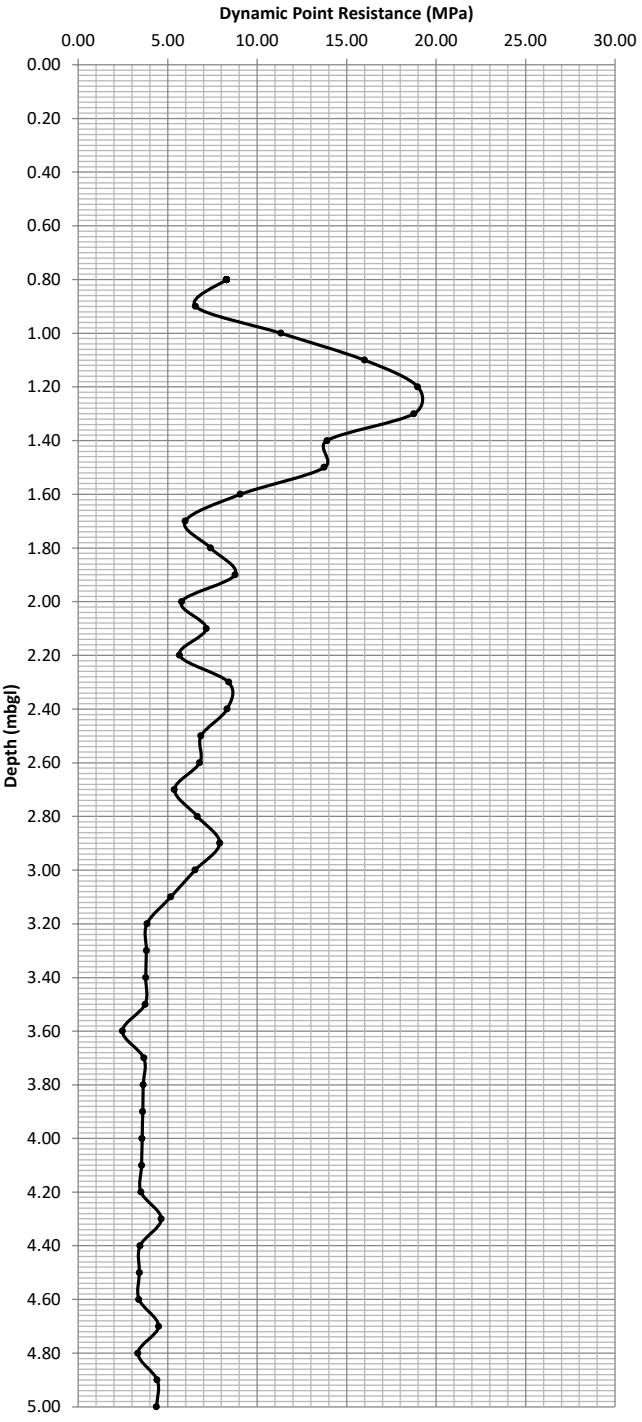
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex **Report Ref.** P16596

Test Location Reference	WS101

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20				
0.30				
0.40				
0.50				
0.60				
0.70				
0.80	5	0.02	9.34	8.30
0.90	4	0.03	7.48	6.56
1.00	7	0.01	13.08	11.33
1.10	10	0.01	18.69	16.00
1.20	12	0.01	22.43	18.98
1.30	12	0.01	22.43	18.76
1.40	9	0.01	16.82	13.91
1.50	9	0.01	16.82	13.75
1.60	6	0.02	11.21	9.06
1.70	4	0.03	7.48	5.98
1.80	5	0.02	9.34	7.39
1.90	6	0.02	11.21	8.77
2.00	4	0.03	7.48	5.78
2.10	5	0.02	9.34	7.15
2.20	4	0.03	7.48	5.66
2.30	6	0.02	11.21	8.41
2.40	6	0.02	11.21	8.32
2.50	5	0.02	9.34	6.86
2.60	5	0.02	9.34	6.79
2.70	4	0.03	7.48	5.38
2.80	5	0.02	9.34	6.66
2.90	6	0.02	11.21	7.91
3.00	5	0.02	9.34	6.53
3.10	4	0.03	7.48	5.17
3.20	3	0.03	5.61	3.84
3.30	3	0.03	5.61	3.81
3.40	3	0.03	5.61	3.77
3.50	3	0.03	5.61	3.74
3.60	2	0.05	3.74	2.47
3.70	3	0.03	5.61	3.67
3.80	3	0.03	5.61	3.64
3.90	3	0.03	5.61	3.60
4.00	3	0.03	5.61	3.57
4.10	3	0.03	5.61	3.54
4.20	3	0.03	5.61	3.51
4.30	4	0.03	7.48	4.64
4.40	3	0.03	5.61	3.45
4.50	3	0.03	5.61	3.42
4.60	3	0.03	5.61	3.39
4.70	4	0.03	7.48	4.49
4.80	3	0.03	5.61	3.34
4.90	4	0.03	7.48	4.41
5.00	4	0.03	7.48	4.38



Notes:

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

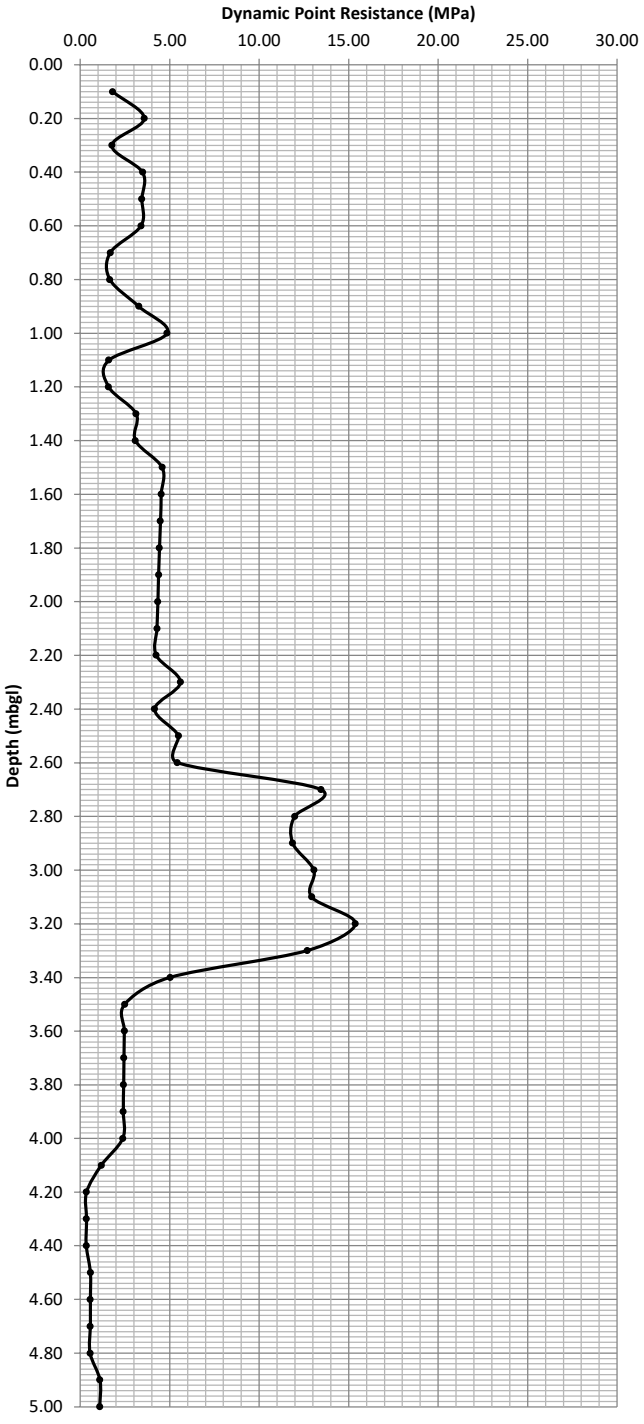
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex **Report Ref.** P16596

Test Location Reference	WS102

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	2	0.05	3.74	3.58
0.30	1	0.10	1.87	1.77
0.40	2	0.05	3.74	3.49
0.50	2	0.05	3.74	3.45
0.60	2	0.05	3.74	3.40
0.70	1	0.10	1.87	1.68
0.80	1	0.10	1.87	1.66
0.90	2	0.05	3.74	3.28
1.00	3	0.03	5.61	4.86
1.10	1	0.10	1.87	1.60
1.20	1	0.10	1.87	1.58
1.30	2	0.05	3.74	3.13
1.40	2	0.05	3.74	3.09
1.50	3	0.03	5.61	4.58
1.60	3	0.03	5.61	4.53
1.70	3	0.03	5.61	4.48
1.80	3	0.03	5.61	4.43
1.90	3	0.03	5.61	4.38
2.00	3	0.03	5.61	4.34
2.10	3	0.03	5.61	4.29
2.20	3	0.03	5.61	4.25
2.30	4	0.03	7.48	5.60
2.40	3	0.03	5.61	4.16
2.50	4	0.03	7.48	5.49
2.60	4	0.03	7.48	5.43
2.70	10	0.01	18.69	13.45
2.80	9	0.01	16.82	11.99
2.90	9	0.01	16.82	11.87
3.00	10	0.01	18.69	13.06
3.10	10	0.01	18.69	12.94
3.20	12	0.01	22.43	15.38
3.30	10	0.01	18.69	12.69
3.40	4	0.03	7.48	5.03
3.50	2	0.05	3.74	2.49
3.60	2	0.05	3.74	2.47
3.70	2	0.05	3.74	2.45
3.80	2	0.05	3.74	2.42
3.90	2	0.05	3.74	2.40
4.00	2	0.05	3.74	2.38
4.10	1	0.10	1.87	1.18
4.20	0.3	0.33	0.56	0.35
4.30	0.3	0.33	0.56	0.35
4.40	0.3	0.33	0.56	0.35
4.50	0.5	0.20	0.93	0.57
4.60	0.5	0.20	0.93	0.57
4.70	0.5	0.20	0.93	0.56
4.80	0.5	0.20	0.93	0.56
4.90	1	0.10	1.87	1.10
5.00	1	0.10	1.87	1.09



Notes:

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

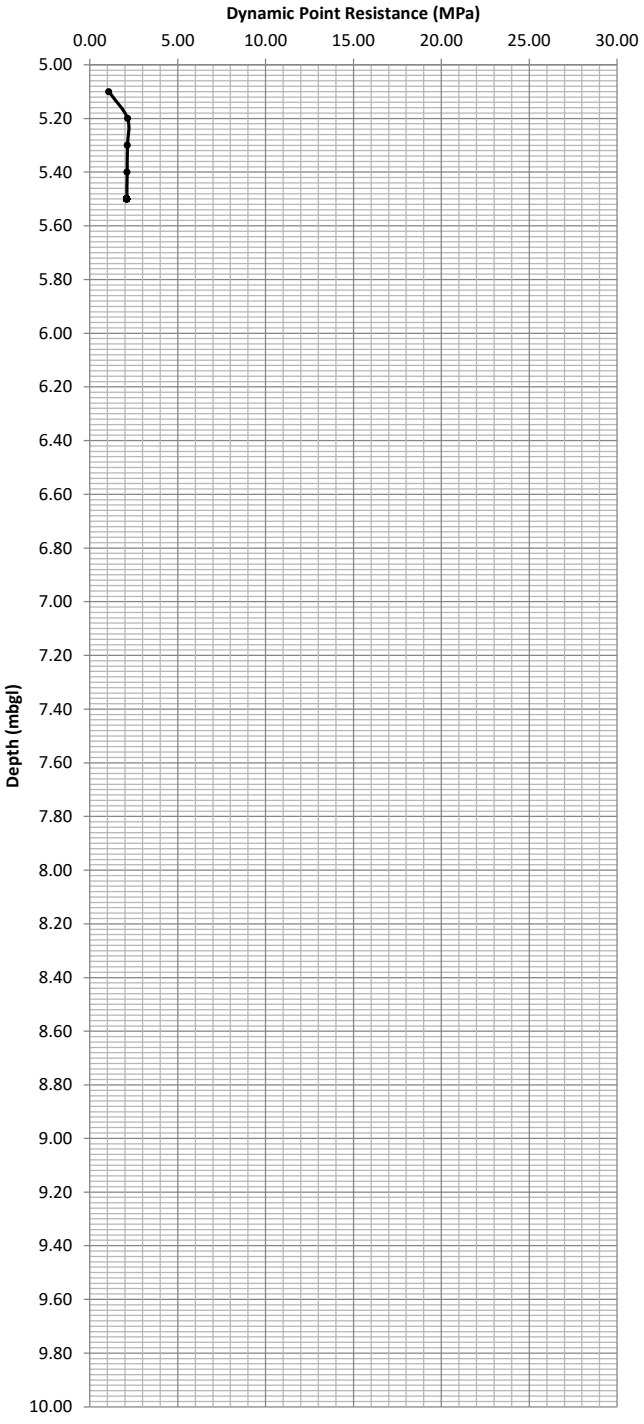
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex **Report Ref.** P16596

Test Location Reference	WS102

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
5.10	1	0.10	1.87	1.09
5.20	2	0.05	3.74	2.15
5.30	2	0.05	3.74	2.14
5.40	2	0.05	3.74	2.12
5.50	2	0.05	3.74	2.10
5.60				
5.70				
5.80				
5.90				
6.00				
6.10				
6.20				
6.30				
6.40				
6.50				
6.60				
6.70				
6.80				
6.90				
7.00				
7.10				
7.20				
7.30				
7.40				
7.50				
7.60				
7.70				
7.80				
7.90				
8.00				
8.10				
8.20				
8.30				
8.40				
8.50				
8.60				
8.70				
8.80				
8.90				
9.00				
9.10				
9.20				
9.30				
9.40				
9.50				
9.60				
9.70				
9.80				
9.90				
10.00				



Notes:

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

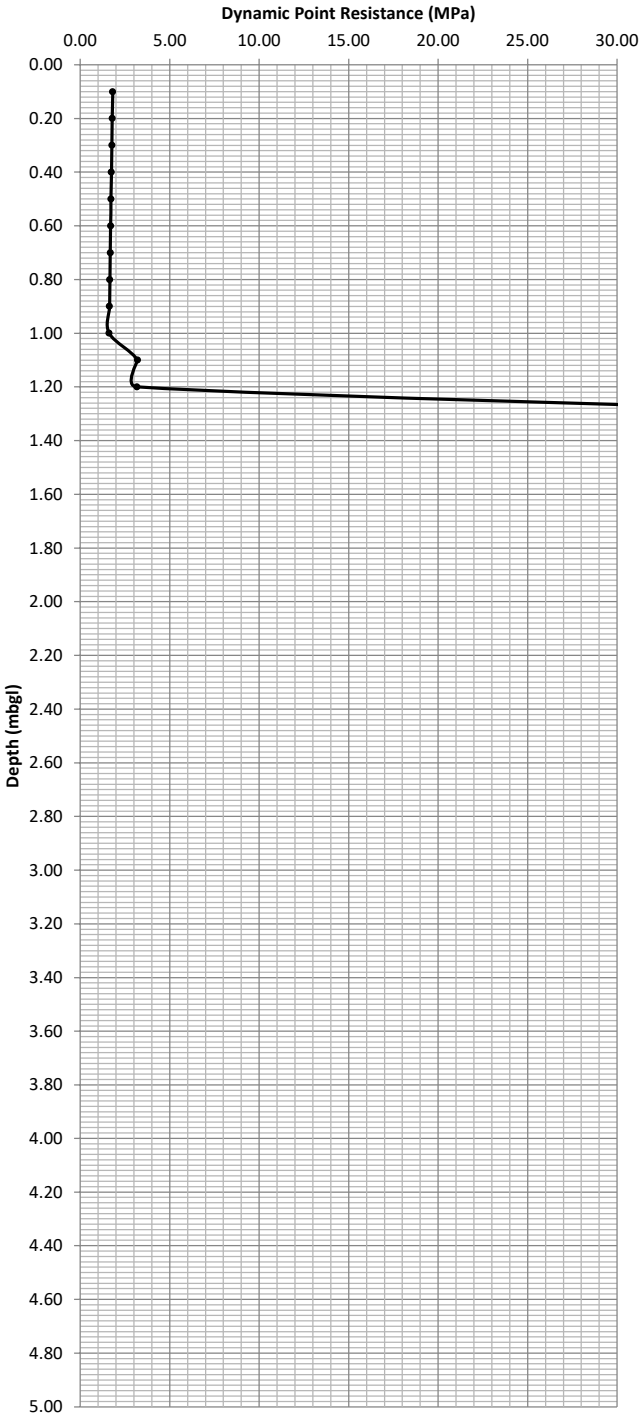
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex **Report Ref.** P16596

Test Location Reference	WS103

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	2	0.05	3.74	3.16
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

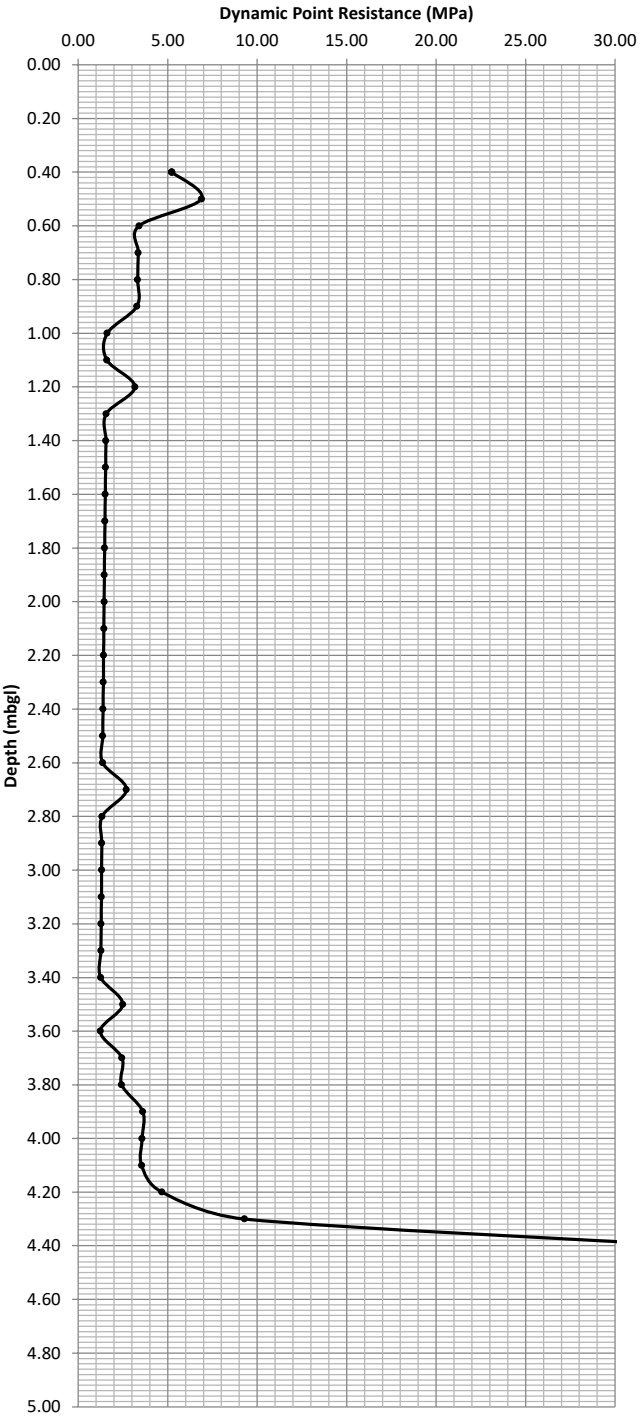
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex **Report Ref.** P16596

Test Location Reference	WS104a

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20				
0.30				
0.40	3	0.03	5.61	5.23
0.50	4	0.03	7.48	6.89
0.60	2	0.05	3.74	3.40
0.70	2	0.05	3.74	3.36
0.80	2	0.05	3.74	3.32
0.90	2	0.05	3.74	3.28
1.00	1	0.10	1.87	1.62
1.10	1	0.10	1.87	1.60
1.20	2	0.05	3.74	3.16
1.30	1	0.10	1.87	1.56
1.40	1	0.10	1.87	1.55
1.50	1	0.10	1.87	1.53
1.60	1	0.10	1.87	1.51
1.70	1	0.10	1.87	1.49
1.80	1	0.10	1.87	1.48
1.90	1	0.10	1.87	1.46
2.00	1	0.10	1.87	1.45
2.10	1	0.10	1.87	1.43
2.20	1	0.10	1.87	1.42
2.30	1	0.10	1.87	1.40
2.40	1	0.10	1.87	1.39
2.50	1	0.10	1.87	1.37
2.60	1	0.10	1.87	1.36
2.70	2	0.05	3.74	2.69
2.80	1	0.10	1.87	1.33
2.90	1	0.10	1.87	1.32
3.00	1	0.10	1.87	1.31
3.10	1	0.10	1.87	1.29
3.20	1	0.10	1.87	1.28
3.30	1	0.10	1.87	1.27
3.40	1	0.10	1.87	1.26
3.50	2	0.05	3.74	2.49
3.60	1	0.10	1.87	1.23
3.70	2	0.05	3.74	2.45
3.80	2	0.05	3.74	2.42
3.90	3	0.03	5.61	3.60
4.00	3	0.03	5.61	3.57
4.10	3	0.03	5.61	3.54
4.20	4	0.03	7.48	4.68
4.30	8	0.01	14.95	9.28
4.40	30	0.00	56.06	34.51
4.50				
4.60				
4.70				
4.80				
4.90				
5.00				



Notes:
No further progress below 4.40m 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

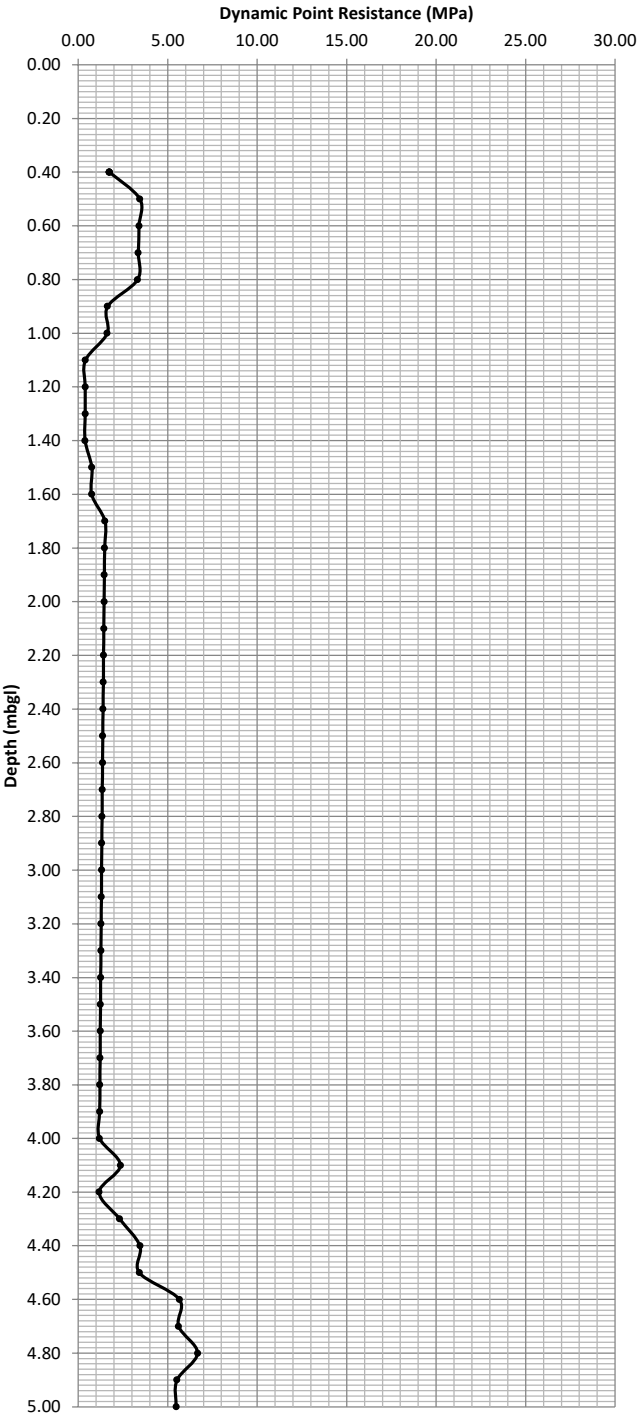
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex **Report Ref.** P16596

Test Location Reference	WS105

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20				
0.30				
0.40	1	0.10	1.87	1.74
0.50	2	0.05	3.74	3.45
0.60	2	0.05	3.74	3.40
0.70	2	0.05	3.74	3.36
0.80	2	0.05	3.74	3.32
0.90	1	0.10	1.87	1.64
1.00	1	0.10	1.87	1.62
1.10	0.25	0.40	0.47	0.40
1.20	0.25	0.40	0.47	0.40
1.30	0.25	0.40	0.47	0.39
1.40	0.25	0.40	0.47	0.39
1.50	0.5	0.20	0.93	0.76
1.60	0.5	0.20	0.93	0.76
1.70	1	0.10	1.87	1.49
1.80	1	0.10	1.87	1.48
1.90	1	0.10	1.87	1.46
2.00	1	0.10	1.87	1.45
2.10	1	0.10	1.87	1.43
2.20	1	0.10	1.87	1.42
2.30	1	0.10	1.87	1.40
2.40	1	0.10	1.87	1.39
2.50	1	0.10	1.87	1.37
2.60	1	0.10	1.87	1.36
2.70	1	0.10	1.87	1.35
2.80	1	0.10	1.87	1.33
2.90	1	0.10	1.87	1.32
3.00	1	0.10	1.87	1.31
3.10	1	0.10	1.87	1.29
3.20	1	0.10	1.87	1.28
3.30	1	0.10	1.87	1.27
3.40	1	0.10	1.87	1.26
3.50	1	0.10	1.87	1.25
3.60	1	0.10	1.87	1.23
3.70	1	0.10	1.87	1.22
3.80	1	0.10	1.87	1.21
3.90	1	0.10	1.87	1.20
4.00	1	0.10	1.87	1.19
4.10	2	0.05	3.74	2.36
4.20	1	0.10	1.87	1.17
4.30	2	0.05	3.74	2.32
4.40	3	0.03	5.61	3.45
4.50	3	0.03	5.61	3.42
4.60	5	0.02	9.34	5.66
4.70	5	0.02	9.34	5.61
4.80	6	0.02	11.21	6.68
4.90	5	0.02	9.34	5.52
5.00	5	0.02	9.34	5.47



Notes:

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

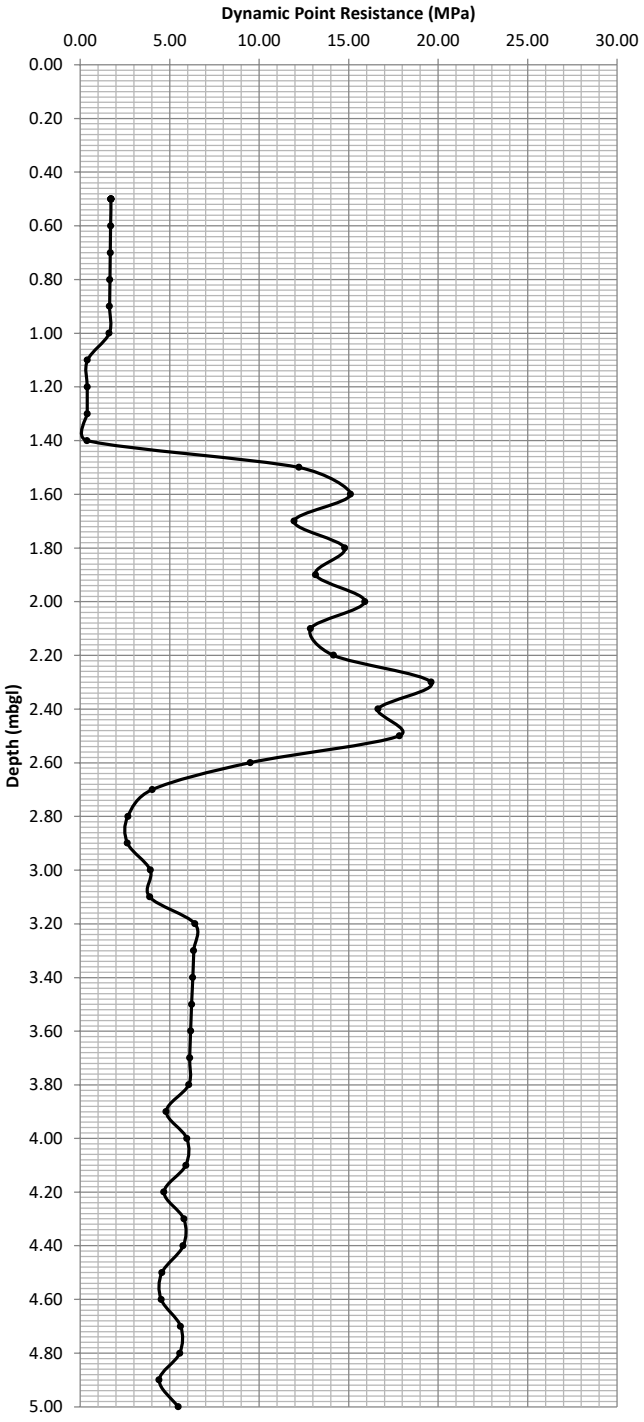
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex **Report Ref.** P16596

Test Location Reference	WS106

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20				
0.30				
0.40				
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	0.25	0.40	0.47	0.40
1.20	0.25	0.40	0.47	0.40
1.30	0.25	0.40	0.47	0.39
1.40	0.25	0.40	0.47	0.39
1.50	8	0.01	14.95	12.22
1.60	10	0.01	18.69	15.11
1.70	8	0.01	14.95	11.95
1.80	10	0.01	18.69	14.78
1.90	9	0.01	16.82	13.15
2.00	11	0.01	20.56	15.91
2.10	9	0.01	16.82	12.88
2.20	10	0.01	18.69	14.16
2.30	14	0.01	26.16	19.61
2.40	12	0.01	22.43	16.64
2.50	13	0.01	24.29	17.84
2.60	7	0.01	13.08	9.51
2.70	3	0.03	5.61	4.04
2.80	2	0.05	3.74	2.66
2.90	2	0.05	3.74	2.64
3.00	3	0.03	5.61	3.92
3.10	3	0.03	5.61	3.88
3.20	5	0.02	9.34	6.41
3.30	5	0.02	9.34	6.35
3.40	5	0.02	9.34	6.29
3.50	5	0.02	9.34	6.23
3.60	5	0.02	9.34	6.17
3.70	5	0.02	9.34	6.12
3.80	5	0.02	9.34	6.06
3.90	4	0.03	7.48	4.81
4.00	5	0.02	9.34	5.95
4.10	5	0.02	9.34	5.90
4.20	4	0.03	7.48	4.68
4.30	5	0.02	9.34	5.80
4.40	5	0.02	9.34	5.75
4.50	4	0.03	7.48	4.56
4.60	4	0.03	7.48	4.52
4.70	5	0.02	9.34	5.61
4.80	5	0.02	9.34	5.56
4.90	4	0.03	7.48	4.41
5.00	5	0.02	9.34	5.47



Notes:

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

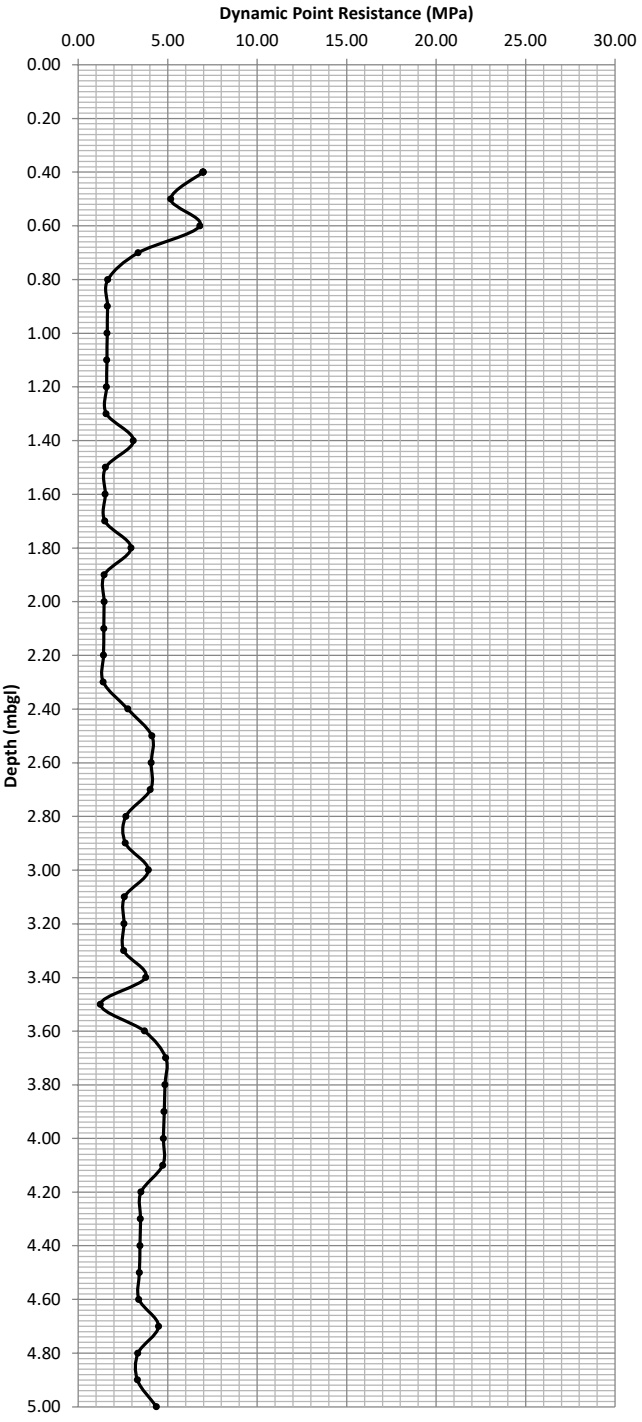
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex **Report Ref.** P16596

Test Location Reference	WS107

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20				
0.30				
0.40	4	0.03	7.48	6.98
0.50	3	0.03	5.61	5.17
0.60	4	0.03	7.48	6.80
0.70	2	0.05	3.74	3.36
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	1	0.10	1.87	1.60
1.20	1	0.10	1.87	1.58
1.30	1	0.10	1.87	1.56
1.40	2	0.05	3.74	3.09
1.50	1	0.10	1.87	1.53
1.60	1	0.10	1.87	1.51
1.70	1	0.10	1.87	1.49
1.80	2	0.05	3.74	2.96
1.90	1	0.10	1.87	1.46
2.00	1	0.10	1.87	1.45
2.10	1	0.10	1.87	1.43
2.20	1	0.10	1.87	1.42
2.30	1	0.10	1.87	1.40
2.40	2	0.05	3.74	2.77
2.50	3	0.03	5.61	4.12
2.60	3	0.03	5.61	4.08
2.70	3	0.03	5.61	4.04
2.80	2	0.05	3.74	2.66
2.90	2	0.05	3.74	2.64
3.00	3	0.03	5.61	3.92
3.10	2	0.05	3.74	2.59
3.20	2	0.05	3.74	2.56
3.30	2	0.05	3.74	2.54
3.40	3	0.03	5.61	3.77
3.50	1	0.10	1.87	1.25
3.60	3	0.03	5.61	3.70
3.70	4	0.03	7.48	4.89
3.80	4	0.03	7.48	4.85
3.90	4	0.03	7.48	4.81
4.00	4	0.03	7.48	4.76
4.10	4	0.03	7.48	4.72
4.20	3	0.03	5.61	3.51
4.30	3	0.03	5.61	3.48
4.40	3	0.03	5.61	3.45
4.50	3	0.03	5.61	3.42
4.60	3	0.03	5.61	3.39
4.70	4	0.03	7.48	4.49
4.80	3	0.03	5.61	3.34
4.90	3	0.03	5.61	3.31
5.00	4	0.03	7.48	4.38



Notes:

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

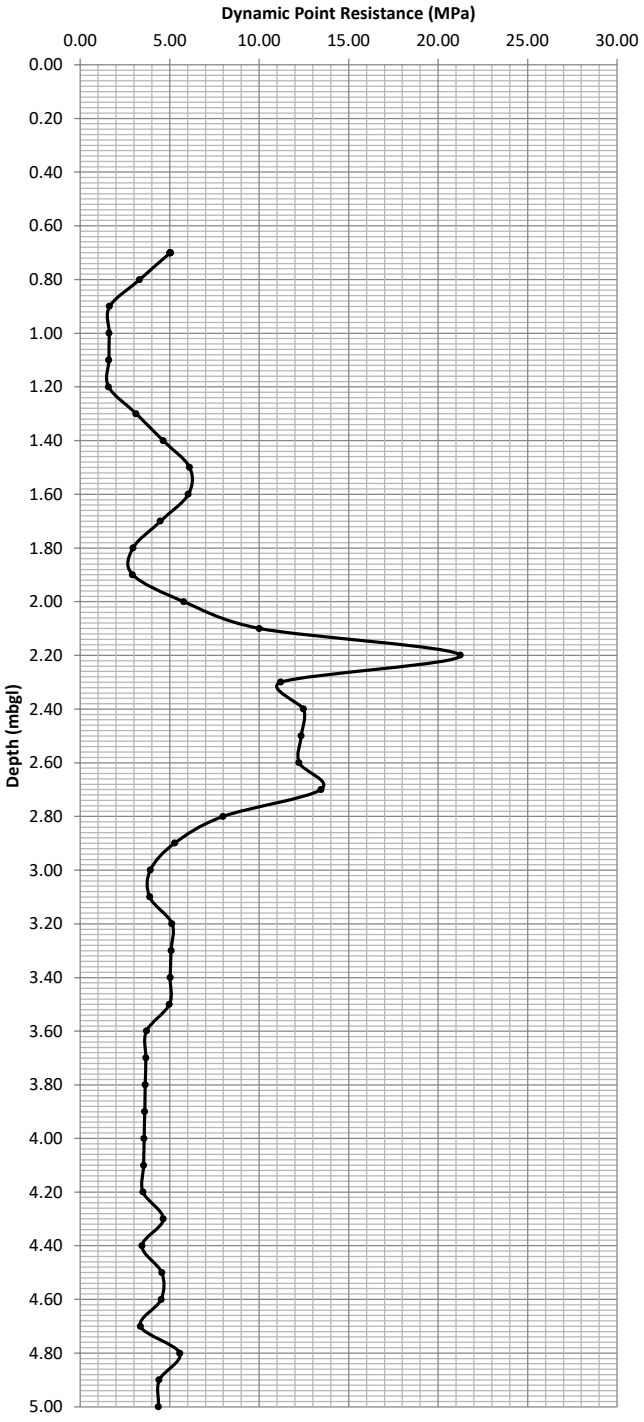
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex **Report Ref.** P16596

Test Location Reference	WS108

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20				
0.30				
0.40				
0.50				
0.60				
0.70	3	0.03	5.61	5.04
0.80	2	0.05	3.74	3.32
0.90	1	0.10	1.87	1.64
1.00	1	0.10	1.87	1.62
1.10	1	0.10	1.87	1.60
1.20	1	0.10	1.87	1.58
1.30	2	0.05	3.74	3.13
1.40	3	0.03	5.61	4.64
1.50	4	0.03	7.48	6.11
1.60	4	0.03	7.48	6.04
1.70	3	0.03	5.61	4.48
1.80	2	0.05	3.74	2.96
1.90	2	0.05	3.74	2.92
2.00	4	0.03	7.48	5.78
2.10	7	0.01	13.08	10.01
2.20	15	0.01	28.03	21.23
2.30	8	0.01	14.95	11.21
2.40	9	0.01	16.82	12.48
2.50	9	0.01	16.82	12.35
2.60	9	0.01	16.82	12.23
2.70	10	0.01	18.69	13.45
2.80	6	0.02	11.21	7.99
2.90	4	0.03	7.48	5.28
3.00	3	0.03	5.61	3.92
3.10	3	0.03	5.61	3.88
3.20	4	0.03	7.48	5.13
3.30	4	0.03	7.48	5.08
3.40	4	0.03	7.48	5.03
3.50	4	0.03	7.48	4.98
3.60	3	0.03	5.61	3.70
3.70	3	0.03	5.61	3.67
3.80	3	0.03	5.61	3.64
3.90	3	0.03	5.61	3.60
4.00	3	0.03	5.61	3.57
4.10	3	0.03	5.61	3.54
4.20	3	0.03	5.61	3.51
4.30	4	0.03	7.48	4.64
4.40	3	0.03	5.61	3.45
4.50	4	0.03	7.48	4.56
4.60	4	0.03	7.48	4.52
4.70	3	0.03	5.61	3.37
4.80	5	0.02	9.34	5.56
4.90	4	0.03	7.48	4.41
5.00	4	0.03	7.48	4.38



Notes:

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

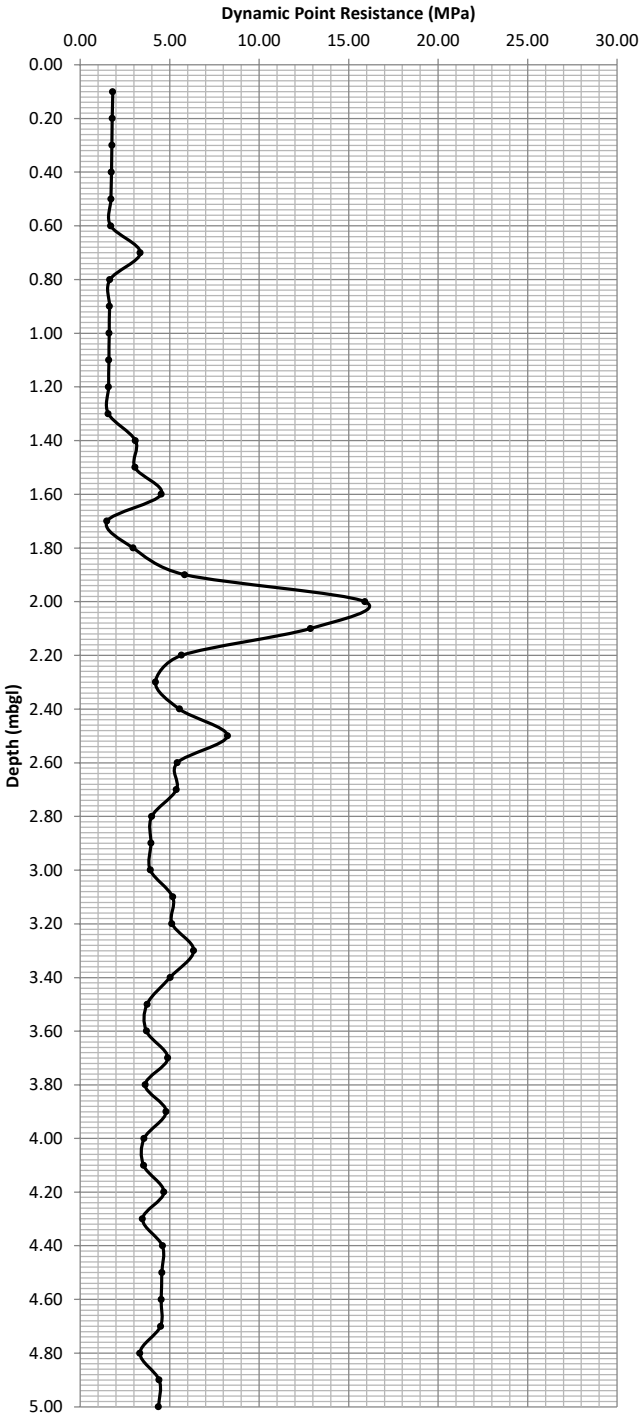
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex **Report Ref.** P16596

Test Location Reference	WS109

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	2	0.05	3.74	3.36
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	1	0.10	1.87	1.60
1.20	1	0.10	1.87	1.58
1.30	1	0.10	1.87	1.56
1.40	2	0.05	3.74	3.09
1.50	2	0.05	3.74	3.06
1.60	3	0.03	5.61	4.53
1.70	1	0.10	1.87	1.49
1.80	2	0.05	3.74	2.96
1.90	4	0.03	7.48	5.85
2.00	11	0.01	20.56	15.91
2.10	9	0.01	16.82	12.88
2.20	4	0.03	7.48	5.66
2.30	3	0.03	5.61	4.20
2.40	4	0.03	7.48	5.55
2.50	6	0.02	11.21	8.23
2.60	4	0.03	7.48	5.43
2.70	4	0.03	7.48	5.38
2.80	3	0.03	5.61	4.00
2.90	3	0.03	5.61	3.96
3.00	3	0.03	5.61	3.92
3.10	4	0.03	7.48	5.17
3.20	4	0.03	7.48	5.13
3.30	5	0.02	9.34	6.35
3.40	4	0.03	7.48	5.03
3.50	3	0.03	5.61	3.74
3.60	3	0.03	5.61	3.70
3.70	4	0.03	7.48	4.89
3.80	3	0.03	5.61	3.64
3.90	4	0.03	7.48	4.81
4.00	3	0.03	5.61	3.57
4.10	3	0.03	5.61	3.54
4.20	4	0.03	7.48	4.68
4.30	3	0.03	5.61	3.48
4.40	4	0.03	7.48	4.60
4.50	4	0.03	7.48	4.56
4.60	4	0.03	7.48	4.52
4.70	4	0.03	7.48	4.49
4.80	3	0.03	5.61	3.34
4.90	4	0.03	7.48	4.41
5.00	4	0.03	7.48	4.38



Notes:

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

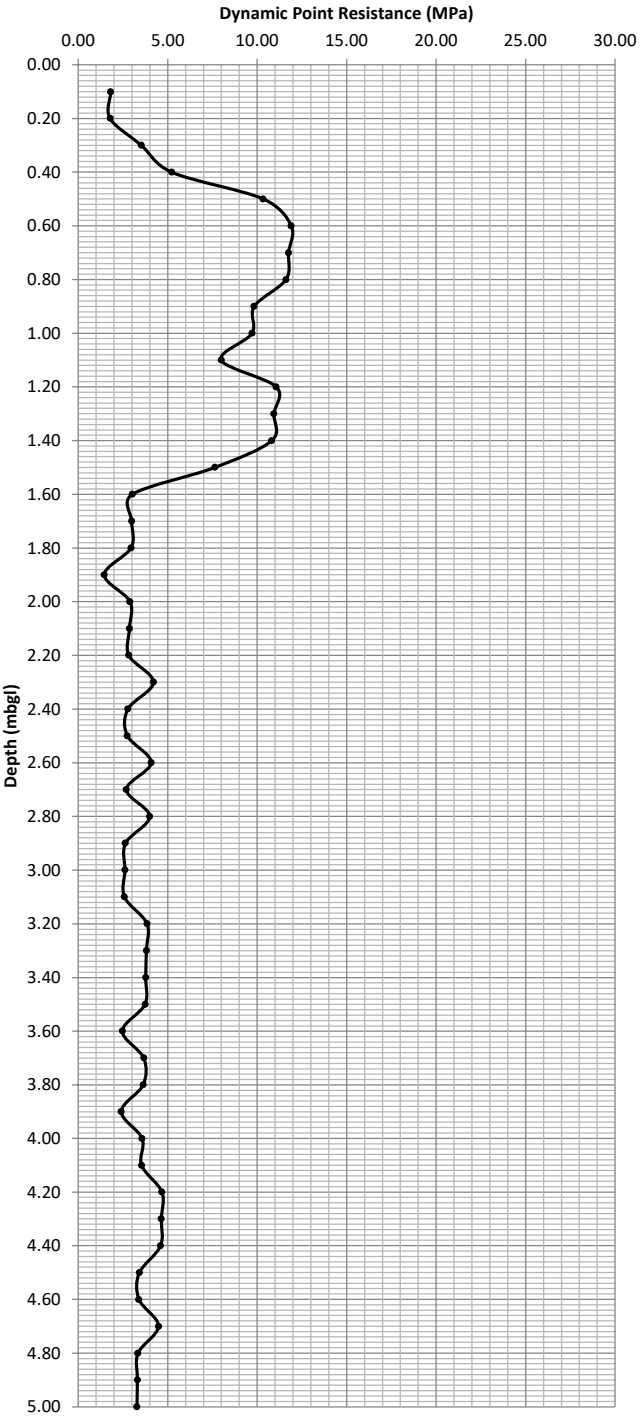
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex **Report Ref.** P16596

Test Location Reference	WS110

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	2	0.05	3.74	3.54
0.40	3	0.03	5.61	5.23
0.50	6	0.02	11.21	10.34
0.60	7	0.01	13.08	11.91
0.70	7	0.01	13.08	11.76
0.80	7	0.01	13.08	11.61
0.90	6	0.02	11.21	9.83
1.00	6	0.02	11.21	9.72
1.10	5	0.02	9.34	8.00
1.20	7	0.01	13.08	11.07
1.30	7	0.01	13.08	10.94
1.40	7	0.01	13.08	10.82
1.50	5	0.02	9.34	7.64
1.60	2	0.05	3.74	3.02
1.70	2	0.05	3.74	2.99
1.80	2	0.05	3.74	2.96
1.90	1	0.10	1.87	1.46
2.00	2	0.05	3.74	2.89
2.10	2	0.05	3.74	2.86
2.20	2	0.05	3.74	2.83
2.30	3	0.03	5.61	4.20
2.40	2	0.05	3.74	2.77
2.50	2	0.05	3.74	2.74
2.60	3	0.03	5.61	4.08
2.70	2	0.05	3.74	2.69
2.80	3	0.03	5.61	4.00
2.90	2	0.05	3.74	2.64
3.00	2	0.05	3.74	2.61
3.10	2	0.05	3.74	2.59
3.20	3	0.03	5.61	3.84
3.30	3	0.03	5.61	3.81
3.40	3	0.03	5.61	3.77
3.50	3	0.03	5.61	3.74
3.60	2	0.05	3.74	2.47
3.70	3	0.03	5.61	3.67
3.80	3	0.03	5.61	3.64
3.90	2	0.05	3.74	2.40
4.00	3	0.03	5.61	3.57
4.10	3	0.03	5.61	3.54
4.20	4	0.03	7.48	4.68
4.30	4	0.03	7.48	4.64
4.40	4	0.03	7.48	4.60
4.50	3	0.03	5.61	3.42
4.60	3	0.03	5.61	3.39
4.70	4	0.03	7.48	4.49
4.80	3	0.03	5.61	3.34
4.90	3	0.03	5.61	3.31
5.00	3	0.03	5.61	3.28



Notes:

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

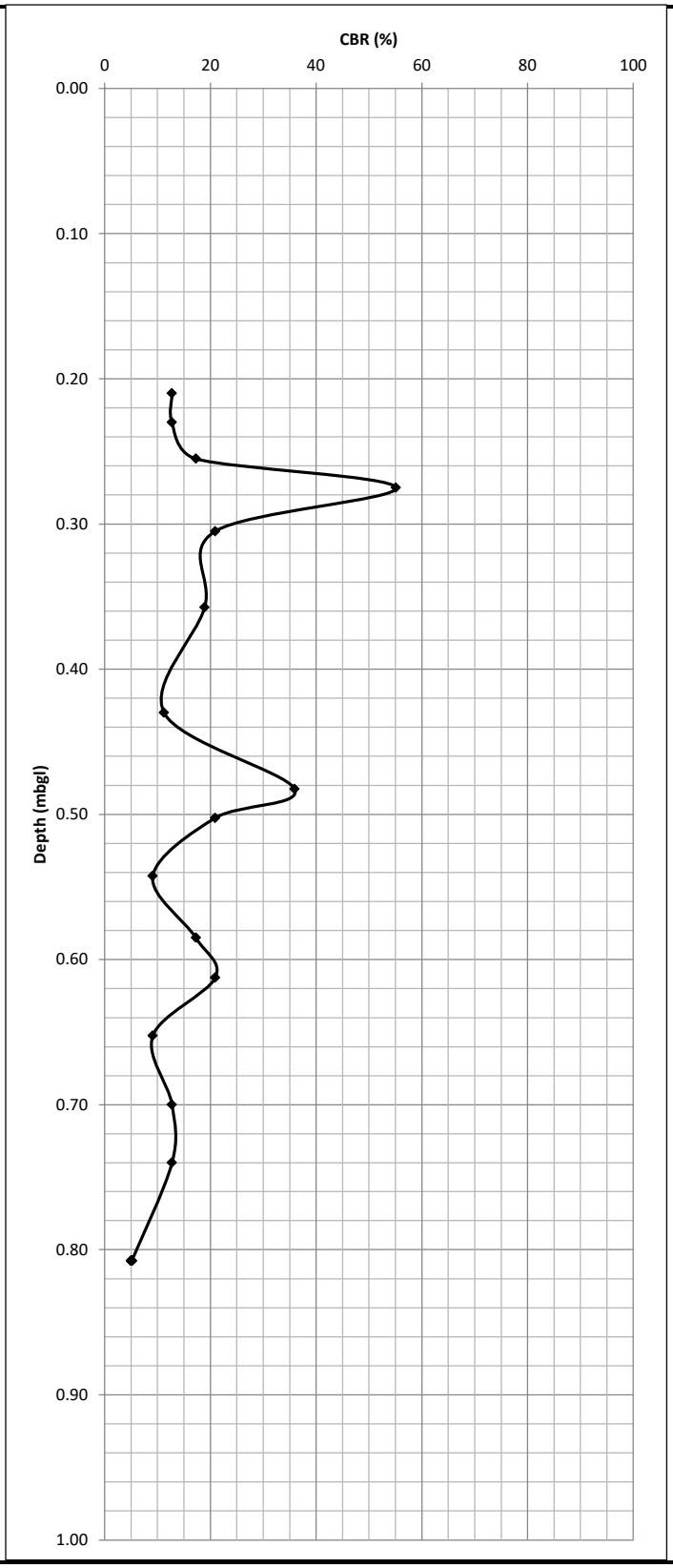
ASHDOWN SITE INVESTIGATION LTD

TRL Dynamic Cone Penetrometer Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex **Project Ref.** P16596

Test Location Reference	**WS102**
Depth of Start of Test (mbgl)	0.20

No. Blows	Total Blows	Reading (mm)	Depth (mbgl)	CBR%
DCP Zero Reading		210	0.20	
1	1	230	0.22	13
1	2	250	0.24	13
2	4	280	0.27	17
2	6	290	0.28	55
4	10	340	0.33	21
4	14	395	0.39	19
4	18	485	0.48	11
2	20	500	0.49	36
2	22	525	0.52	21
2	24	580	0.57	9
2	26	610	0.60	17
2	28	635	0.63	21
2	30	690	0.68	9
2	32	730	0.72	13
2	34	770	0.76	13
2	36	865	0.86	5



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

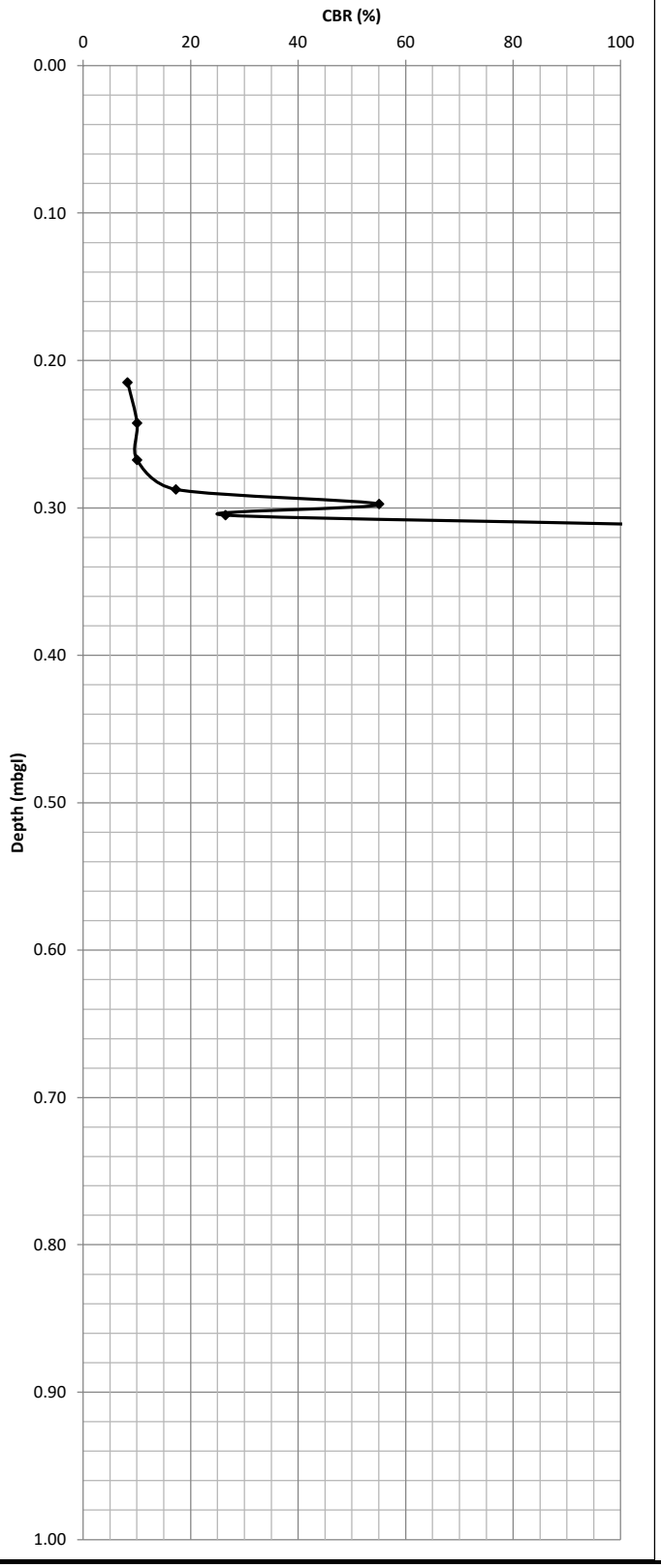
ASHDOWN SITE INVESTIGATION LTD

TRL Dynamic Cone Penetrometer Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex Project Ref. P16596

Test Location Reference	WS103 -1
Depth of Start of Test (mbgl)	0.20

No. Blows	Total Blows	Reading (mm)	Depth (mbgl)	CBR%
DCP Zero Reading		290	0.20	
1	1	320	0.23	8
1	2	345	0.26	10
1	3	370	0.28	10
1	4	385	0.30	17
1	5	390	0.30	55
1	6	400	0.31	26
2	8	405	0.32	115
4	12	415	0.33	115
8	20	425	0.34	239



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.
No further progress - too gravelly/hard/dense.

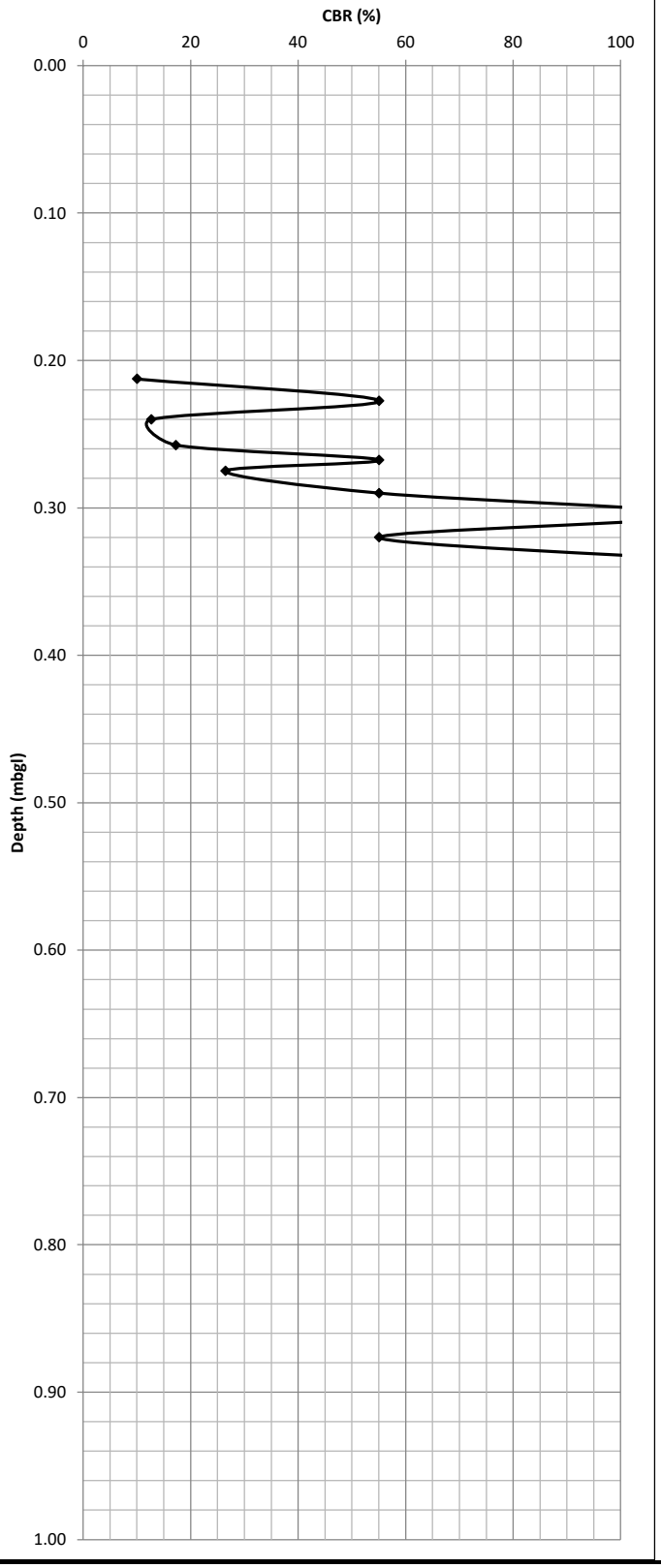
ASHDOWN SITE INVESTIGATION LTD

TRL Dynamic Cone Penetrometer Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex Project Ref. P16596

Test Location Reference	WS103 -2
Depth of Start of Test (mbgl)	0.20

No. Blows	Total Blows	Reading (mm)	Depth (mbgl)	CBR%
DCP Zero Reading		290	0.20	
1	1	315	0.23	10
1	2	320	0.23	55
1	3	340	0.25	13
1	4	355	0.27	17
1	5	360	0.27	55
1	6	370	0.28	26
4	10	390	0.30	55
4	14	400	0.31	115
4	18	420	0.33	55
4	22	430	0.34	115



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.
No further progress on second attempt - too gravelly/hard/dense.

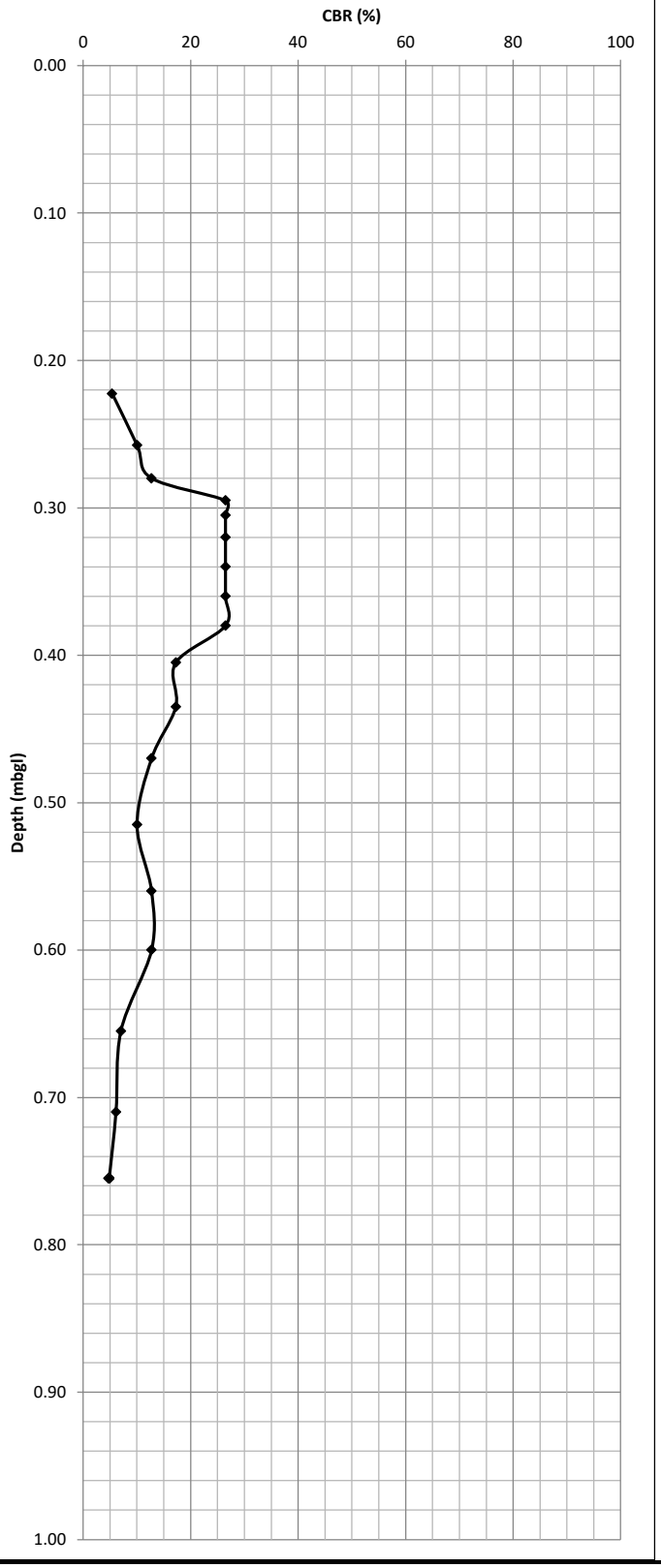
ASHDOWN SITE INVESTIGATION LTD

TRL Dynamic Cone Penetrometer Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex Project Ref. P16596

Test Location Reference	**WS104a**
Depth of Start of Test (mbgl)	0.20

No. Blows	Total Blows	Reading (mm)	Depth (mbgl)	CBR%
DCP Zero Reading		270	0.20	
1	1	315	0.25	5
1	2	340	0.27	10
1	3	360	0.29	13
1	4	370	0.30	26
1	5	380	0.31	26
2	7	400	0.33	26
2	9	420	0.35	26
2	11	440	0.37	26
2	13	460	0.39	26
2	15	490	0.42	17
2	17	520	0.45	17
2	19	560	0.49	13
2	21	610	0.54	10
2	23	650	0.58	13
2	25	690	0.62	13
2	27	760	0.69	7
1	28	800	0.73	6
1	29	850	0.78	5



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

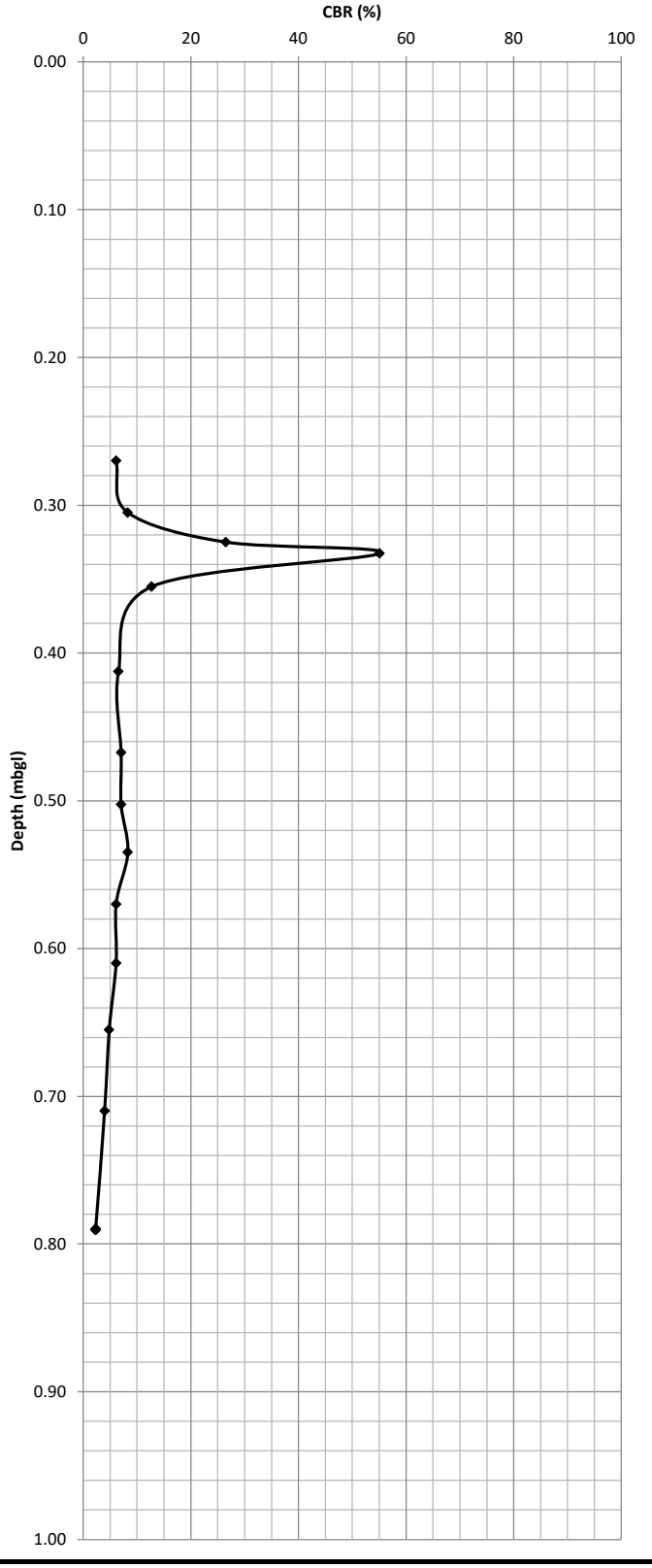
ASHDOWN SITE INVESTIGATION LTD

TRL Dynamic Cone Penetrometer Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex Project Ref. P16596

Test Location Reference	**WS106**
Depth of Start of Test (mbgl)	0.25

No. Blows	Total Blows	Reading (mm)	Depth (mbgl)	CBR%
DCP Zero Reading		340	0.25	
1	1	380	0.29	6
1	2	410	0.32	8
1	3	420	0.33	26
1	4	425	0.34	55
2	6	465	0.38	13
2	8	540	0.45	7
1	9	575	0.49	7
1	10	610	0.52	7
1	11	640	0.55	8
1	12	680	0.59	6
1	13	720	0.63	6
1	14	770	0.68	5
1	15	830	0.74	4
1	16	930	0.84	2



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

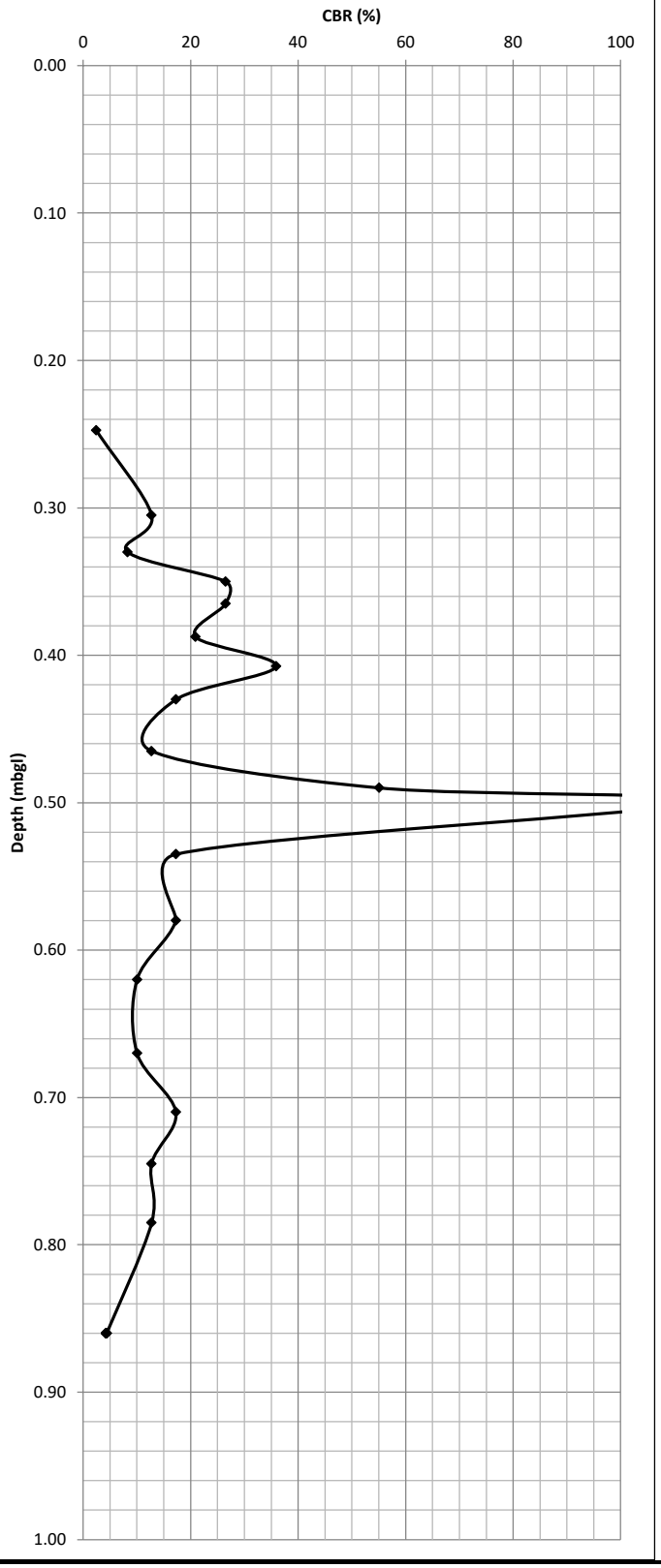
ASHDOWN SITE INVESTIGATION LTD

TRL Dynamic Cone Penetrometer Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex Project Ref. P16596

Test Location Reference	**WS107**
Depth of Start of Test (mbgl)	0.20

No. Blows	Total Blows	Reading (mm)	Depth (mbgl)	CBR%
DCP Zero Reading		145	0.20	
1	1	240	0.30	2
1	2	260	0.32	13
1	3	290	0.35	8
1	4	300	0.36	26
2	6	320	0.38	26
2	8	345	0.40	21
2	10	360	0.42	36
2	12	390	0.45	17
2	14	430	0.49	13
2	16	440	0.50	55
4	20	450	0.51	115
4	24	510	0.57	17
2	26	540	0.60	17
2	28	590	0.65	10
2	30	640	0.70	10
2	32	670	0.73	17
2	34	710	0.77	13
2	36	750	0.81	13
2	38	860	0.92	4



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

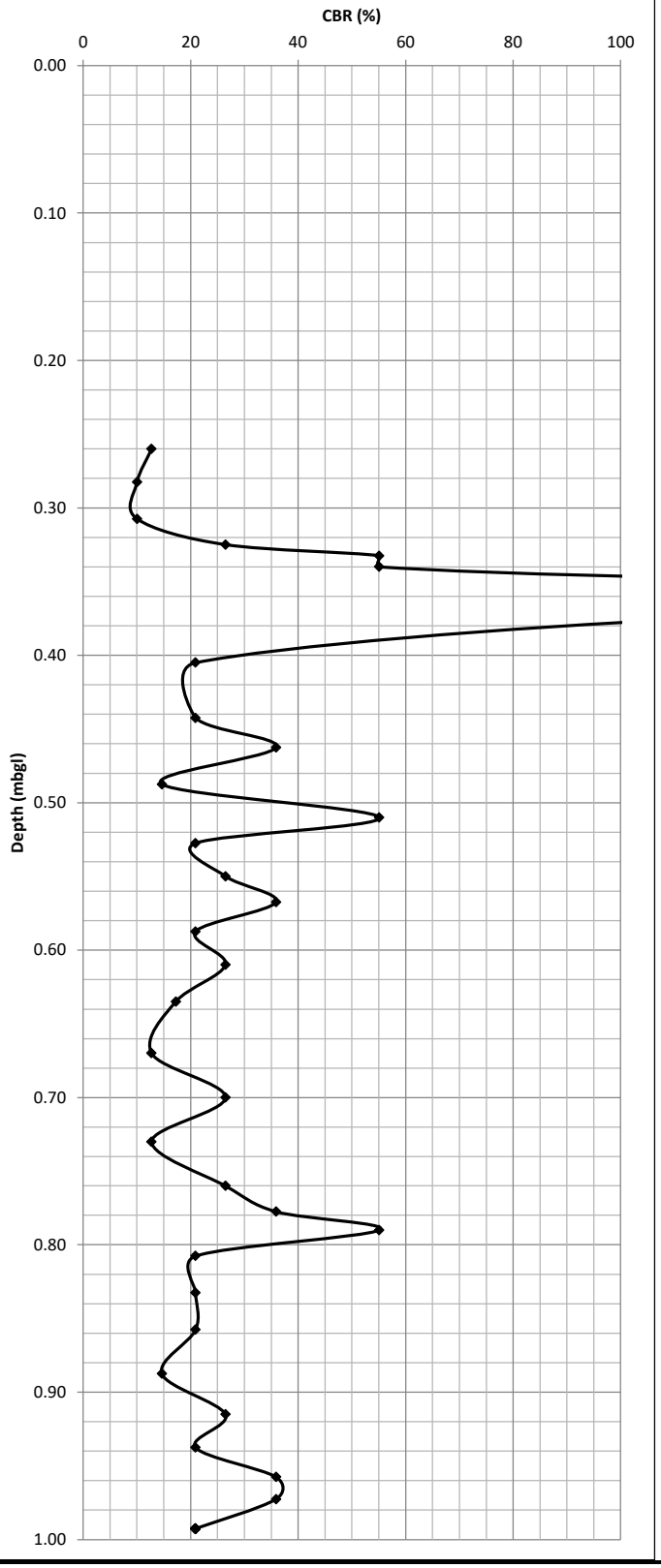
ASHDOWN SITE INVESTIGATION LTD

TRL Dynamic Cone Penetrometer Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex Project Ref. P16596

Test Location Reference	**WS108**
Depth of Start of Test (mbgl)	0.25

No. Blows	Total Blows	Reading (mm)	Depth (mbgl)	CBR%
DCP Zero Reading		50	0.25	
1	1	70	0.27	13
1	2	95	0.30	10
1	3	120	0.32	10
1	4	130	0.33	26
1	5	135	0.34	55
2	7	145	0.35	55
2	9	150	0.35	115
4	13	155	0.36	239
4	17	165	0.37	115
4	21	170	0.37	239
4	25	180	0.38	115
4	29	230	0.43	21
2	31	255	0.46	21
2	33	270	0.47	36
2	35	305	0.51	15
2	37	315	0.52	55
2	39	340	0.54	21
2	41	360	0.56	26
2	43	375	0.58	36
2	45	400	0.60	21
2	47	420	0.62	26
2	49	450	0.65	17
2	51	490	0.69	13
2	53	510	0.71	26
2	55	550	0.75	13
2	57	570	0.77	26
2	59	585	0.79	36
2	61	595	0.80	55
2	63	620	0.82	21
2	65	645	0.85	21
2	67	670	0.87	21
2	69	705	0.91	15
2	71	725	0.93	26
2	73	750	0.95	21
2	75	765	0.97	36
2	77	780	0.98	36
2	79	805	1.01	21



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

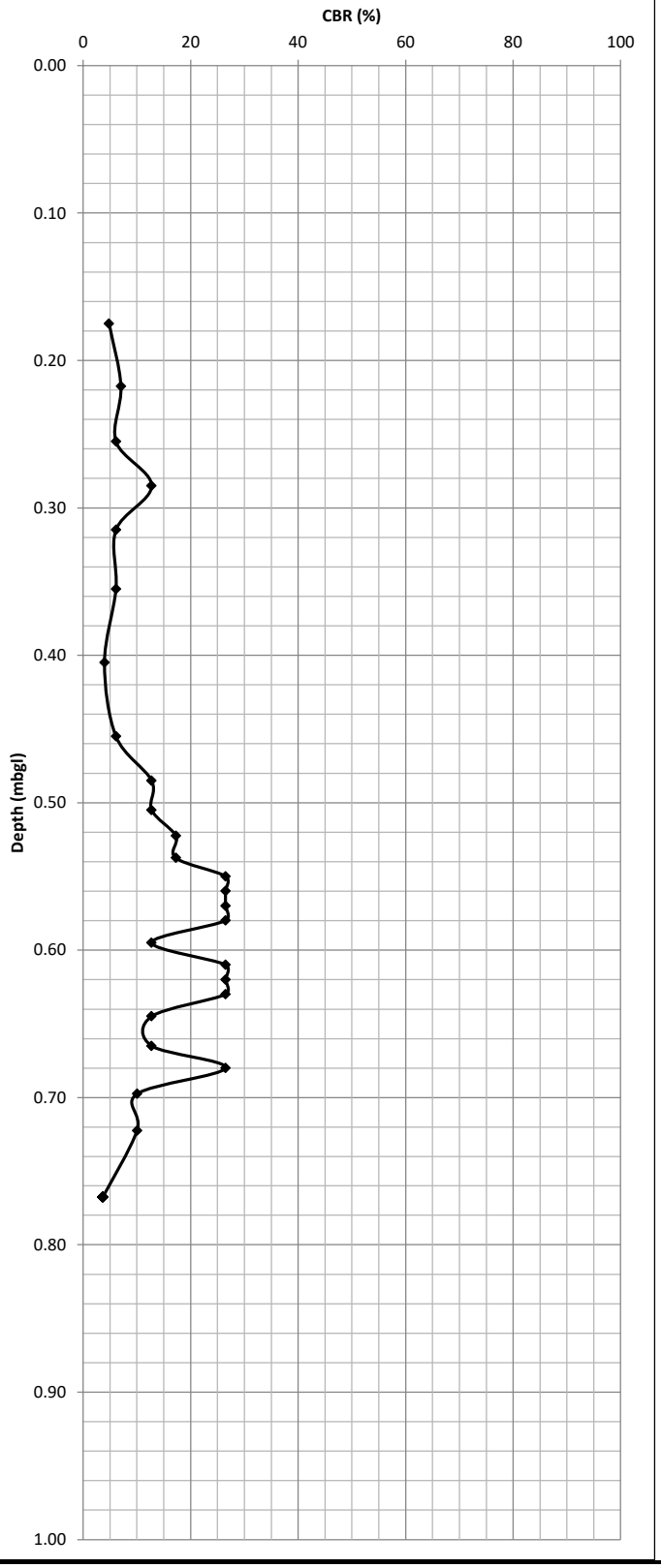
ASHDOWN SITE INVESTIGATION LTD

TRL Dynamic Cone Penetrometer Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex Project Ref. P16596

Test Location Reference	**WS109**
Depth of Start of Test (mbgl)	0.15

No. Blows	Total Blows	Reading (mm)	Depth (mbgl)	CBR%
DCP Zero Reading		205	0.15	
1	1	255	0.20	5
1	2	290	0.24	7
1	3	330	0.28	6
1	4	350	0.30	13
1	5	390	0.34	6
1	6	430	0.38	6
1	7	490	0.44	4
1	8	530	0.48	6
1	9	550	0.50	13
1	10	570	0.52	13
1	11	585	0.53	17
1	12	600	0.55	17
1	13	610	0.56	26
1	14	620	0.57	26
1	15	630	0.58	26
1	16	640	0.59	26
1	17	660	0.61	13
1	18	670	0.62	26
1	19	680	0.63	26
1	20	690	0.64	26
1	21	710	0.66	13
1	22	730	0.68	13
1	23	740	0.69	26
1	24	765	0.71	10
1	25	790	0.74	10
1	26	855	0.80	4



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

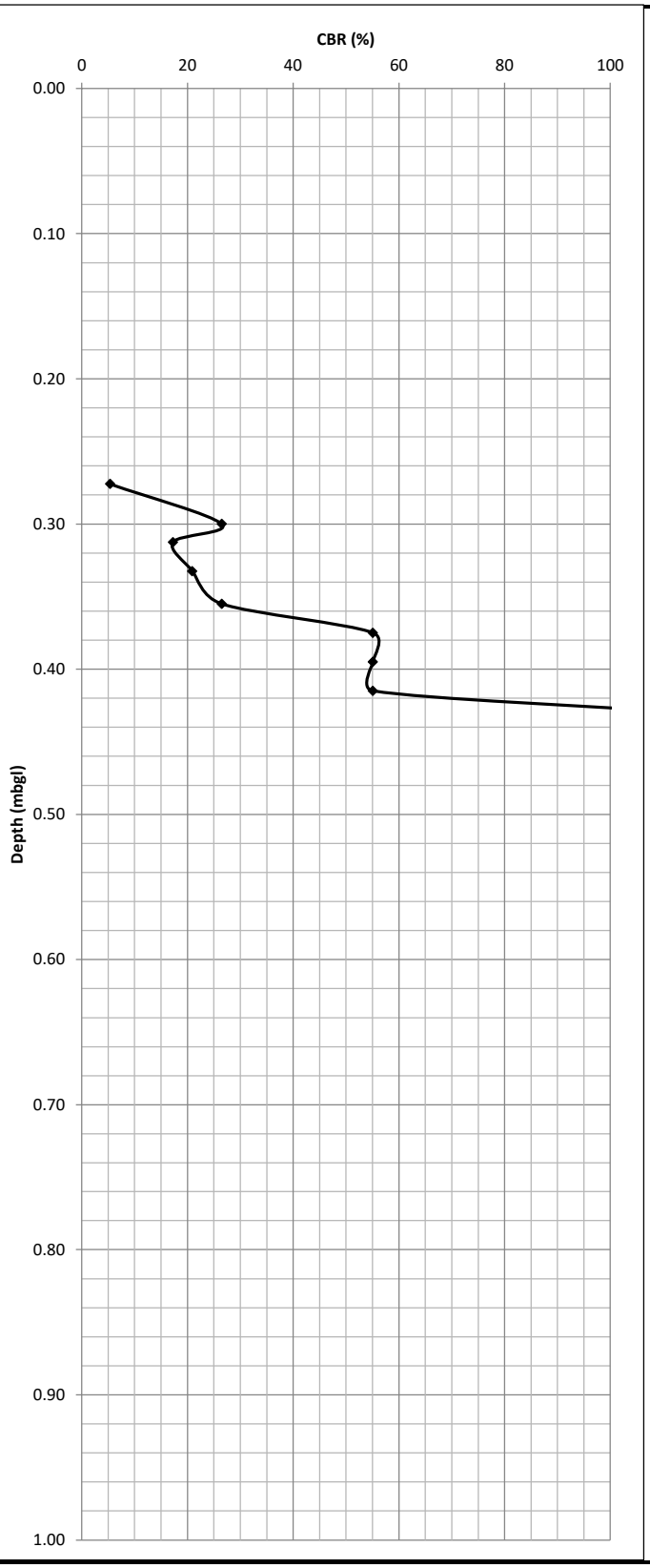
ASHDOWN SITE INVESTIGATION LTD

TRL Dynamic Cone Penetrometer Record

SITE Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex Project Ref. P16596

Test Location Reference	**WS110**
Depth of Start of Test (mbgl)	0.25

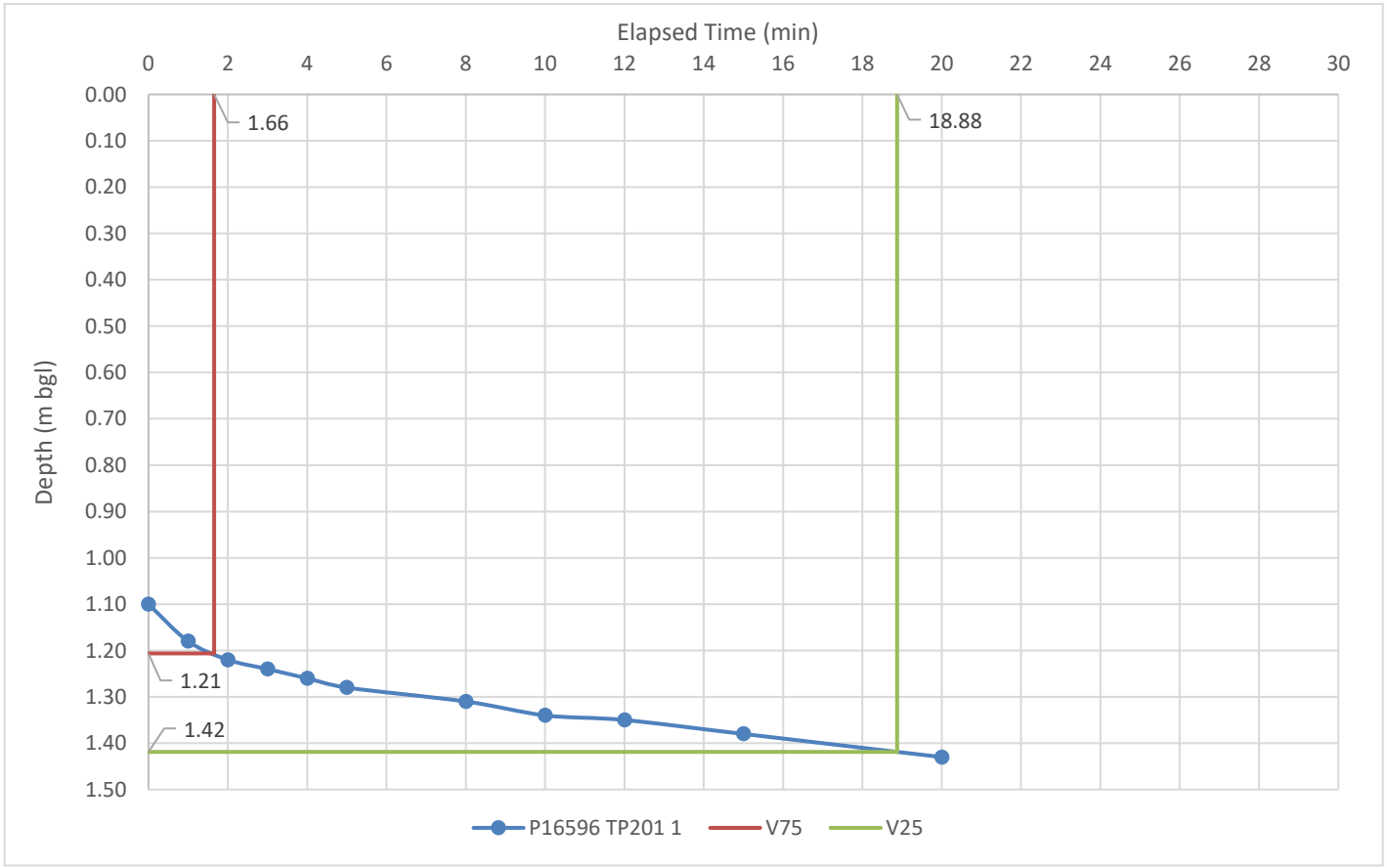
No. Blows	Total Blows	Reading (mm)	Depth (mbgl)	CBR%
DCP Zero Reading		195	0.25	
1	1	240	0.30	5
1	2	250	0.31	26
1	3	265	0.32	17
2	5	290	0.35	21
2	7	310	0.37	26
4	11	330	0.39	55
4	15	350	0.41	55
4	19	370	0.43	55
4	23	380	0.44	115
8	31	395	0.45	155
8	39	410	0.47	155
8	47	420	0.48	239
8	55	435	0.49	155



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.
No further progress - too gravelly/hard/dense.

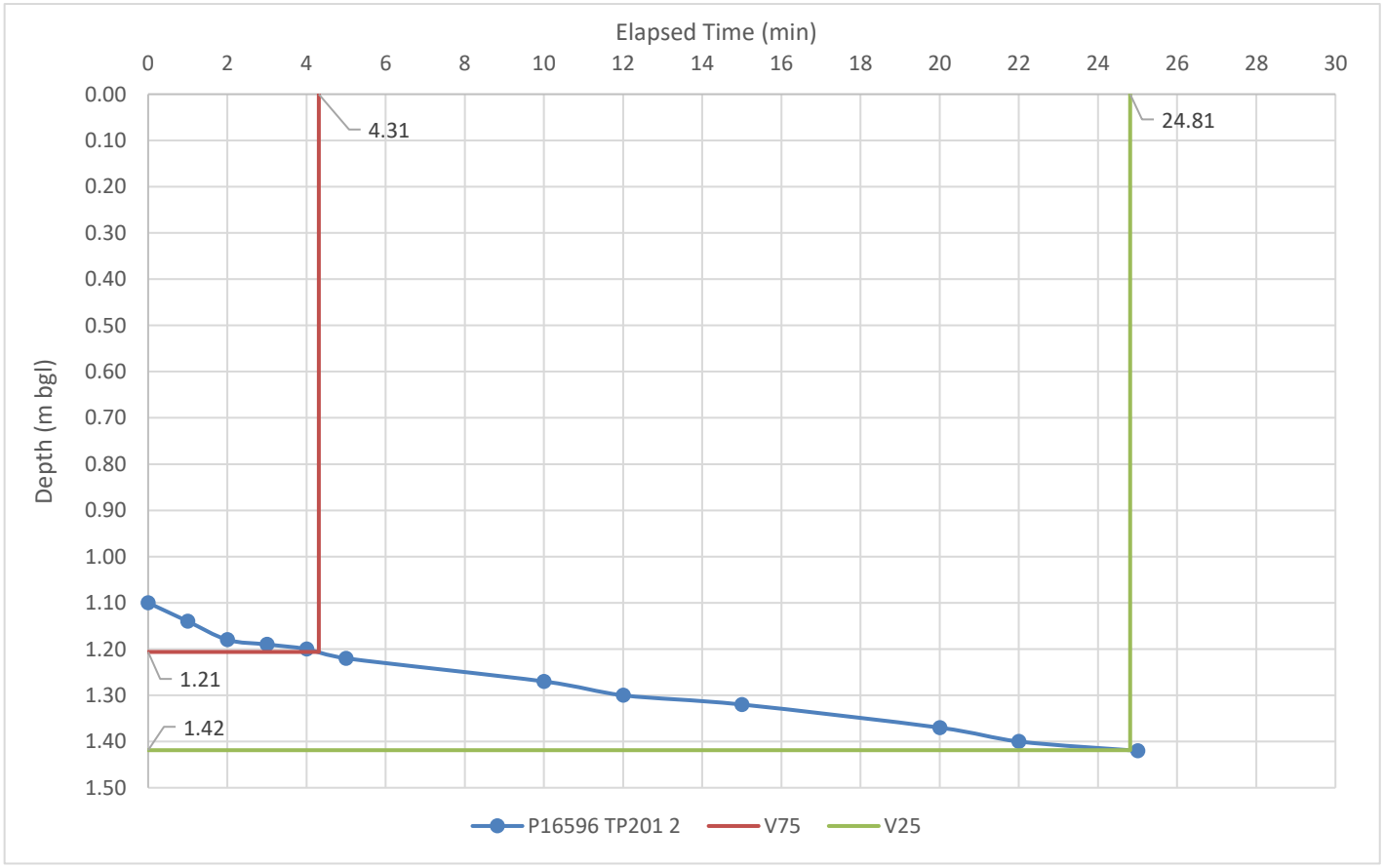
Infiltration Test Results

Test Position	TP201		
Test No.	1		
Project No.	P16596		
Project Name	Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex		
Width of Pit	0.59	m	W
Length of Pit	1.49	m	L
Depth of Pit	1.53	m	D
Pit type	Open		
Volume of water introduced into pit	0.370	m^3	
Initial head of water	0.43	m	h_o
Water level at start of test	1.10	m	
Water level at end of test	1.43	m	
Volume of water discharged from pit	0.288	m^3	
Duration of test	20	min	
Average soaked surface area	1.95	m^2	
Time for water level to fall to 75% of initial head	1.66	min	t_{p75}
Time for water level to fall to 25% of initial head	18.88	min	t_{p25}
Depth to water at 75% of initial head	1.21	m	d_{75}
Depth to water at 25% of initial head	1.42	m	d_{25}
Time for the water level to fall from 75% to 25% of initial head	17.22	min	t_{p75-25}
Effective storage volume of water in the soakage trial pit between 75% and 25% of initial head	0.185	m^3	V_{p75-25}
Internal surface area of the soakage trial pit up to 50% of initial head and including the base area	1.75	m^2	a_{s50}
Infiltration rate	**1.02E-04**	**m/sec**	**f**
Calculation method:	BRE 365		



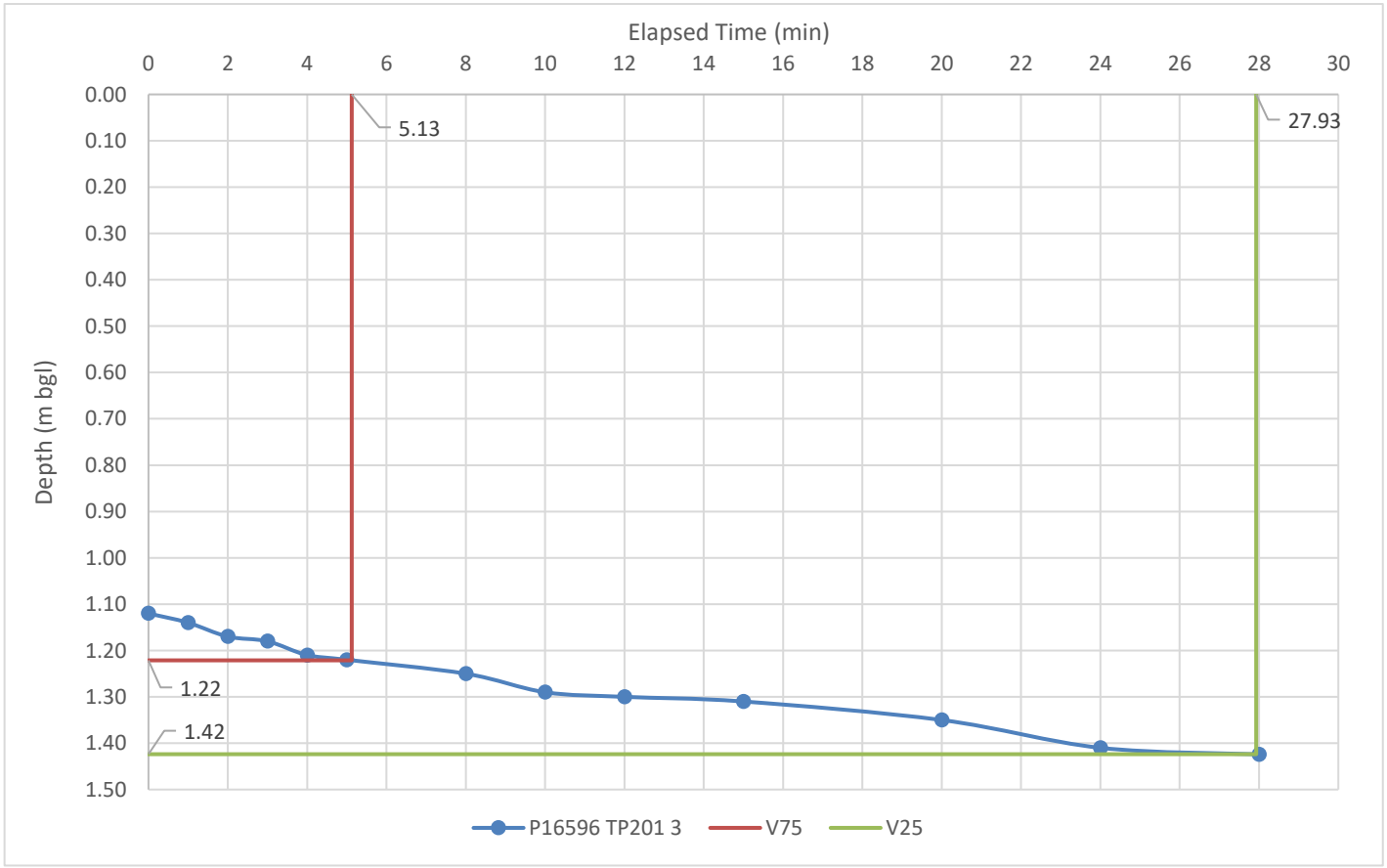
Infiltration Test Results

Test Position	TP201		
Test No.	2		
Project No.	P16596		
Project Name	Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex		
Width of Pit	0.59	m	W
Length of Pit	1.49	m	L
Depth of Pit	1.53	m	D
Pit type	Open		
Volume of water introduced into pit	0.370	m^3	
Initial head of water	0.43	m	h_o
Water level at start of test	1.10	m	
Water level at end of test	1.42	m	
Volume of water discharged from pit	0.279	m^3	
Duration of test	25	min	
Average soaked surface area	1.97	m^2	
Time for water level to fall to 75% of initial head	4.31	min	t_{p75}
Time for water level to fall to 25% of initial head	24.81	min	t_{p25}
Depth to water at 75% of initial head	1.21	m	d_{75}
Depth to water at 25% of initial head	1.42	m	d_{25}
Time for the water level to fall from 75% to 25% of initial head	20.50	min	t_{p75-25}
Effective storage volume of water in the soakage trial pit between 75% and 25% of initial head	0.185	m^3	V_{p75-25}
Internal surface area of the soakage trial pit up to 50% of initial head and including the base area	1.75	m^2	a_{s50}
Infiltration rate	**8.59E-05**	**m/sec**	**f**
Calculation method:	BRE 365		



Infiltration Test Results

Test Position	TP201			
Test No.	3			
Project No.	P16596			
Project Name	Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex			
Width of Pit		0.59	m	W
Length of Pit		1.49	m	L
Depth of Pit		1.53	m	D
Pit type		Open		
Volume of water introduced into pit		0.353	m^3	
Initial head of water		0.41	m	h_o
Water level at start of test		1.12	m	
Water level at end of test		1.42	m	
Volume of water discharged from pit		0.265	m^3	
Duration of test		28	min	
Average soaked surface area		1.92	m^2	
Time for water level to fall to 75% of initial head		5.13	min	t_{p75}
Time for water level to fall to 25% of initial head		27.93	min	t_{p25}
Depth to water at 75% of initial head		1.22	m	d_{75}
Depth to water at 25% of initial head		1.42	m	d_{25}
Time for the water level to fall from 75% to 25% of initial head		22.80	min	t_{p75-25}
Effective storage volume of water in the soakage trial pit between 75% and 25% of initial head		0.177	m^3	V_{p75-25}
Internal surface area of the soakage trial pit up to 50% of initial head and including the base area		1.71	m^2	a_{s50}
Infiltration rate		**7.54E-05**	**m/sec**	**f**
Calculation method:	BRE 365			



Gas Concentrations and Groundwater Monitoring Results

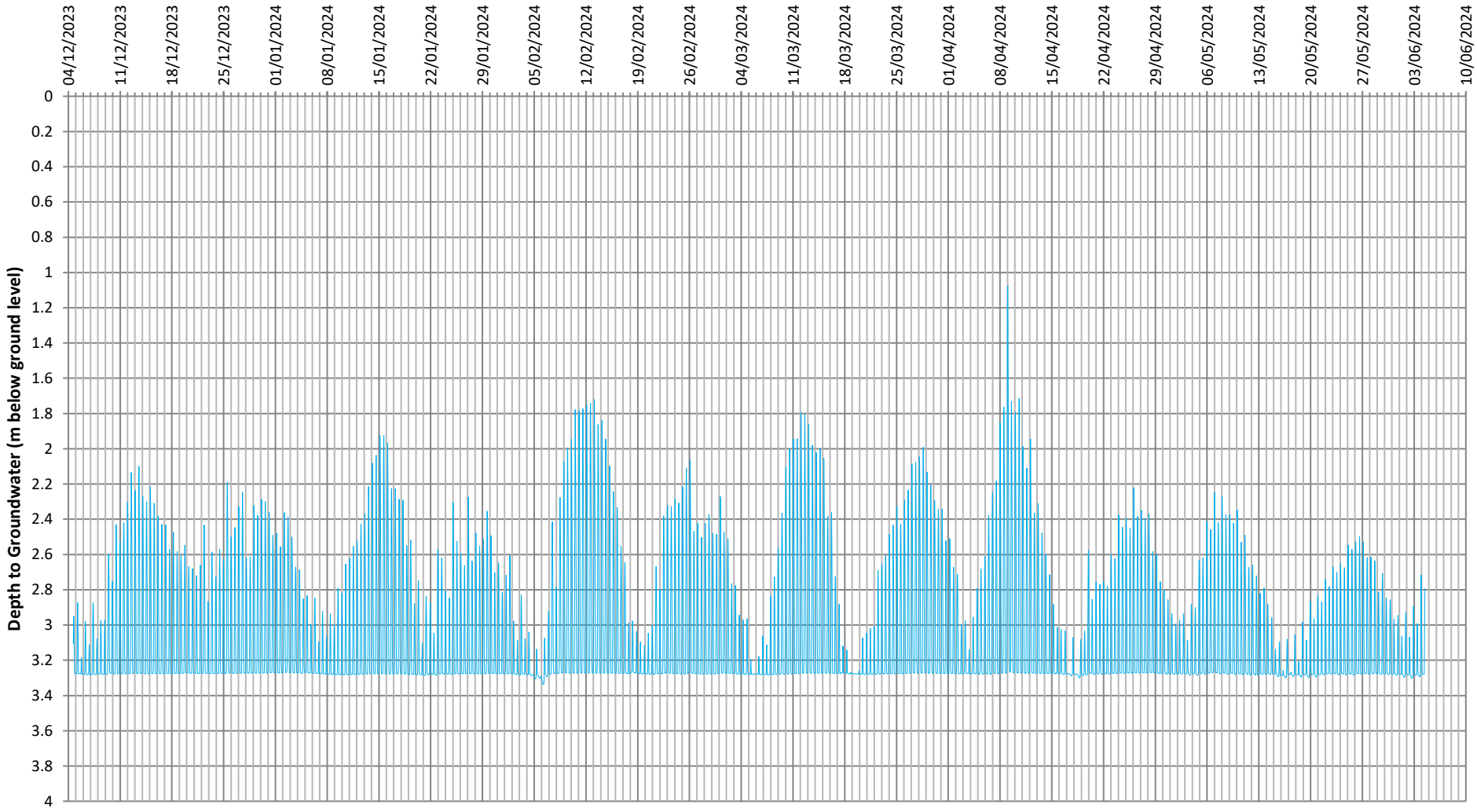
Site Name:	Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex
Project Ref:	P16596

Position	Date	Time	Dynamic Pressure (pa)	Atmospheric Pressure (mbar)	Atmospheric Trend	Standing Water Depth (m bgl)	Flow Rate (l/hr)				Methane (%)				Carbon Dioxide (%)				Oxygen (%)				CO (ppm)	H_2S (ppm)
							Seconds				Seconds				Seconds				Seconds					
							15	30	45	60	15	30	45	60	15	30	45	60	15	30	45	60		
WS102	08/05/2024	12:56	0	1028	Static	2.10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	20.3	20.0	20.0	20.0	0	0
WS104	08/05/2024	13:02	0	1028	Static	2.05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.6	20.5	20.5	20.5	0	0
WS106	08/05/2024	13:16	0	1028	Static	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.6	20.5	20.5	20.4	0	0
WS107	08/05/2024	13:07	0	1028	Static	2.15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	20.5	20.4	20.4	20.3	0	0
WS102	13/05/2024	10:44	0	1007	Falling	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	20.5	19.9	19.6	19.5	0	0
WS104	13/05/2024	10:49	0	1007	Falling	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.3	20.3	20.3	20.3	0	0
WS106	13/05/2024	10:58	0	1007	Falling	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.5	20.4	20.4	20.4	0	0
WS107	13/05/2024	10:53	0	1007	Falling	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	20.5	20.4	20.4	20.4	0	0
WS102	22/05/2024	10:25	0	1005	Rising	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	19.9	19.2	19.1	19.1	0	0
WS104	22/05/2024	10:30	0	1005	Rising	2.95	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.4	20.5	20.5	20.5	0	0
WS106	22/05/2024	10:20	0	1005	Rising	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	20.4	20.2	19.9	19.9	0	0
WS107	22/05/2024	10:35	0	1005	Rising	2.90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	20.1	19.9	19.8	19.8	0	0
WS102	24/05/2024	09:23	0	1018	Rising	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.3	0.3	19.5	19.3	19.2	19.1	0	0
WS104	24/05/2024	09:28	0	1018	Rising	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	20.2	20.1	20.1	20.1	0	0
WS106	24/05/2024	09:33	0	1018	Rising	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.4	20.3	20.3	20.3	0	0
WS107	24/05/2024	09:41	0	1018	Rising	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	20.4	20.3	20.4	20.4	0	0
WS102	28/05/2024	12:12	0	1012	Falling	2.62	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	19.7	19.9	20.0	19.9	0	0
WS104	28/05/2024	12:16	0	1012	Falling	2.97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.7	20.8	20.8	20.8	0	0
WS106	28/05/2024	12:25	0	1012	Falling	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.7	20.5	20.5	20.5	0	0
WS107	28/05/2024	12:21	0	1012	Falling	2.97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.7	20.5	20.5	20.6	0	0
WS102	04/06/2024	12:29	0	1010	Falling	1.30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	20.1	20.0	20.0	20.0	0	0
WS104	04/06/2024	12:36	0	1010	Falling	2.35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.8	20.8	20.8	20.8	0	0
WS106	04/06/2024	12:48	0	1010	Falling	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.4	20.4	20.4	20.4	0	0
WS107	04/06/2024	12:42	0	1010	Falling	2.57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.3	20.5	20.3	20.2	20.1	0	0

Ashdown Site Investigation Limited

Site: Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex	Project No. P16388

Groundwater Monitoring Results - WS02



APPENDIX C

Geotechnical Laboratory Test Results
Contamination Laboratory Test Results

ASHDOWN SITE INVESTIGATION LIMITED

Soil Classification Summary

Site Name:	Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex	Job No:	P16596

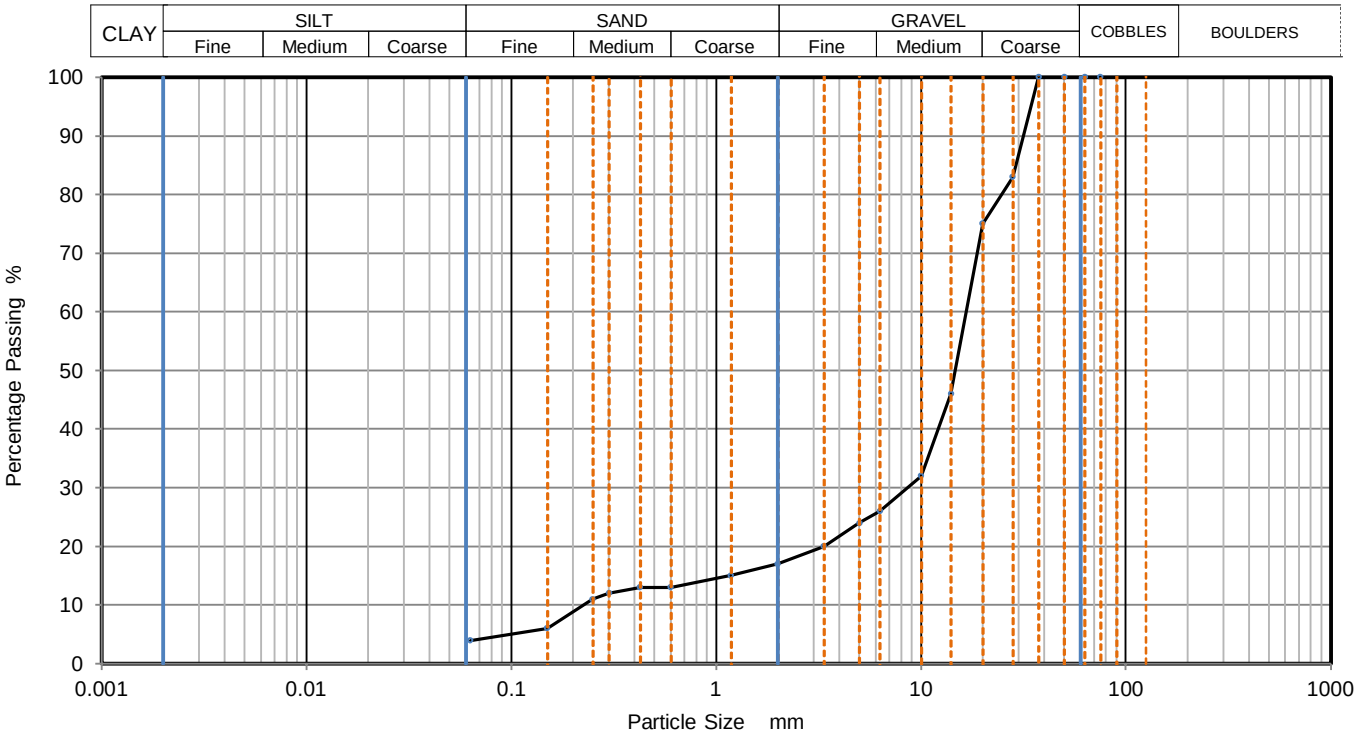
BH/TP No.	Depth (m)	Nat. Moist. Cont. (w %)	Equiv. Moist. Cont. (w_a %)	Atterberg Limits			Class'n	Cons. Index (I_c)	% passing 425 µm sieve	Visual Description of Sample
				W_l %	W_p %	I_p %				
WS101	2.90	20		26	20	6	SiL-ClL		85	Orange brown orange slightly gravelly silty CLAY. Gravel is fine to medium flint and chalk. Chalk gravel broke down during sample preparation.
WS104A	2.95	13		58	22	36	ClH		19	Grey very gravelly CLAY. Gravel is medium to coarse flint.
WS109	4.10	13		35	13	22	ClL/ClM		57	Orange brown slightly gravelly sandy CLAY. Gravel is fine to medium flint.
WS110	1.80	6.8			17		N		10	Grey sandy clayey fine to coarse GRAVEL of flint (insufficient fine fraction to undertake liquid limit testing).

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.	

ASHDOWN SITE INVESTIGATION LIMITED

Particle Size Distribution

Site Name:	Fomer Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex	Job No.:	P16596
Soil Description:	Sandy slightly clayey GRAVEL.	Borehole/Pit No.	WS102
Test Method	BS1377:Part2:1990, Clause 9.2	Depth (m)	2.80



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.0200	
63	100	0.0060	
50	100	0.0020	
37.5	100		
28	83		
20	75		
14	46		
10	32		
6.3	26		
5	24		
3.35	20		
2	17		
1.18	15		
0.6	13		
0.425	13		
0.3	12		
0.25	11		
0.15	6		
0.063	4		

Dry Mass of sample (g)	576

Sample Proportions	% dry mass
Very coarse	0
Gravel	83
Sand	13
Fines <0.063mm	4

Grading Analysis		
D_{100}	mm	37.500
D_{60}	mm	16.631
D_{30}	mm	8.573
D_{10}	mm	0.226
Uniformity Coefficient		73.7
Curvature Coefficient		19.6

Remarks

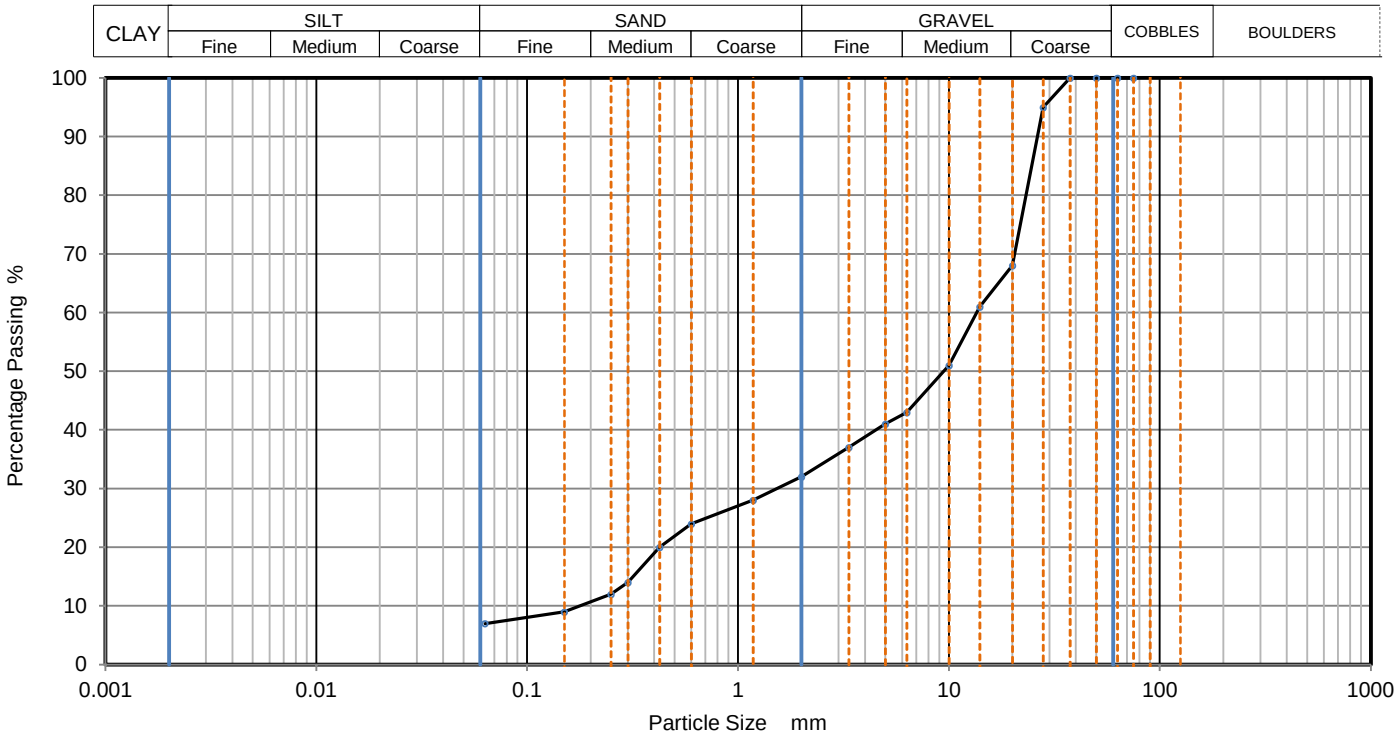
Preparation and testing in accordance with BS1377 unless noted below

Sheet No.: 1

ASHDOWN SITE INVESTIGATION LIMITED

Particle Size Distribution

Site Name:	Fomer Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex	Job No.:	P16596
Soil Description:	Very sandy clayey GRAVEL.	Borehole/Pit No.	WS106
Test Method	BS1377:Part2:1990, Clause 9.2	Depth (m)	1.20



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.0200	
63	100	0.0060	
50	100	0.0020	
37.5	100		
28	95		
20	68		
14	61		
10	51		
6.3	43		
5	41		
3.35	37		
2	32		
1.18	28		
0.6	24		
0.425	20		
0.3	14		
0.25	12		
0.15	9		
0.063	7		

Dry Mass of sample (g)	517

Sample Proportions	% dry mass
Very coarse	0
Gravel	68
Sand	25
Fines <0.063mm	7

Grading Analysis		
D_{100}	mm	37.500
D_{60}	mm	13.537
D_{30}	mm	1.536
D_{10}	mm	0.178
Uniformity Coefficient		76.1
Curvature Coefficient		1

Remarks

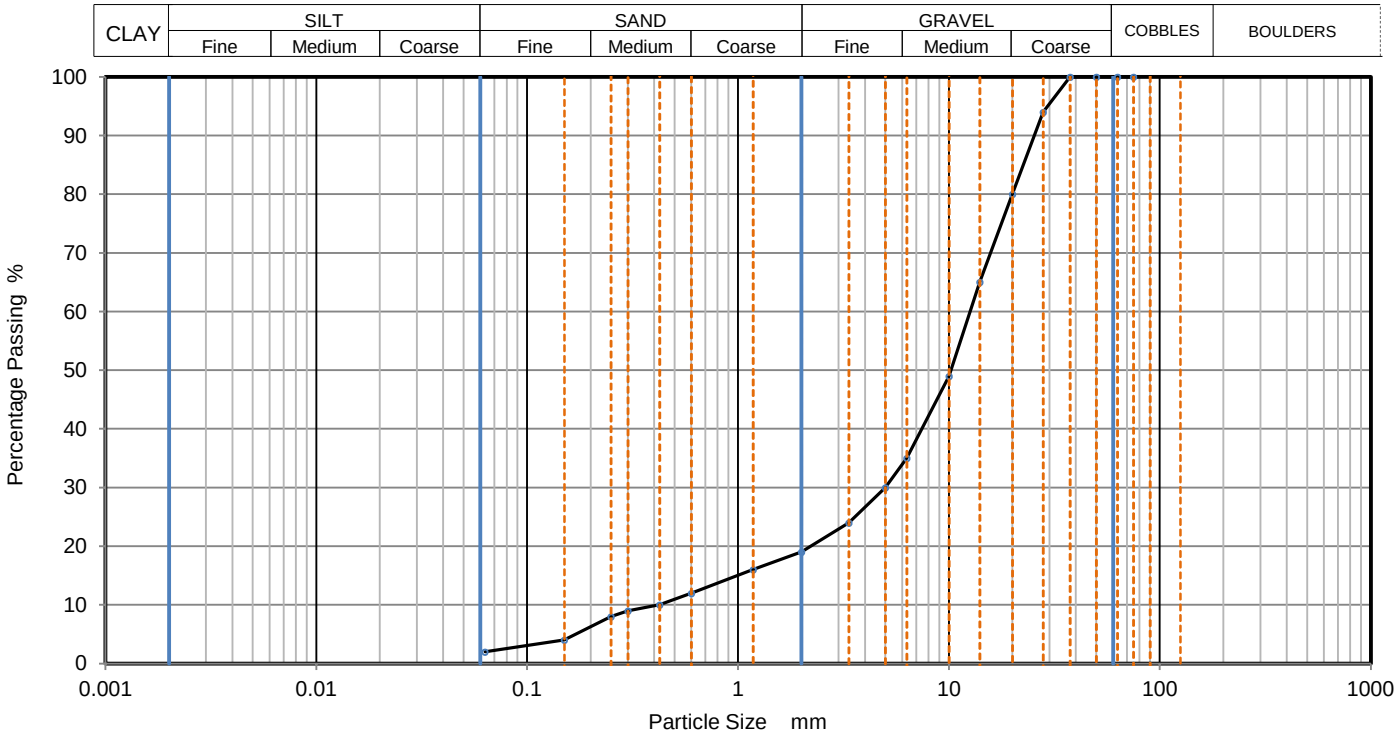
Preparation and testing in accordance with BS1377 unless noted below

Sheet No.: 2

ASHDOWN SITE INVESTIGATION LIMITED

Particle Size Distribution

Site Name:	Fomer Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex	Job No.:	P16596
Soil Description:	Sandy slightly silty GRAVEL.	Borehole/Pit No.	WS107
Test Method	BS1377:Part2:1990, Clause 9.2	Depth (m)	2.00



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.0200	
63	100	0.0060	
50	100	0.0020	
37.5	100		
28	94		
20	80		
14	65		
10	49		
6.3	35		
5	30		
3.35	24		
2	19		
1.18	16		
0.6	12		
0.425	10		
0.3	9		
0.25	8		
0.15	4		
0.063	2		

Dry Mass of sample (g)	455

Sample Proportions	% dry mass
Very coarse	0
Gravel	81
Sand	17
Fines <0.063mm	2

Grading Analysis		
D_{100}	mm	37.500
D_{60}	mm	12.603
D_{30}	mm	5.000
D_{10}	mm	0.425
Uniformity Coefficient		29.7
Curvature Coefficient		4.7

Remarks

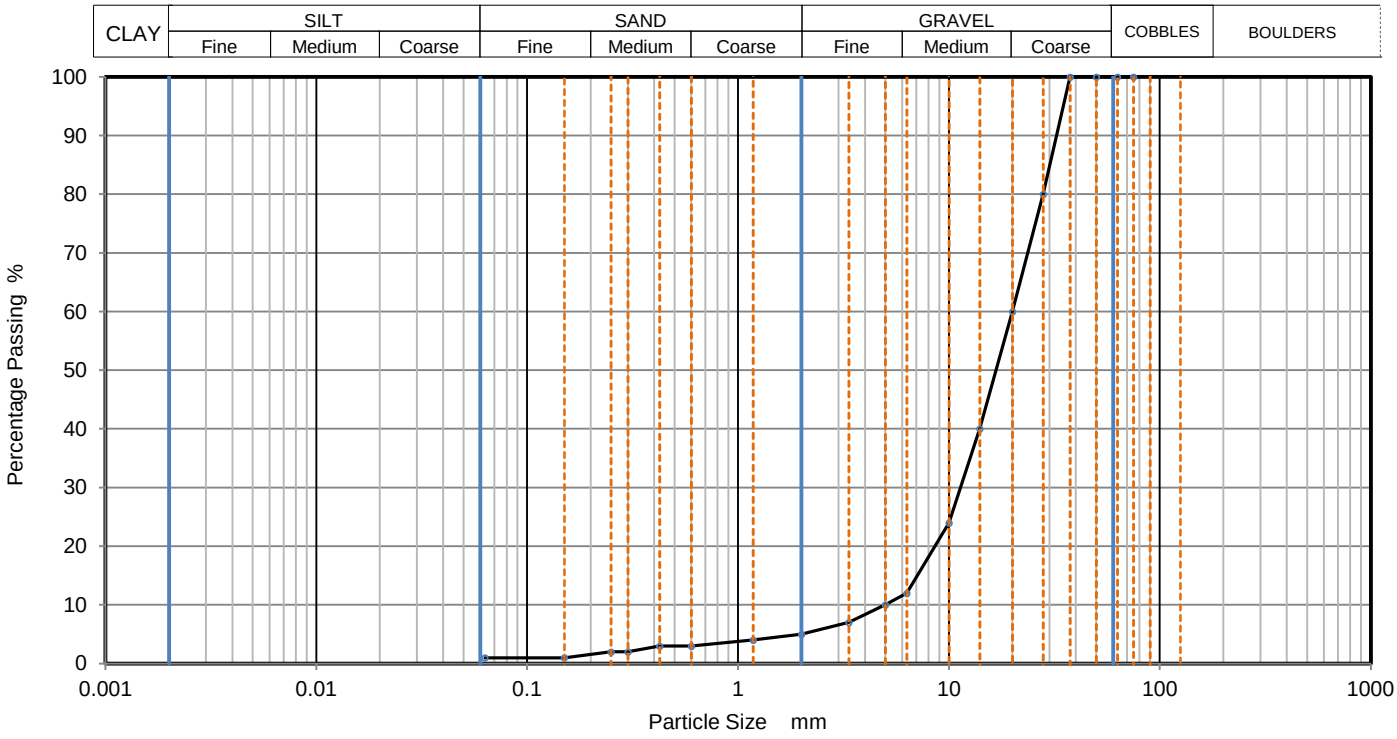
Preparation and testing in accordance with BS1377 unless noted below

Sheet No.: 3

ASHDOWN SITE INVESTIGATION LIMITED

Particle Size Distribution

Site Name:	Fomer Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex	Job No.:	P16596
Soil Description:	Slightly sandy slightly silty GRAVEL.	Borehole/Pit No.	WS108
Test Method	BS1377:Part2:1990, Clause 9.2	Depth (m)	1.30



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100	0.0200	
63	100	0.0060	
50	100	0.0020	
37.5	100		
28	80		
20	60		
14	40		
10	24		
6.3	12		
5	10		
3.35	7		
2	5		
1.18	4		
0.6	3		
0.425	3		
0.3	2		
0.25	2		
0.15	1		
0.063	1		

Dry Mass of sample (g): 762

Sample Proportions	% dry mass
Very coarse	0
Gravel	95
Sand	4
Fines <0.063mm	1

Grading Analysis		
D_{100}	mm	37.500
D_{60}	mm	20.000
D_{30}	mm	11.345
D_{10}	mm	5.000
Uniformity Coefficient		4
Curvature Coefficient		1.3

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Sheet No.: 4

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

Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 24-04980

Site Reference:	Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea
Project / Job Ref:	P16596 2201
Order No:	11647
Sample Receipt Date:	08/05/2024
Sample Scheduled Date:	08/05/2024
Report Issue Number:	1
Reporting Date:	14/05/2024

Authorised by:

Steve Knight
Customer Support Manager

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

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate						
DETS Report No: 24-04980	**~Date Sampled**	03/05/24	02/05/24	03/05/24	03/05/24	03/05/24
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS101	WS102	WS104A	WS107	WS109
~Project / Job Ref: P16596_2201	**~Additional Refs**	D	D	D	D	D
~Order No: 11647	**~Depth (m)**	1.80	2.20	2.60	3.40	0.85
Reporting Date: 14/05/2024	**DETS Sample No**	713921	713922	713923	713924	713925

Determinand	**Unit**	**RL**	**Accreditation**					
pH	pH Units	N/a	**MCERTS**	8.1	8.2	8.2	8.2	8.1
Total Sulphate as SO_4	mg/kg	< 200	**MCERTS**	629	569	972	1140	433
Total Sulphate as SO_4	%	< 0.02	**MCERTS**	0.06	0.06	0.10	0.11	0.04
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	248	109	324	190	14
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.25	0.11	0.32	0.19	0.01
Total Sulphur	%	< 0.02	NONE	0.04	0.04	0.05	0.04	0.03
W/S Chloride (2:1)	mg/kg	< 1	**MCERTS**	1310	361	3530	2930	165
W/S Chloride (2:1)	mg/l	< 0.5	**MCERTS**	657	181	1760	1460	82.4
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	**MCERTS**	38	3	< 3	4	5
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	**MCERTS**	19.1	1.6	< 1.5	2.2	2.7
W/S Magnesium	mg/l	< 0.1	NONE	5.5	4.5	30	42	2

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)
~Sample details provided by customer section and can affect the validity of results
(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate						
DETS Report No: 24-04980	**~Date Sampled**	03/05/24				
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied				
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS110				
~Project / Job Ref: P16596_2201	**~Additional Refs**	D				
~Order No: 11647	**~Depth (m)**	1.80				
Reporting Date: 14/05/2024	**DETS Sample No**	713926				

Determinand	**Unit**	**RL**	**Accreditation**	(n)				
pH	pH Units	N/a	**MCERTS**	8.4				
Total Sulphate as SO_4	mg/kg	< 200	**MCERTS**	475				
Total Sulphate as SO_4	%	< 0.02	**MCERTS**	0.05				
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	74				
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.07				
Total Sulphur	%	< 0.02	NONE	0.04				
W/S Chloride (2:1)	mg/kg	< 1	**MCERTS**	1220				
W/S Chloride (2:1)	mg/l	< 0.5	**MCERTS**	611				
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	**MCERTS**	< 3				
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	**MCERTS**	< 1.5				
W/S Magnesium	mg/l	< 0.1	NONE	6.1				

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)
~Sample details provided by customer section and can affect the validity of results

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 24-04980	
Ashdown Site Investigations Ltd	
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	
~Project / Job Ref: P16596_2201	
~Order No: 11647	
Reporting Date: 14/05/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
713921	WS101	D	1.80	16.1	Light brown sandy clay with stones
713922	WS102	D	2.20	4.5	Light brown gravel with stones
713923	WS104A	D	2.60	5.3	Light grey gravel with stones
713924	WS107	D	3.40	17.9	White chalk
713925	WS109	D	0.85	7.1	Brown sandy clay with stones and concrete
713926	WS110	D	1.80	2.9	Brown sandy gravel with stones and concrete

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S
~Sample details provided by customer section and can affect the validity of results

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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-04980

Ashdown Site Investigations Ltd

~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea

~Project / Job Ref: P16596_2201

~Order No: 11647

Reporting Date: 14/05/2024

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 diphenylcarbazide 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 @ 450oC	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 (ali: 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 (ali: 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

~Sample details provided by customer section and can affect the validity of results

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List of HWOL Acronyms and Operators
DETS Report No: 24-04980
Ashdown Site Investigations Ltd
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea
~Project / Job Ref: P16596_2201
~Order No: 11647
Reporting Date: 14/05/2024

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
~	Sample details provided by customer section and can affect the validity of results

Det - Acronym

Alex Bewick
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Ditchling Common Business Park
Ditchling Common
West Sussex
BN6 8SG

Normec DETS Limited
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t: 01622 850410

DETS Report No: 24-04977

Site Reference:	Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea
Project / Job Ref:	P16596_2202
Order No:	11648
Sample Receipt Date:	08/05/2024
Sample Scheduled Date:	08/05/2024
Report Issue Number:	1
Reporting Date:	15/05/2024

Authorised by:

Steve Knight
Customer Support Manager

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

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

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Soil Analysis Certificate						
DETS Report No: 24-04977	**~Date Sampled**	03/05/24	03/05/24	02/05/24	02/05/24	02/05/24
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS101	WS101	WS102	WS102	WS103
~Project / Job Ref: P16596_2202	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11648	**~Depth (m)**	0.50	0.80	0.35	1.50	0.30
Reporting Date: 15/05/2024	**DETS Sample No**	713887	713888	713889	713890	713891

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected			(n)	Not Detected
pH	pH Units	N/a	MCERTS	9.6				8.8
Total Cyanide	mg/kg	< 1	NONE	< 1		< 1		
Total Sulphate as SO_4	mg/kg	< 200	MCERTS	924				1484
Total Sulphate as SO_4	%	< 0.02	MCERTS	0.09				0.15
Organic Matter (SOM)	%	< 0.1	MCERTS	2.3				2.8
Arsenic (As)	mg/kg	< 2	MCERTS	13				16
W/S Boron	mg/kg	< 1	NONE	2.1				1.8
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.4				0.3
Chromium (Cr)	mg/kg	< 2	MCERTS	13				18
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2				< 2
Copper (Cu)	mg/kg	< 4	MCERTS	20				20
Lead (Pb)	mg/kg	< 3	MCERTS	143				62
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1				< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	15				15
Selenium (Se)	mg/kg	< 2	MCERTS	< 2				< 2
Zinc (Zn)	mg/kg	< 3	MCERTS	263				167
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2		< 2		

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)

~Sample details provided by customer section and can affect the validity of results

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation

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Soil Analysis Certificate						
DETS Report No: 24-04977	**~Date Sampled**	02/05/24	02/05/24	03/05/24	03/05/24	02/05/24
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS103	WS104	WS104a	WS105	WS106
~Project / Job Ref: P16596_2202	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11648	**~Depth (m)**	1.00	0.20 - 0.30	1.80	0.35	0.35
Reporting Date: 15/05/2024	**DETS Sample No**	713892	713893	713894	713895	713896

Determinand	**Unit**	**RL**	**Accreditation**	(n)	(n)	(n)	(n)
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Not Detected		Not Detected	Not Detected
pH	pH Units	N/a	**MCERTS**		9.7		11.3	9.7
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1			< 1
Total Sulphate as SO_4	mg/kg	< 200	**MCERTS**		2131		3122	2179
Total Sulphate as SO_4	%	< 0.02	**MCERTS**		0.21		0.31	0.22
Organic Matter (SOM)	%	< 0.1	**MCERTS**		21.1		25.5	3.3
Arsenic (As)	mg/kg	< 2	**MCERTS**		10		20	8
W/S Boron	mg/kg	< 1	NONE		< 1		1	< 1
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**		< 0.2		0.2	0.3
Chromium (Cr)	mg/kg	< 2	**MCERTS**		11		15	7
Chromium (hexavalent)	mg/kg	< 2	NONE		< 2		< 2	< 2
Copper (Cu)	mg/kg	< 4	**MCERTS**		20		33	21
Lead (Pb)	mg/kg	< 3	**MCERTS**		23		26	255
Mercury (Hg)	mg/kg	< 1	**MCERTS**		< 1		< 1	< 1
Nickel (Ni)	mg/kg	< 3	**MCERTS**		19		32	7
Selenium (Se)	mg/kg	< 2	**MCERTS**		< 2		< 2	< 2
Zinc (Zn)	mg/kg	< 3	**MCERTS**		128		78	155
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2			< 2

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)

~Sample details provided by customer section and can affect the validity of results

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Soil Analysis Certificate						
DETS Report No: 24-04977	**~Date Sampled**	02/05/24	03/05/24	02/05/24	02/05/24	03/05/24
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS106	WS107	WS108	WS108	WS109
~Project / Job Ref: P16596_2202	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11648	**~Depth (m)**	1.10	0.80	0.50	1.70	0.50
Reporting Date: 15/05/2024	**DETS Sample No**	713897	713898	713899	713900	713901

Determinand	Unit	RL	Accreditation	(n)	(n)			
Asbestos Screen (S)	N/a	N/a	ISO17025			Not Detected		Not Detected
pH	pH Units	N/a	MCERTS			9.5		8.1
Total Cyanide	mg/kg	< 1	NONE		< 1	< 1		< 1
Total Sulphate as SO_4	mg/kg	< 200	MCERTS			1191		430
Total Sulphate as SO_4	%	< 0.02	MCERTS			0.12		0.04
Organic Matter (SOM)	%	< 0.1	MCERTS			5.3		5.2
Arsenic (As)	mg/kg	< 2	MCERTS			15		12
W/S Boron	mg/kg	< 1	NONE			< 1		< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS			0.5		0.2
Chromium (Cr)	mg/kg	< 2	MCERTS			6		8
Chromium (hexavalent)	mg/kg	< 2	NONE			< 2		< 2
Copper (Cu)	mg/kg	< 4	MCERTS			89		27
Lead (Pb)	mg/kg	< 3	MCERTS			634		376
Mercury (Hg)	mg/kg	< 1	MCERTS			11.8		1.7
Nickel (Ni)	mg/kg	< 3	MCERTS			11		9
Selenium (Se)	mg/kg	< 2	MCERTS			< 2		< 2
Zinc (Zn)	mg/kg	< 3	MCERTS			214		84
Total Phenols (monohydric)	mg/kg	< 2	NONE		< 2	< 2		< 2

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)

~Sample details provided by customer section and can affect the validity of results

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Soil Analysis Certificate						
DETS Report No: 24-04977	**~Date Sampled**	03/05/24	03/05/24	03/05/24	03/05/24	
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS109	WS110	WS110	TP201	
~Project / Job Ref: P16596_2202	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	
~Order No: 11648	**~Depth (m)**	2.10	0.60	1.20	1.00	
Reporting Date: 15/05/2024	**DETS Sample No**	713902	713903	713904	713905	

Determinand	**Unit**	**RL**	**Accreditation**		(n)	(n)	(n)	
Asbestos Screen (S)	N/a	N/a	**ISO17025**		Not Detected			
pH	pH Units	N/a	**MCERTS**		8.5			
Total Cyanide	mg/kg	< 1	NONE		< 1		< 1	
Total Sulphate as SO_4	mg/kg	< 200	**MCERTS**		2137			
Total Sulphate as SO_4	%	< 0.02	**MCERTS**		0.21			
Organic Matter (SOM)	%	< 0.1	**MCERTS**		2			
Arsenic (As)	mg/kg	< 2	**MCERTS**		9			
W/S Boron	mg/kg	< 1	NONE		< 1			
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**		0.3			
Chromium (Cr)	mg/kg	< 2	**MCERTS**		12			
Chromium (hexavalent)	mg/kg	< 2	NONE		< 2			
Copper (Cu)	mg/kg	< 4	**MCERTS**		19			
Lead (Pb)	mg/kg	< 3	**MCERTS**		906			
Mercury (Hg)	mg/kg	< 1	**MCERTS**		< 1			
Nickel (Ni)	mg/kg	< 3	**MCERTS**		9			
Selenium (Se)	mg/kg	< 2	**MCERTS**		< 2			
Zinc (Zn)	mg/kg	< 3	**MCERTS**		357			
Total Phenols (monohydric)	mg/kg	< 2	NONE		< 2		< 2	

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 - Speciated PAHs						
DETS Report No: 24-04977	**~Date Sampled**	03/05/24	02/05/24	02/05/24	03/05/24	02/05/24
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS101	WS103	WS104	WS105	WS106
~Project / Job Ref: P16596_2202	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11648	**~Depth (m)**	0.50	0.30	0.20 - 0.30	0.35	0.35
Reporting Date: 15/05/2024	**DETS Sample No**	713887	713891	713893	713895	713896

Determinand	Unit	RL	Accreditation		(n)	(n)		(n)
Naphthalene	mg/kg	< 0.1	MCERTS	0.12	< 0.1	< 0.1	< 0.1	0.15
Acenaphthylene	mg/kg	< 0.1	MCERTS	0.16	< 0.1	< 0.1	< 0.1	0.24
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	0.25	< 0.1	< 0.1	< 0.1	0.29
Phenanthrene	mg/kg	< 0.1	MCERTS	2.70	1.30	0.48	0.14	6.17
Anthracene	mg/kg	< 0.1	MCERTS	0.62	0.14	< 0.1	< 0.1	0.90
Fluoranthene	mg/kg	< 0.1	MCERTS	4.95	2.35	0.75	0.24	14.40
Pyrene	mg/kg	< 0.1	MCERTS	4.23	2.03	0.67	0.22	11.90
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	2.26	0.73	0.27	< 0.1	6.11
Chrysene	mg/kg	< 0.1	MCERTS	2.21	1.14	0.38	0.12	6.88
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	2.24	1.27	0.48	0.12	8.03
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.70	0.34	0.15	< 0.1	2.76
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	1.80	0.97	0.38	< 0.1	6.33
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.83	0.58	0.29	< 0.1	3.08
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	0.24	0.12	< 0.1	< 0.1	0.74
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.67	0.55	0.24	< 0.1	2.45
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	24	11.5	4.1	< 1.6	70.4

~Sample details provided by customer section and can affect the validity of results
(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 24-04977	**~Date Sampled**	02/05/24	03/05/24	03/05/24		
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied		
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS108	WS109	WS110		
~Project / Job Ref: P16596_2202	**~Additional Refs**	None Supplied	None Supplied	None Supplied		
~Order No: 11648	**~Depth (m)**	0.50	0.50	0.60		
Reporting Date: 15/05/2024	**DETS Sample No**	713899	713901	713903		

Determinand	Unit	RL	Accreditation			(n)		
Naphthalene	mg/kg	< 0.1	MCERTS	0.31	0.18	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	0.72	0.35	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	0.71	< 0.1	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	1.70	0.44	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	32	7.93	0.49		
Anthracene	mg/kg	< 0.1	MCERTS	4.68	1.53	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	57.60	21	1.34		
Pyrene	mg/kg	< 0.1	MCERTS	48.30	17.30	1.25		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	37	8.16	0.56		
Chrysene	mg/kg	< 0.1	MCERTS	29.80	9.11	0.79		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	9.04	6.99	0.85		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	6.86	3.88	0.26		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	27.90	8.01	0.67		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	6.98	3.16	0.38		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	1.86	0.89	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	5.55	2.42	0.34		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	271	91.4	6.9		

~Sample details provided by customer section and can affect the validity of results

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
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Soil Analysis Certificate - EPH Banded (Type F)						
DETS Report No: 24-04977	**~Date Sampled**	03/05/24	03/05/24	02/05/24	02/05/24	02/05/24
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS101	WS101	WS102	WS102	WS103
~Project / Job Ref: P16596_2202	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11648	**~Depth (m)**	0.50	0.80	0.35	1.50	0.30
Reporting Date: 15/05/2024	**DETS Sample No**	713887	713888	713889	713890	713891

Determinand	Unit	RL	Accreditation		(n)		(n)	(n)
EPH (>C8 - C10) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C10 - C12) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C12 - C16) : EH_1D_Total	mg/kg	< 1	MCERTS	4	< 1	< 1	< 1	2
EPH (>C16 - C21) : EH_1D_Total	mg/kg	< 1	MCERTS	35	< 1	< 1	< 1	13
EPH (>C21 - C40) : EH_1D_Total	mg/kg	< 6	MCERTS	94	7	< 6	< 6	26
EPH (C8 - C40) : EH_1D_Total	mg/kg	< 6	MCERTS	133	7	< 6	< 6	40

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Soil Analysis Certificate - EPH Banded (Type F)						
DETS Report No: 24-04977	**~Date Sampled**	02/05/24	03/05/24	03/05/24	02/05/24	02/05/24
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS104	WS104a	WS105	WS106	WS106
~Project / Job Ref: P16596_2202	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11648	**~Depth (m)**	0.20 - 0.30	1.80	0.35	0.35	1.10
Reporting Date: 15/05/2024	**DETS Sample No**	713893	713894	713895	713896	713897

Determinand	Unit	RL	Accreditation	(n)	(n)		(n)	(n)
EPH (>C8 - C10) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C10 - C12) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	1	< 1
EPH (>C12 - C16) : EH_1D_Total	mg/kg	< 1	MCERTS	1	< 1	< 1	19	< 1
EPH (>C16 - C21) : EH_1D_Total	mg/kg	< 1	MCERTS	8	< 1	3	87	7
EPH (>C21 - C40) : EH_1D_Total	mg/kg	< 6	MCERTS	92	< 6	25	174	16
EPH (C8 - C40) : EH_1D_Total	mg/kg	< 6	MCERTS	101	< 6	28	282	23

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Soil Analysis Certificate - EPH Banded (Type F)						
DETS Report No: 24-04977	**~Date Sampled**	03/05/24	02/05/24	02/05/24	03/05/24	03/05/24
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS107	WS108	WS108	WS109	WS109
~Project / Job Ref: P16596_2202	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11648	**~Depth (m)**	0.80	0.50	1.70	0.50	2.10
Reporting Date: 15/05/2024	**DETS Sample No**	713898	713899	713900	713901	713902

Determinand	Unit	RL	Accreditation	(n)				
EPH (>C8 - C10) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C10 - C12) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	1	< 1	< 1	< 1
EPH (>C12 - C16) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	21	< 1	6	< 1
EPH (>C16 - C21) : EH_1D_Total	mg/kg	< 1	MCERTS	1	239	< 1	97	2
EPH (>C21 - C40) : EH_1D_Total	mg/kg	< 6	MCERTS	< 6	453	< 6	251	6
EPH (C8 - C40) : EH_1D_Total	mg/kg	< 6	MCERTS	< 6	714	< 6	354	8

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Soil Analysis Certificate - EPH Banded (Type F)						
DETS Report No: 24-04977	**~Date Sampled**	03/05/24	03/05/24	03/05/24		
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied		
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS110	WS110	TP201		
~Project / Job Ref: P16596_2202	**~Additional Refs**	None Supplied	None Supplied	None Supplied		
~Order No: 11648	**~Depth (m)**	0.60	1.20	1.00		
Reporting Date: 15/05/2024	**DETS Sample No**	713903	713904	713905		

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)		
EPH (>C8 - C10) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	< 1	3		
EPH (>C10 - C12) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	< 1	20		
EPH (>C12 - C16) : EH_1D_Total	mg/kg	< 1	MCERTS	< 1	5	182		
EPH (>C16 - C21) : EH_1D_Total	mg/kg	< 1	MCERTS	5	41	537		
EPH (>C21 - C40) : EH_1D_Total	mg/kg	< 6	MCERTS	13	142	907		
EPH (C8 - C40) : EH_1D_Total	mg/kg	< 6	MCERTS	18	189	1648		

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Soil Analysis Certificate - Volatile Organic Compounds (VOC)						
DETS Report No: 24-04977	**~Date Sampled**	03/05/24	03/05/24	02/05/24	02/05/24	03/05/24
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS101	WS101	WS102	WS102	WS104a
~Project / Job Ref: P16596_2202	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11648	**~Depth (m)**	0.50	0.80	0.35	1.50	1.80
Reporting Date: 15/05/2024	**DETS Sample No**	713887	713888	713889	713890	713894

Determinand	Unit	RL	Accreditation		(n)		(n)	(n)
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chloromethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Chloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromomethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chloroform	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Trichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Dibromomethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
TAME	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Toluene	ug/kg	< 5	MCERTS	14	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	8
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethyl Benzene	ug/kg	< 2	MCERTS	3	< 2	< 2	< 2	< 2
m,p-Xylene	ug/kg	< 2	MCERTS	9	5	< 2	< 2	2
o-Xylene	ug/kg	< 2	MCERTS	3	< 2	< 2	< 2	< 2
Styrene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromoform	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

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Soil Analysis Certificate - Volatile Organic Compounds (VOC)						
DETS Report No: 24-04977	**~Date Sampled**	03/05/24	02/05/24	02/05/24	03/05/24	02/05/24
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS105	WS106	WS106	WS107	WS108
~Project / Job Ref: P16596_2202	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11648	**~Depth (m)**	0.35	0.35	1.10	0.80	0.50
Reporting Date: 15/05/2024	**DETS Sample No**	713895	713896	713897	713898	713899

Determinand	Unit	RL	Accreditation		(n)	(n)	(n)	
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chloromethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Chloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromomethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chloroform	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Benzene	ug/kg	< 2	MCERTS	8	< 2	< 2	< 2	23
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Trichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Dibromomethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
TAME	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Toluene	ug/kg	< 5	MCERTS	67	13	8	6	32
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethyl Benzene	ug/kg	< 2	MCERTS	9	2	3	< 2	5
m,p-Xylene	ug/kg	< 2	MCERTS	32	8	8	3	15
o-Xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Styrene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromoform	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	7	< 5	< 5	< 5	< 5
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

~Sample details provided by customer section and can affect the validity of results

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Soil Analysis Certificate - Volatile Organic Compounds (VOC)						
DETS Report No: 24-04977	**~Date Sampled**	02/05/24	03/05/24	03/05/24	03/05/24	03/05/24
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	**~TP / BH No**	WS108	WS109	WS110	WS110	TP201
~Project / Job Ref: P16596_2202	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: 11648	**~Depth (m)**	1.70	0.50	0.60	1.20	1.00
Reporting Date: 15/05/2024	**DETS Sample No**	713900	713901	713903	713904	713905

Determinand	Unit	RL	Accreditation			(n)	(n)	(n)
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chloromethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Chloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromomethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chloroform	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	10
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Trichloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Dibromomethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
TAME	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Toluene	ug/kg	< 5	MCERTS	6	< 5	13	< 5	35
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethyl Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	9
m,p-Xylene	ug/kg	< 2	MCERTS	6	< 2	6	< 2	80
o-Xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	33
Styrene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromoform	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Bromobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	104
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

~Sample details provided by customer section and can affect the validity of results

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 24-04977	
Ashdown Site Investigations Ltd	
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea	
~Project / Job Ref: P16596_2202	
~Order No: 11648	
Reporting Date: 15/05/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
713887	WS101	None Supplied	0.50	10.9	Brown sandy clay with stones
713888	WS101	None Supplied	0.80	4.2	Light brown sandy gravel with stones
713889	WS102	None Supplied	0.35	13.1	Brown sandy clay with stones and chalk
713890	WS102	None Supplied	1.50	4.2	Light brown gravel with stones
713891	WS103	None Supplied	0.30	8.4	Brown sandy gravel with stones
713892	WS103	None Supplied	1.00	3.6	Brown gravel with stones and concrete
713893	WS104	None Supplied	0.20 - 0.30	5.7	Black gravel with stones and concrete
713894	WS104a	None Supplied	1.80	3.8	Light brown gravel with stones
713895	WS105	None Supplied	0.35	7.2	Black loamy sand with stones and concrete
713896	WS106	None Supplied	0.35	7.9	Brown sandy gravel with stones and concrete
713897	WS106	None Supplied	1.10	8.4	Brown sandy gravel with stones
713898	WS107	None Supplied	0.80	7.1	Brown sandy gravel with stones and concrete
713899	WS108	None Supplied	0.50	8.7	Brown gravelly sand with stones
713900	WS108	None Supplied	1.70	5.1	Brown gravelly sand with stones
713901	WS109	None Supplied	0.50	9.4	Brown sandy clay with stones
713902	WS109	None Supplied	2.10	4	Brown gravelly sand with stones
713903	WS110	None Supplied	0.60	12.1	Brown sandy gravel with stones and concrete
713904	WS110	None Supplied	1.20	7.1	Brown sandy gravel with stones and chalk
713905	TP201	None Supplied	1.00	5.7	Brown sandy gravel with stones

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S
~Sample details provided by customer section and can affect the validity of results

Normec DETS Limited
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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
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4480

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 24-04977
Ashdown Site Investigations Ltd
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea
~Project / Job Ref: P16596_2202
~Order No: 11648
Reporting Date: 15/05/2024

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 diphenylcarbazide 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 @ 450oC	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 (ali: 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 (ali: 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

~Sample details provided by customer section and can affect the validity of results

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
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List of HWOL Acronyms and Operators
DETS Report No: 24-04977
Ashdown Site Investigations Ltd
~Site Reference: Former Howard Kent Storage, Brighton Road, Shoreham-by-Sea
~Project / Job Ref: P16596_2202
~Order No: 11648
Reporting Date: 15/05/2024

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
~	Sample details provided by customer section and can affect the validity of results

EPH Banded (C10 - C12) - EH_1D_Total
EPH Banded (C12 - C16) - EH_1D_Total
EPH Banded (C16 - C21) - EH_1D_Total
EPH Banded (C21 - C40) - EH_1D_Total
EPH Banded (C8 - C10) - EH_1D_Total
EPH Banded (C8 - C40) - EH_1D_Total

APPENDIX D

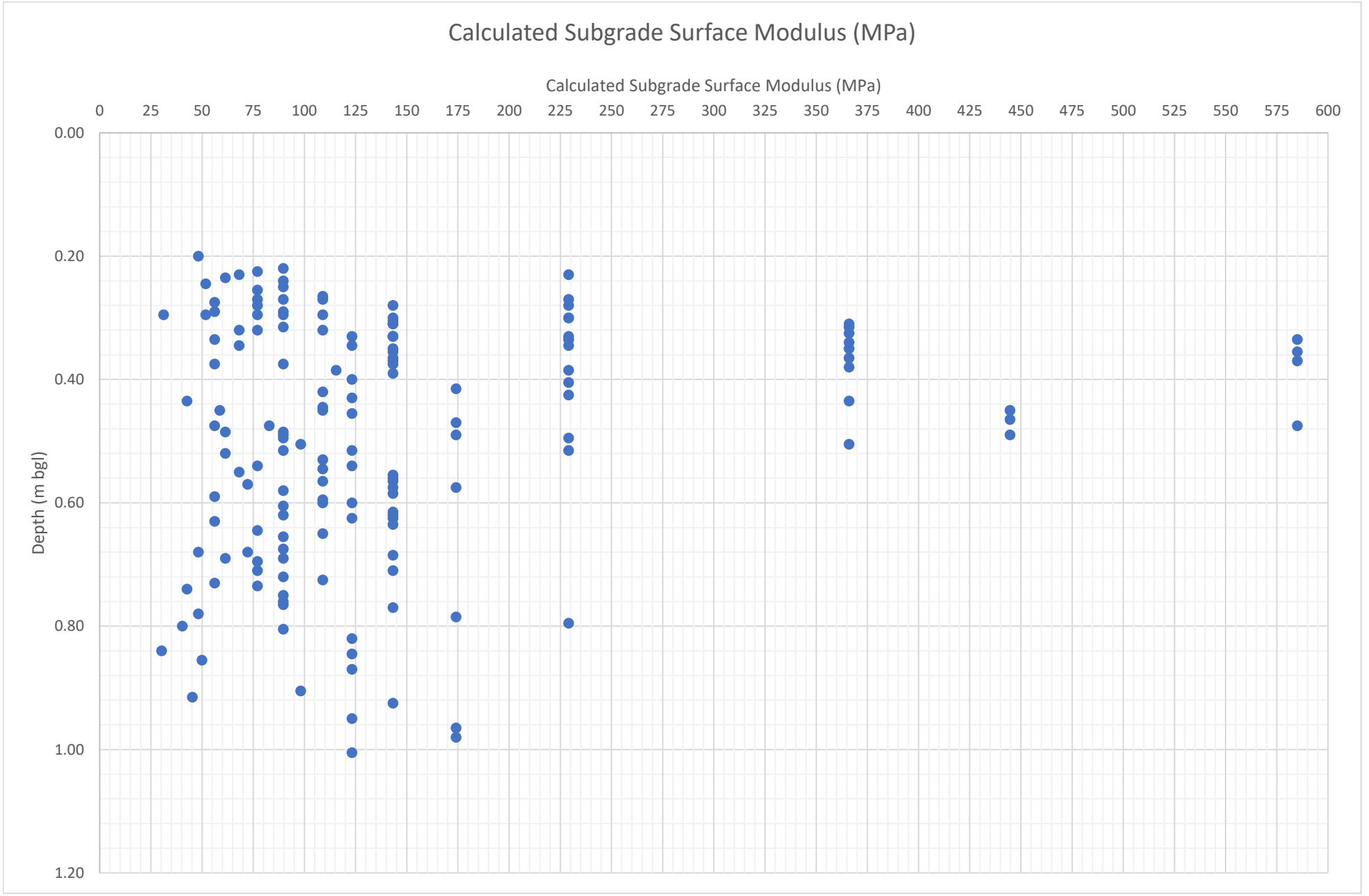
Summary of In Situ CBR Test Results
Graph of Subgrade Surface Modulus vs Depth
Graph of CBR vs Depth

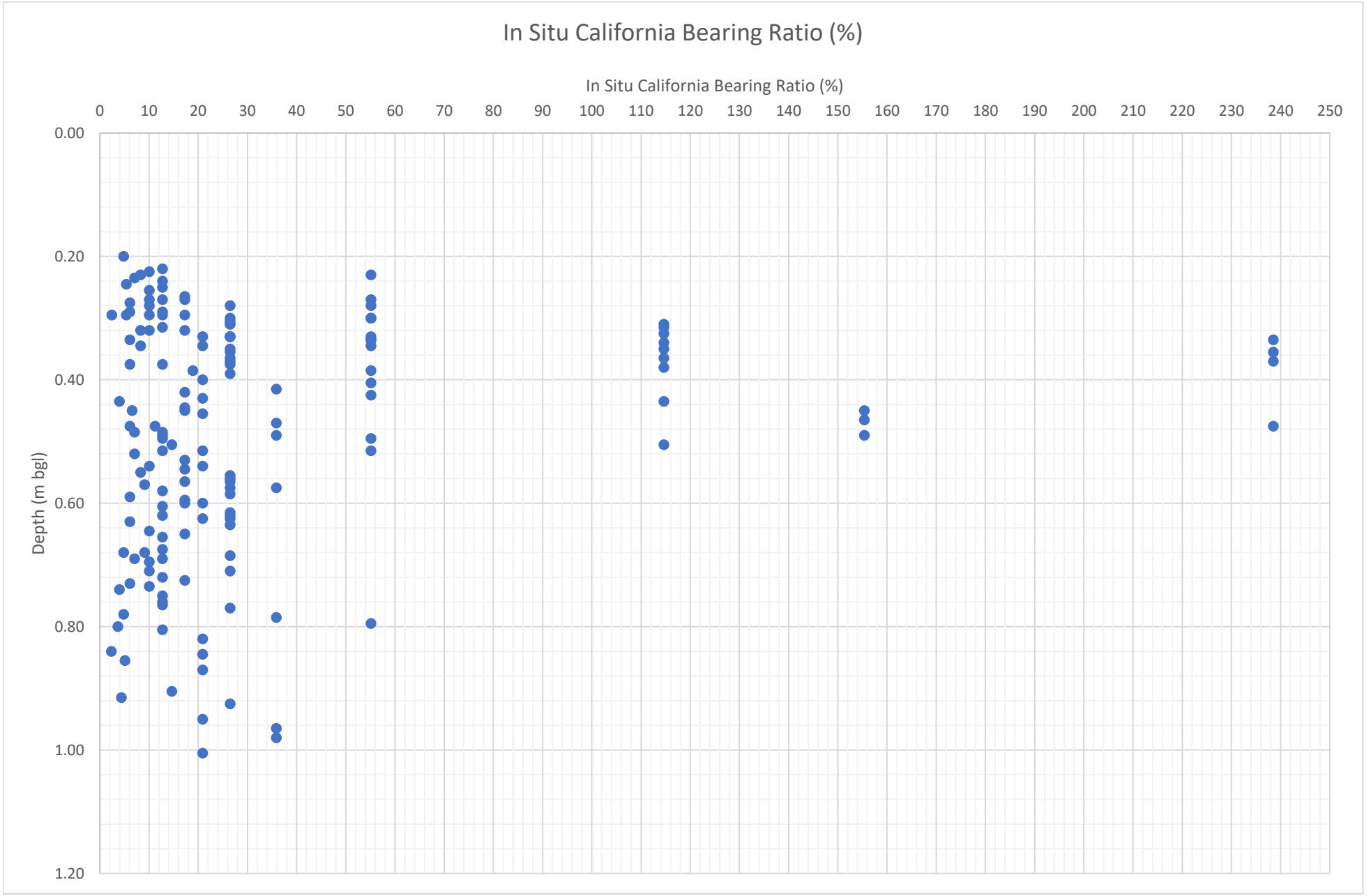
BH	Depth (m)	CBR (%)	Ks (Mpa)
WS102	0.22	13	90
WS102	0.24	13	90
WS102	0.27	17	109
WS102	0.28	55	229
WS102	0.33	21	123
WS102	0.39	19	116
WS102	0.48	11	83
WS102	0.49	36	174
WS102	0.52	21	123
WS102	0.57	9	72
WS102	0.60	17	109
WS102	0.63	21	123
WS102	0.68	9	72
WS102	0.72	13	90
WS102	0.76	13	90
WS102	0.86	5	50
WS103 - 1	0.23	8	68
WS103 - 1	0.26	10	77
WS103 - 1	0.28	10	77
WS103 - 1	0.30	17	109
WS103 - 1	0.30	55	229
WS103 - 1	0.31	26	143
WS103 - 1	0.32	115	366
WS103 - 1	0.33	115	366
WS103 - 1	0.34	239	585
WS103 - 2	0.23	10	77
WS103 - 2	0.23	55	229
WS103 - 2	0.25	13	90
WS103 - 2	0.27	17	109
WS103 - 2	0.27	55	229
WS103 - 2	0.28	26	143
WS103 - 2	0.30	55	229
WS103 - 2	0.31	115	366
WS103 - 2	0.33	55	229
WS103 - 2	0.34	115	366
WS104a	0.25	5	52
WS104a	0.27	10	77
WS104a	0.29	13	90
WS104a	0.30	26	143
WS104a	0.31	26	143
WS104a	0.33	26	143
WS104a	0.35	26	143
WS104a	0.37	26	143
WS104a	0.39	26	143
WS104a	0.42	17	109
WS104a	0.45	17	109
WS104a	0.49	13	90
WS104a	0.54	10	77
WS104a	0.58	13	90

BH	Depth (m)	CBR (%)	Ks (Mpa)
WS104a	0.62	13	90
WS104a	0.69	7	61
WS104a	0.73	6	56
WS104a	0.78	5	48
WS106	0.29	6	56
WS106	0.32	8	68
WS106	0.33	26	143
WS106	0.34	55	229
WS106	0.38	13	90
WS106	0.45	7	59
WS106	0.49	7	61
WS106	0.52	7	61
WS106	0.55	8	68
WS106	0.59	6	56
WS106	0.63	6	56
WS106	0.68	5	48
WS106	0.74	4	43
WS106	0.84	2	30
WS107	0.30	2	31
WS107	0.32	13	90
WS107	0.35	8	68
WS107	0.36	26	143
WS107	0.38	26	143
WS107	0.40	21	123
WS107	0.42	36	174
WS107	0.45	17	109
WS107	0.49	13	90
WS107	0.50	55	229
WS107	0.51	115	366
WS107	0.57	17	109
WS107	0.60	17	109
WS107	0.65	10	77
WS107	0.70	10	77
WS107	0.73	17	109
WS107	0.77	13	90
WS107	0.81	13	90
WS107	0.92	4	45
WS108	0.27	13	90
WS108	0.30	10	77
WS108	0.32	10	77
WS108	0.33	26	143
WS108	0.34	55	229
WS108	0.35	55	229
WS108	0.35	115	366
WS108	0.36	239	585
WS108	0.37	115	366
WS108	0.37	239	585
WS108	0.38	115	366
WS108	0.43	21	123

BH	Depth (m)	CBR (%)	Ks (Mpa)
WS108	0.46	21	123
WS108	0.47	36	174
WS108	0.51	15	98
WS108	0.52	55	229
WS108	0.54	21	123
WS108	0.56	26	143
WS108	0.58	36	174
WS108	0.60	21	123
WS108	0.62	26	143
WS108	0.65	17	109
WS108	0.69	13	90
WS108	0.71	26	143
WS108	0.75	13	90
WS108	0.77	26	143
WS108	0.79	36	174
WS108	0.80	55	229
WS108	0.82	21	123
WS108	0.85	21	123
WS108	0.87	21	123
WS108	0.91	15	98
WS108	0.93	26	143
WS108	0.95	21	123
WS108	0.97	36	174
WS108	0.98	36	174
WS108	1.01	21	123
WS109	0.20	5	48
WS109	0.24	7	61
WS109	0.28	6	56
WS109	0.30	13	90
WS109	0.34	6	56
WS109	0.38	6	56
WS109	0.44	4	43
WS109	0.48	6	56
WS109	0.50	13	90
WS109	0.52	13	90
WS109	0.53	17	109
WS109	0.55	17	109
WS109	0.56	26	143
WS109	0.57	26	143
WS109	0.58	26	143
WS109	0.59	26	143
WS109	0.61	13	90
WS109	0.62	26	143
WS109	0.63	26	143
WS109	0.64	26	143
WS109	0.66	13	90
WS109	0.68	13	90
WS109	0.69	26	143
WS109	0.71	10	77

BH	Depth (m)	CBR (%)	Ks (Mpa)
WS109	0.74	10	77
WS109	0.80	4	40
WS110	0.30	5	52
WS110	0.31	26	143
WS110	0.32	17	109
WS110	0.35	21	123
WS110	0.37	26	143
WS110	0.39	55	229
WS110	0.41	55	229
WS110	0.43	55	229
WS110	0.44	115	366
WS110	0.45	155	445
WS110	0.47	155	445
WS110	0.48	239	585
WS110	0.49	155	445


Calculated Subgrade Surface Modulus (MPa)
Calculated Subgrade Surface Modulus (MPa)
0
25
50
75
100
125
150
175
200
225
250
275
300
325
350
375
400
425
450
475
500
525
550
575
600
Depth (m bgl)
0.00
0.20
0.40
0.60
0.80
1.00
1.20


In Situ California Bearing Ratio (%)
In Situ California Bearing Ratio (%)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
Depth (m bgl)
0.00
0.20
0.40
0.60
0.80
1.00
1.20

APPENDIX E

Classification of Probability, Consequence and Risk

Probability of risk being realised	
Classification	Definition
High	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Moderate	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the shorter term.
Very Low	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

Consequence of risk being realised		
Classification	Category	Definition
Severe	Human Health	Short term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA.
	Controlled Waters	Short term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource.
	Property	Catastrophic damage to buildings/property.
	Ecological Systems	A short term risk to a particular ecosystem or organisation forming part of such ecosystem.
Moderate	Human Health	Chronic damage to Human Health.
	Controlled Waters	Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution).
	Ecological System	A significant change in a particular ecosystem or organism forming part of such ecosystem.
Minor	Controlled Waters	Pollution of non-sensitive water resources.
	Property	Significant damage to crops, buildings, structures and services.
	Ecological Systems	Damage to sensitive buildings/structures/services or the environment.
Very Minor	Human Health	Non-permanent health effects to human health (easily prevented by means such as personal protective clothing, etc).
	Property	Easily repairable effects of damage to buildings, structures and services.
	Project	Harm, although not necessarily significant harm, which may result in a financial loss or expenditure to resolve.

Risk classification definitions	
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the long term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low	It is possible that harm could arise to a designated receptor from an identified hazard, but there is a low likelihood of this hazard occurring and if realised, harm would at worst normally be mild.
Very Low	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

APPENDIX F

Preliminary Conceptual Model

Table C5 Qualitative Risk Assessment: Former Storage Yard, 5 Brighton Road, Shoreham-by-sea

Potential contamination sources related to industry	Pathway	Receptor	Hazard classification	Likelihood classification	Risk classification
Historical use of the site: Building Ship Yard, Sawing and Planing Mills.	Soil ingestion, dermal contact, inhalation uptake, leaching migration, groundwater migration.	Current users of the site or adjacent land.	Moderate	Moderate	Moderate
		Construction workers on the site.	Moderate	Moderate	Moderate
		Future users of the proposed site.	Moderate	Moderate	Moderate
	Leaching migration through the concrete /open ground.	Controlled water bodies in/on/under and close to the site (surface water).	Moderate	Moderate	Moderate
		Controlled water bodies close to the site (ground water).	Moderate	Moderate	Moderate
	Chemical attack.	Current physical structures on and adjacent to the site.	Moderate	Low	Low/Moderate
		Future physical structures on the site, including services.	Moderate	Low	Low/Moderate

Potential contamination sources related to industry	Pathway	Receptor	Hazard classification	Likelihood classification	Risk classification
Current use of the site: vacant plot and car park.	Soil ingestion, dermal contact, inhalation uptake, leaching migration, vegetation uptake, groundwater migration.	Current users of the site or adjacent land.	Minor	Low	Low
	Soil ingestion, dermal contact, inhalation uptake	Construction workers on the site.	Minor	Low	Low
	Leaching migration through the concrete /open ground.	Controlled water bodies in/on/under and close to the site (surface /ground water).	Minor	Low	Low
	Chemical attack from observed stains.	Current physical structures on and adjacent to the site, including services.	Minor	Low	Low
Future use of the site: as residential housing.	Soil ingestion, dermal contact, inhalation uptake, leaching migration, vegetation uptake, groundwater migration.	Future users of the site or adjacent land.	Very Minor	Very Low	Negligible
		Physical structures on and adjacent to the site, including services.	Very Minor	Very Low	Negligible

Potential contamination sources related to industry	Pathway	Receptor	Hazard classification	Likelihood classification	Risk classification
		Controlled water bodies in/on/under and close to the site (surface /ground water).	Very Minor	Low	Low
Historic and current offsite uses. Industrial and heavy industrial activities.	Soil ingestion, vegetable/root uptake, dermal contact, inhalation uptake, leaching migration, groundwater migration.	Current users of the site or adjacent land.	Moderate	Moderate	Moderate
		Construction workers on the site.	Moderate	Moderate	Moderate
		Future users of the proposed site.	Moderate	Moderate	Moderate
	Leaching migration into the controlled water bodies.	Controlled water bodies in/on/under and close to the site (surface water).	Moderate	Moderate	Moderate
		Controlled water bodies close to the site (ground water).	Moderate	Moderate	Moderate
	Chemical attack.	Current physical structures on and adjacent to the site.	Moderate	Moderate	Moderate
		Future physical structures on the site, including services.	Moderate	Moderate	Moderate

Potential contamination sources related to industry	Pathway	Receptor	Hazard classification	Likelihood classification	Risk classification
Asbestos (Asbestos is included as a risk whilst it is not known if asbestos is present in the materials on site. It is assumed that the risk will be assessed and mitigated against by best practice management during the site works).	Inhalation uptake.	Current user, construction worker, future users.	Severe	Very Low	Low

APPENDIX G

Quantitative Conceptual Model

Former Howard Kent Storage Yard, 5 Brighton Road, Shoreham-by-Sea, West Sussex				Quantitative Conceptual Model		P16596	
Source	**Receptor**	**Contaminants**	**Pathway**	**Complete Linkage Present?**	**Probability**	**Consequence**	**Risk**
• Made ground containing elevated concentrations of lead and PAH compounds	End Users	Lead and PAH Compounds	Dermal contact with soil and dust (indoor & outdoor)	Yes	P3: Moderate	C3: Moderate	Moderate
			Ingestion of soil and indoor dust	Yes	P3: Moderate	C3: Moderate	Moderate
			Consumption of home-grown produce and attached soil	No private gardens proposed			N/A
			Inhalation of soil dust (indoor and outdoor)	Yes	P3: Moderate	C3: Moderate	Moderate
			Inhalation of soil vapours	Identified contaminant(s) do not pose a risk via this pathway			N/A
			Inhalation of soil gases/ Risk of explosion	Identified contaminant(s) do not pose a risk via this pathway			N/A
	End Users (via Water Supply Pipework)		Contamination of incoming services	Identified contaminant(s) do not pose a risk via this pathway			N/A
	Groundwater		Migration to groundwater	No contaminants present at concentrations posing risk to groundwater			N/A
• Concentrations of petroleum hydrocarbons and BTEX above the threshold for PE and PVC water supply pipework	End Users		Dermal contact with soil and dust (indoor & outdoor)	Identified contaminant(s) do not pose a risk via this pathway			N/A
			Ingestion of soil and indoor dust	Identified contaminant(s) do not pose a risk via this pathway			N/A
			Consumption of home-grown produce and attached soil	No private gardens proposed			N/A
			Inhalation of soil dust (indoor and outdoor)	Identified contaminant(s) do not pose a risk via this pathway			N/A
			Inhalation of soil vapours	Identified contaminant(s) do not pose a risk via this pathway			N/A
			Inhalation of soil gases/ Risk of explosion	Identified contaminant(s) do not pose a risk via this pathway			N/A
	End Users (via Water Supply Pipework)	Petroleum Hydrocarbons and BTEX	Contamination of incoming services	Yes	P3: Moderate	C3: Moderate	Moderate
	Groundwater		Migration to groundwater	No contaminants present at concentrations posing risk to groundwater			N/A