



Flood Risk Assessment

Proposed Residential Development at

**37 Barfield Park
Lancing, West Sussex**

On behalf of

The Community Stadium Limited

February 2026

Document History and Status

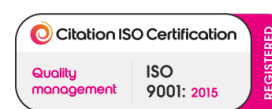
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1 Non Technical Summary

- 1.1 This Flood Risk Assessment has been undertaken in accordance with the National Planning Policy Framework on behalf of The Community Stadium Limited in support of a Full Planning Application for the construction of a medical facility at ground floor housing an MRI scanner and two 2 bedroom residential dwellings above with associated car parking spaces, hardstanding and landscaping on the site of the former bungalow at 37 Barfield Park, Lancing, West Sussex.
- 1.2 This Assessment is to be read in conjunction with all planning, architectural and other reports that accompany the Outline Planning Application for the proposed development.
- 1.3 The site is located in defended Tidal Flood Zone 3 and protected from tidal flooding by the Adur Tidal Walls scheme and the secondary defences being constructed as part of the New Monks Farm development to the east.
- 1.4 These defences will provide protection beyond the future year 2125 and safe refuge will be available at first floor level in the unlikely event of their failure.
- 1.5 The proposed development will incorporate a sustainable drainage system which will discharge surface water by infiltration to ground and provide storage for all storm return periods up to and including the 1:100 year rainfall event with an allowance for climate change.
- 1.6 Foul water will be discharge to the existing public foul sewer located beneath Barfield Park immediately southwest of the site. The existing foul drainage connection from the former dwelling will be reused if possible.
- 1.7 This report concludes that the site is defended against tidal flooding and is not at risk of flooding from fluvial sources, overland flows, or groundwater.
- 1.8 In terms of flood risk and the level of protection afforded to the site from two forms of tidal flood defence the proposed development is considered suitable at this location.

2 Planning Policy Context

2.1 National Planning Policy Framework

2.1.1 The current version of the National Planning Policy Framework is dated December 2024 and was amended on 7 February 2025 to correct cross references from footnotes 7 and 8 and amend the end of the first sentence of paragraph 155 in relation to development in the Green Belt to make its intent clear.

2.1.2 With regard to planning and flood risk the National Planning Policy Framework states that *‘when determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment⁶³. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:*

- a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
- b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
- c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
- d) any residual risk can be safely managed; and*
- e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.’*

2.1.3 Footnote 63 states that *‘a site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.*

2.1.4 With regard to minor developments the NPPF states that *‘applications for some minor development and changes of use⁶² should also not be subject to the sequential test, nor the exception test set out below, but should still meet the requirements for site-specific flood risk assessments set out in footnote 63.’*

2.1.5 Footnote 62 states that *'this includes householder development, small non-residential extensions (with a footprint of less than 250m²) and changes of use; except for changes of use to a caravan, camping or chalet site, or to a mobile home or park home site, where the sequential and exception tests should be applied as appropriate.'*

2.2 National Standards for Sustainable Drainage Systems (SuDS)

2.2.1 The National Standards for Sustainable Drainage Systems were published on 19 June 2025 and updated on 30 July 2025.

2.2.2 The standards are intended to be used in conjunction with the National Planning Policy Framework and remain non statutory guidance.

2.2.3 **Standard 1: runoff destinations** states:

'1.1 a 'SuDS approach' shall be adopted to address the management of surface water by the development and where it should be discharged. Runoff shall be treated as a resource and managed in a way that avoids negative impacts of the development on flood risk, the morphology and water quality of receiving waters and the associated ecology.'

1.2 Runoff from the development shall be discharged to the following final destinations, to the maximum extent practicable, in accordance with the below hierarchy:

priority 1: collected for non-potable use

priority 2: infiltrated to ground

priority 3: discharged to an above ground surface water body

priority 4: discharged to a surface water sewer, or another piped surface water drainage system

priority 5: discharged to a combined sewer

Note 1: priority 1 is the highest priority and priority 5 is the lowest.

Note 2: for the purposes of this standard, a combined sewer is a sewer intended to receive both foul sewage and surface runoff and does not include a sewer intended to receive only foul sewage, even if it has the capacity to accommodate additional flows or has an element of surface water in it already.

1.3 To utilise a lesser priority final destination, appropriate evidence shall be provided that demonstrates all higher priority final destinations have been

utilised to the maximum extent practicable. Higher cost alone shall not be a reason to utilise lower priority final destinations.

1.4 Where more than one final destination is utilised, each final destination's ability to accept runoff shall be maximised in order of priority.'

2.2.4 Standard 2: management of everyday rainfall (interception) states:

'2.1 Apply a 'SuDS approach' so that at least the first 5mm of rainfall for the majority of rainfall events does not result in runoff from the site to surface waters or piped drainage systems.

2.2 Evidence shall be provided that the approach to managing runoff from 'everyday' rainfall has been developed alongside and in support of the management of runoff quality (standard 4) and the delivery of amenity and biodiversity benefits (standards 5 and 6).'

2.2.5 Standard 3: management of extreme rainfall and flooding states:

'3.1 A 'SuDS approach' shall be adopted to address the management of development runoff during extreme rainfall, including allowances for climate change and urban creep to:

- protect people and property on the development from flooding of the surface water drainage system*
- mitigate any increased flood risk to people and property adjacent to or downstream of the development*
- protect the receiving water body from morphological damage or minimise the impact on sewer capacity*

3.2 When discharging to an infiltration feature, the system shall be appropriately sized to accommodate the design event based on ground conditions and contributing areas.

3.3 When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff (rate and volume) for the 1% annual exceedance probability (AEP) event shall be controlled to ensure the runoff from the development does not increase flood risk elsewhere.

3.4 When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff rate for the 50% AEP event shall be controlled to ensure development runoff from an event of this magnitude has no negative impact.

- 3.5 *Any flooding from the surface water drainage system for events up to the 1% AEP event shall be managed within the development.*
- 3.6 *Any flooding from off-site sources for the 1% AEP event should be managed on site or safely routed through the site, ensuring any downstream risks are not increased compared to the pre-development scenario.*
- 3.7 *The risks (both on and off the development) associated with flooding from the surface water drainage system for exceedance events greater than the 1% AEP event shall be appropriately managed.*

2.2.6 Standard 4: water quality states:

- '4.1 Apply a 'SuDS approach' that protects surface waters, groundwater and coastal waters by managing the quality of the surface water runoff to adequately address water quality risks from the development.*
- 4.2 The proposed SuDS management train(s) shall be based on a robust water quality risk assessment, appropriate to the pollution hazard and sensitivity of receiving waters, reflecting industry recognised guidance or other quantitative assessment as agreed with the approving body and permitting requirements.'*

2.2.7 Standard 5: amenity states:

- '5.1 A 'SuDS approach' shall be adopted that maximises benefits for amenity through the creation of multi-functional places and landscapes.'*

2.2.8 Standard 6: biodiversity states:

- '6.1 A 'SuDS approach' shall be adopted to ensure the surface water drainage system maximises biodiversity benefits throughout the development lifecycle.*
- 6.2 The surface water drainage system shall add biodiversity value by:*
- creating diverse, self-sustaining, resilient local ecosystems which contribute to net gains in biodiversity*
 - supporting and promoting natural local habitat and species, for example, through local nature recovery strategies (LNRS)*
 - contributing to the delivery of local biodiversity strategies*
 - contributing to habitat connectivity'*

2.2.9 Standard 7: design of drainage for construction, operation, maintenance, decommissioning and structural integrity states:

‘7.1 A ‘SuDS approach’ shall be adopted to ensure that surface water drainage systems are designed so they can be easily and safely constructed, operated and maintained taking account of the need to minimise negative impacts on natural resources and the environment.

7.2 The designer shall provide a management and maintenance plan [that supports the design objectives detailed in standards 1 to 6 and ensures the performance of the surface water drainage system with regards to runoff destinations, everyday and extreme rainfall, water quality, amenity and biodiversity is maintained throughout the lifetime of the development.

7.3 Surface water drainage design shall examine for the likelihood and consequences of potential failure scenarios that may occur during the operation phase and safely manage the associated risks.

7.4 The surface water drainage system shall be designed to ensure structural integrity of all components under anticipated loading conditions for the design life of the development so that it does not affect the structural integrity of any existing or proposed components within, or adjacent to, the development.’

2.1 Lead Local Flood Authority

2.1.1 As part of its role as the Lead Local Flood Authority West Sussex County Council has commissioned and produced the following documents:

- Preliminary Flood Risk Assessment - May 2011
- Policy for the Management of Surface Water - November 2018
- Local Flood Risk Management Strategy 2025-2030 - July 2025

2.1.2 The above documents have been reviewed in the preparation of this report.

2.2 Adur District and Worthing Councils

2.2.1 Adur District and Worthing Councils have commissioned and produced the following documents:

- Lancing Surface Water Management Plan - September 2015
- Level 2 Strategic Flood Risk Assessment - July 2020
- Level 1 Strategic Flood Risk Assessment - July 2024

2.2.2 The above documents have been reviewed in the preparation of this report.

2.3 Local Planning Policy

2.3.1 The Adur Local Plan was adopted by Adur District Council on 14 December 2017.

2.3.2 The following policies are of specific relevance to this Flood Risk Assessment:

2.3.3 **Policy 35:** Water Quality and Protection states that *‘development will be permitted provided that: It does not have an unacceptable impact on the quality and potential yield of local water resources and the water environment; also It protects and enhances groundwater, surface water features and controls aquatic pollution to help achieve the objectives of the Water Framework Directive; and It has an adequate means of water supply (even in a drought), sufficient foul and surface water drainage and adequate sewage treatment capacity.*

Development must be phased to take into account the timing of any water and/or wastewater infrastructure required which must be in place prior to the occupation of development. A preliminary risk assessment will be required for any development where there is potential risk of contamination of controlled waters.

New development within Groundwater Source Protection Zones will only be permitted provided that it has no adverse impact on the quality of the groundwater source or a risk to its ability to maintain a public water supply.’

2.3.4 **Policy 36:** Flood Risk and Sustainable Drainage states that *‘the Council will work with relevant bodies to ensure that flood risk in Adur is reduced.*

A site specific flood risk assessment must be submitted with planning applications for:

- *Proposals of 1 hectare or greater in Flood Zone 1*
- *All development or changes of use to a more vulnerable use in Flood Zones 2 and 3*
- *All development or changes of use to a more vulnerable use, regardless of flood zone or size, where flood risk from other sources (surface water, sewer, groundwater) is identified by the Strategic Flood Risk Assessment.*

The flood risk assessment will need to demonstrate that development:

- *is appropriately flood resilient and resistant, includes safe access and escape routes where required, and that any residual risk can be safely managed;*
- *will be safe for its lifetime taking account of the vulnerability of its users;*
- *will not increase flood risk (including sewer flooding, surface water and groundwater flood risk) elsewhere;*

- *will, where possible, reduce flood risk overall; and will give priority to the use of sustainable drainage systems.*

The flood risk assessment will also need to demonstrate that, where possible, higher vulnerability uses have been located on parts of the site at the lowest probability of flooding.

New development within Adur must include some form of Sustainable Drainage System (SuDS) or other appropriate design measures in order to reduce the risks of surface water flooding and to mitigate the risk of pollution to groundwater sources. SuDS should be considered before other forms of disposal.

Substantial storage through SuDS will be required to achieve a reduction in runoff to levels below that experienced prior to development. On relevant sites, storage of runoff during the high part of the tidal cycle should be addressed. SuDS must be designed sensitively and must seek to enhance landscapes, increase biodiversity gains, and provide quality spaces.

For all developments, applicants will be required to demonstrate that acceptable management arrangements are in place and funded to ensure the ongoing maintenance of SuDS into the future. Where it is not practical to provide SuDS on site, the development of strategic level SuDS may be considered appropriate. In these circumstances, contributions may be required through s106 undertakings/ CIL.'

3 Existing Site

3.1 Site Location

3.1.1 The development site is located at 37 Barfield Park, Lancing, West Sussex, BN15 9DF and centred on Ordnance Survey reference TQ 188 049.



Image 1: Site Location

3.1.2 The site is surrounded by residential properties and bounded on its north side by Mash Barn Lane. Access is from Barfield Park at the southwest corner of the site.

3.1.3 A copy of the site location plan is located in Appendix 1 at the rear of this report.

3.2 Site Description

3.2.1 The site is approximately 1,325m² in area and currently comprises the site of the demolished former Bungalow (37 Barfield Park).

3.2.2 Existing ground levels are highest at the northeast corner of the site at approximately 3.6m AOD. The site falls towards its southwest corner to a level of approximately 2.88m AOD.

3.2.3 A copy of the existing site layout plan is located in Appendix 2 at the rear of this report.

3.3 Existing Drainage

- 3.3.1 The historic method of surface water drainage from the former Bungalow was by infiltration to ground via a soakaway.
- 3.3.2 Foul water from the former dwelling was discharged by gravity to the existing drainage beneath Barfield Park.
- 3.3.3 The sewer records do not show this existing drainage but given that it serves more than one dwelling it is likely that this drainage is classified as a public sewer.
- 3.3.4 There is a foul rising main within the site adjacent to its northern and western boundaries which is currently in the process of being adopted by Southern Water and will be subject to a 6m wide easement.
- 3.3.5 A copy of the sewer records is located in Appendix 3 at the rear of this report.

3.4 Geology and Groundwater

- 3.4.1 Site investigation undertaken by Soils Limited in January 2022 confirms the presence of superficial Alluvium overlying the Newhaven Chalk Formation.
- 3.4.2 The superficial Alluvium consists generally of silty clays with organic content, occasional lenses of sand, gravel and commonly pockets of peat and is between 2.90m and 4.20m thick.
- 3.4.3 Permeability testing has been carried out on site and confirms permeability of 2.99×10^{-6} m/s at a depth of 550mm below ground level and permeability of 1.205×10^{-6} m/s at a depth of 1.25m below ground level.
- 3.4.4 Groundwater was recorded groundwater at 1.86m and 2.04m below ground level.
- 3.4.5 Further ground water monitoring was undertaken between March and October 2022.
- 3.4.6 The highest level of groundwater was recorded at 1.75m below ground level in borehole WS1 (1.55m AOD) and 2.03m below ground level in borehole WS2 (1.53m AOD).
- 3.4.7 Extracts from the Site Investigations are located in Appendix 4 at the rear of this report.

4 Flood Zone, Flood Defences and Flood History

4.1 Tidal Flood Zone

- 4.1.1 The Environment Agency's mapping confirms that the site is located in defended Tidal Flood Zone 3.
- 4.1.2 The tidal flood level data supplied by the Environment Agency is based on the data model from 2012. The predicted climate change models were updated in July 2021.
- 4.1.3 Reference has been made to the Environment Agency's latest predicted sea level rise data at <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> in order to establish the present day and future year tidal flood levels using the updated climate change predictions.
- 4.1.4 These are presented by the Environment Agency as a higher central allowance (70th percentile exceeded by 30% of the projections in the range) and an upper end allowance (95th percentile exceeded by 5% of the projections in the range).
- 4.1.5 The undefended 1:200 year tidal flood level supplied by the Environment Agency based on the data model from 2012 is 4.26 AOD.
- 4.1.6 The predicted undefended levels based on the updated climate change predictions are as follows:

- 2012 1:200 year flood level 4.26m AOD

Currently predicted Higher Central increase:

2000 to 2035 5.7mm per annum

2036 to 2065 8.7mm per annum

2066 to 2095 13.1mm per annum

2096 to 2125 13.1mm to per annum

- 2026 1:200 year flood level 4.340m AOD
- 2125 1:200 year flood level 5.393m AOD

4.2 Fluvial Flood Zone

- 4.2.1 The Environment Agency's mapping confirms that the site is located in Fluvial Flood Zone 1 and is not at risk of fluvial flooding from anything less extreme than a 1:1,000 year flood event.

4.3 Flood Defences

4.3.1 Section W6 and W7 of the Environment Agency Adur Tidal Walls Scheme are located on the west bank of the River Adur and offer a 1:300 year protection against Tidal Flooding for up to 50 years and 1:200 year protection for approximately 75 years.

4.4 Flood History

4.4.1 Environment Agency

4.4.1.1 The Environment Agency maps of historic flood incidents do not identify any historic incidents of flooding in the locality of the site.

4.4.2 West Sussex County Council

4.4.2.1 Neither the Preliminary Flood Risk Assessment dated May 2011 nor the Local Flood Risk Management Strategy 2025-2030 dated July 2025 identify any specific flood incidents affecting the site.

4.4.3 Adur District and Worthing Borough Councils

4.4.3.1 Neither the Lancing Surface Water Management Plan dated September 2015, the Level 2 Strategic Flood Risk Assessment dated July 2020 nor the Level 1 Strategic Flood Risk Assessment dated July 2024 identify any specific flood incidents affecting the site.

4.4.4 Copies of the available flood maps and correspondence are located in Appendix 5 at the rear of this report.

5 Flooding Potential

5.1 Tidal Flooding

5.1.1 As previously noted the present day undefended 2025 and future year 2125 predicted Higher Central tidal flood levels are as follows:

- 1:200 year present day 2026 flood level 4.340m AOD
- 1:200 future year 2125 flood level 5.393m AOD

5.1.2 The existing flood defences on the banks of the River Adur were designed to offer a 1:300 year protection for up to 50 years and 1:200 year protection for approximately 75 years.

5.1.3 The crest level of those defences is 5.1m AOD and the secondary defences on the New Monks Farm development to the east of the site have a crest height of 5.4m AOD.

5.1.4 The site is defended and the hazard associated with flood risk is very low.

5.2 Fluvial Flooding

5.2.1 The area of the proposed site is not at risk of fluvial flooding from anything less extreme than a 1:1,000 year flood event.

5.3 Surface Water Flooding

5.3.1 The Environment Agency's maps confirm that a small part of the site is potentially at risk of flooding from surface water ponding to a depth of up to 200mm.

5.3.2 The surface water flood map confirms that the area affected has between a 1:100 to 1:1,000 annual chance of flooding equivalent to Flood Zone 2.

5.3.3 Paragraph 27 of the Flood Risk and Coastal Change notes that *'where a site-specific flood risk assessment demonstrates clearly that the proposed layout, design, and mitigation measures would ensure that occupiers and users would remain safe from current and future surface water flood risk for the lifetime of the development (therefore addressing the risks identified e.g. by Environment Agency flood risk mapping), without increasing flood risk elsewhere, then the sequential test need not be applied.'*

5.3.4 The flood mapping contained within the various flood documents produced by West Sussex County Council and Adur District and Worthing Borough Councils do not identify any flood risk associated with overland flow routes.

5.4 Groundwater Flooding

- 5.4.1 Winter ground water monitoring was undertaken between March and October 2022. The highest level of groundwater was recorded at 1.75m below ground level.
- 5.4.2 There are no records of groundwater flooding affecting the site identified within West Sussex County Council's Preliminary Flood Risk Assessment dated May 2011, Local Flood Risk Management Strategy dated May 2014 or Lancing Surface Water Management Plan dated September 2015 nor in Adur District and Worthing Borough Council's Level 1 Strategic Flood Risk Assessment dated July 2024.

6 Development Proposals

6.1 Description

6.1.1 The development proposals are for the construction of a medical facility at ground floor housing an MRI scanner and two 2 bedroom residential dwellings above with associated car parking spaces, hardstanding and landscaping.

6.1.2 The areas of the various positively drained elements of the development are summarised as follows:

- Roof Area 314m²
- Parking Spaces 59m²
- Hardstanding 81m²

6.2 Flood Mitigation Proposals

6.2.1 The site is defended against Tidal Flooding.

6.2.2 The site will be positively drained and the low point shown on the Environment agency surface water flood map will not subject to surface water ponding upon project completion.

6.2.3 Flood resilient construction will be undertaken at ground floor level to a depth 300mm above the predicted 2125 1:200 flood level of 5.393m AOD to a level of 5.693m AOD.

6.2.4 The residential units will be located at first floor level at approximately 6.65m AOD approximately 1.25m above the predicted 2125 1:200 year flood level.

6.2.5 A copy of the proposed site layout plan showing the positively drained areas is located in Appendix 6 at the rear of this report.

6.3 Surface Water Drainage

6.3.1 CIRIA report C753 The SuDS Manual-v6 provides guidance on surface water drainage. The aim for surface water runoff is to match greenfield runoff rates and volumes where reasonably achievable.

6.3.2 The National Standards for Sustainable Drainage Systems set out the drainage hierarchy for surface water drainage and notes the following list of drainage options in order of preference:

- Priority 1: collected for non-potable use
- Priority 2: infiltrated to ground
- Priority 3: discharged to an above ground surface water body
- Priority 4: discharged to a surface water sewer, or another piped surface water drainage system
- Priority 5: discharged to a combined sewer

6.3.3 The proposed surface water drainage strategy is based on infiltration to ground with sufficient storage provided to accommodate a 1:100 year storm event including an additional 45% to account for the predicted effects of future climate change.

6.3.4 The proposed parking spaces and part of the proposed hard standing will be located above the existing rising main which is currently in the process of being adopted by Southern Water.

6.3.5 Southern Water will not accept infiltration features over their adopted infrastructure and these areas will therefore be of permeable construction to provide water quality, but lined to prevent infiltration with surface water collected from those areas discharge to soakaways located outside of the proposed easement.

6.3.6 Calculations have been undertaken for the design of two soakaways constructed as 95% voided crate style soakaways on to the west of the proposed new building and one to the east.

6.3.7 The western soakaway will accept surface water from the parking spaces at the northwest of the site and the hardstanding at the southwest of the site.

6.3.8 The eastern soakaway will accept surface water from the roof of the new building and that collected from the parking space at the northeast of the site.

6.3.9 An additional 10% of roof area has been accounted for in the calculations to account for potential future urban creep.

6.3.10 The eastern soakaway is proposed at one crate high with an invert level at 2.550m AOD so as to remain 1m above the highest recorded winter groundwater level.

6.3.11 The western soakaway is proposed at one crate high (400mm) with an invert level at 2.13m AOD so as have a minimum of 350mm cover. This places the base of the soakaway 530mm above the highest recorded winter groundwater level.

6.3.12 Permeability at the base of the crate soakaways has been taken as 1.205×10^{-6} m/s as recorded at a depth of 1.25m below ground level.

6.3.13 The calculations confirm that the soakaways can adequately accommodate a 1:100 year return period storm including an additional 45%.

6.3.14 A further calculation has been undertaken to confirm the time to half empty of the 1:30 year storm remains below 24 hours.

6.3.15 Further soakage testing is proposed to confirm the detailed design. This cannot be undertaken at the time of writing due to the presence of slow worms and will be undertaken once ecological conditions allow.

6.4 Foul Water Drainage

6.4.1 The existing foul drainage connection from the former dwelling will be reused and discharge foul water to the existing public foul sewer located beneath Barfield Park immediately southwest of the site.

6.4.2 Copies of the preliminary drainage strategy plan and calculations are located in Appendix 7 at the rear of this report.

6.5 Water Quality

6.5.1 The proposed development is for residential use. In accordance with CIRIA SuDS Manual 2015 (Report C753), the pollution hazard level for this type of development is between very low and low depending on the use / area of the site.

6.5.2 The surface water scheme will include mitigation to ensure that surface water is suitably treated and any pollution risk adequately managed prior to discharge.

6.5.3 Table 26.2 in Chapter 26 of CIRIA report C753 The SuDS Manual provides Pollution Hazard Indices for varying land types. Those of relevance to the development proposals are as follows:

Land Use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car park, low-traffic roads	Low	0.5	0.4	0.4

Table 1: Pollution Hazard Indices

6.5.4 The surface water drainage design incorporates permeable paving and will meet the target treatment level required as follows:

SuDS Type	Total suspended solids (TSS)	Metals	Hydrocarbons
Permeable pavement	0.7	0.6	0.7
Soakaway with 300mm minimum depth underlying soil drainage media	0.4	0.4	0.4

Table 2: Pollution Mitigation Indices

6.5.5 A drainage management and maintenance plan is located in Appendix 8 at the rear of this report.

7 Safe Development

7.1 Flood Zone Compatibility

7.1.1 The site is located in defended Tidal Flood Zone 3 and will remain defended for the foreseeable future.

7.1.2 With reference to the Government Guidance on Flood Risk and Coastal Change at <https://www.gov.uk/guidance/flood-risk-and-coastal-change>:

- Table 2: Flood Risk Vulnerability Classification

The medical and residential elements of the proposed development are both classified as More Vulnerable

- Table 3: Flood Risk Vulnerability and Flood Zone Compatibility

More Vulnerable development is appropriate in Flood Zones 1 and 2

7.1.3 The site is however defended against Tidal Flooding. Residential accommodation will be located at first floor level providing safe refuge in the event of a failure of the existing defences.

7.1.4 Flood warnings can be signed up for at www.fws.environment-agency.gov.uk or by phone using the Environment Agency's Floodline service on 0345 988 1188.

7.2 Risk to Others

7.2.1 The proposed surface water drainage system will be designed to current standards incorporating SuDS elements providing treatment, attenuation and storage which will minimise runoff leaving the site during times of heavy rain.

7.2.2 Allowance has been made for a 45% increase in rainfall intensities which accords with the latest figures published by the Environment Agency and in accordance with the requirements under the National Planning Policy Framework.

7.2.3 The proposed drainage system will incorporate sufficient treatment prior to final discharge thus mitigating the risk of pollution from the site.

7.2.4 The risk of surface water flooding to others due to the development proposals is reduced and the resultant risk is negligible.

7.2.5 Sewerage undertakers have an obligation to upgrade the existing networks if a connection to an equivalent or larger sized public sewer is technically achievable.

7.2.6 The residual risk of sewer flooding from this development for the foreseeable future is therefore negligible.

7.3 Surface Water Exceedance Route

- 7.3.1 In the event that part of the onsite surface water drainage network was to become blocked, suffer a failure due to lack of maintenance or be inundated with a storm beyond the 1:100 year +45% design storm surface water would migrate overland towards Barfield Park
- 7.3.2 Any water leaving the site would flow via the local highway network towards the coast.
- 7.3.3 There is no associated flood risk to the downstream catchment.
- 7.3.4 A surface water exceedance route plan is located in Appendix 9 at the rear of this report.

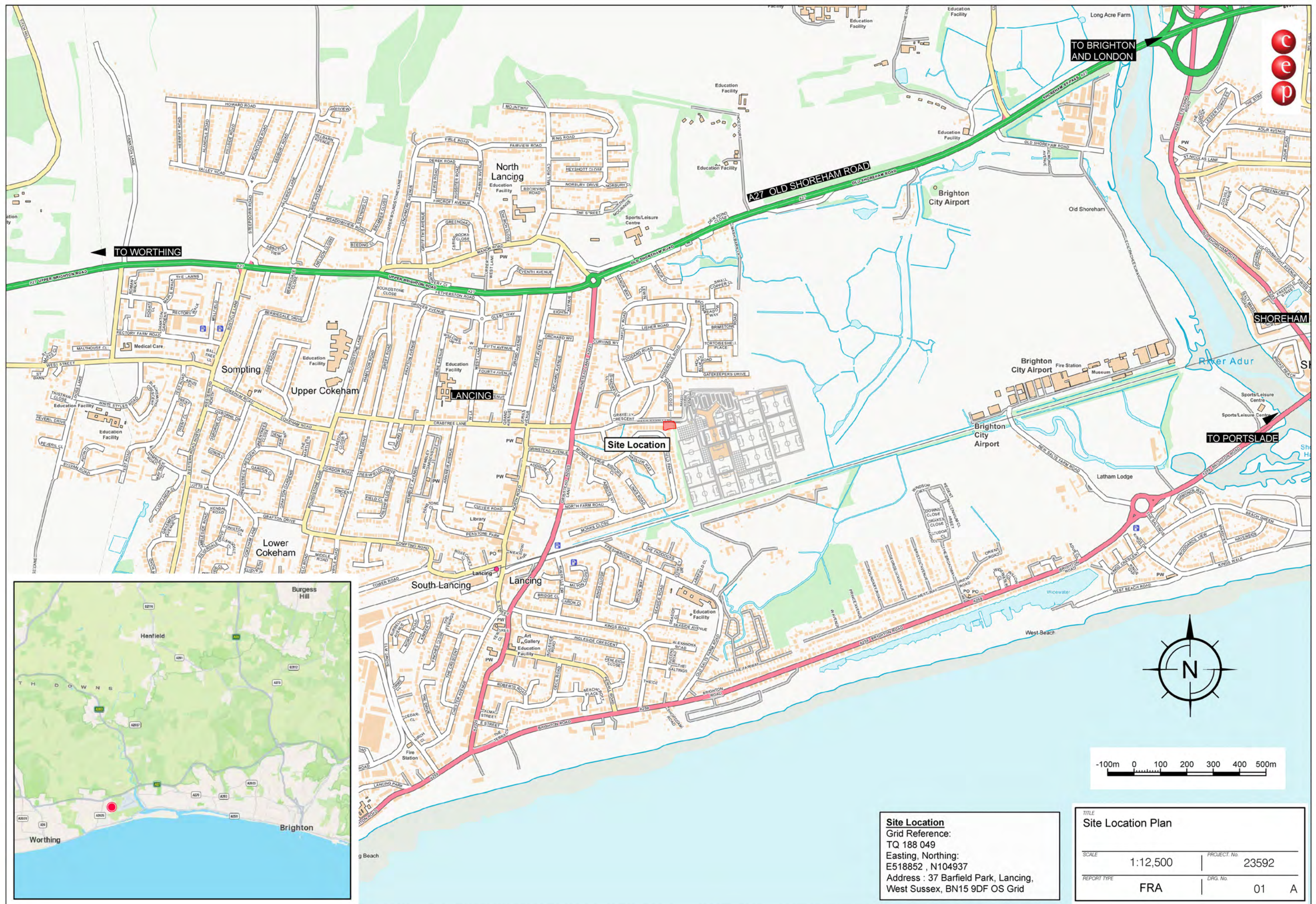
8 Conclusions

- 8.1 The site is located within defended Tidal Flood Zone 3 and will remain defended beyond the future year 2125.
- 8.2 Residential accommodation will be located at first floor level providing safe refuge in the event of a failure of the existing River Adur flood defences and the secondary defences on the New Monks Farm development to the east of the site.
- 8.3 The low point shown on the Environment agency surface water flood map will not subject to surface water ponding upon project completion.
- 8.4 The site is not at risk from any other source of flooding.
- 8.5 There are no historic records of flooding from any source affecting the site.
- 8.6 A suitable SuDS drainage system is proposed which accords with the requirements of national and local policy.
- 8.7 Calculations confirm that surface water runoff generated by the proposed development can be attenuated on site for all rainfall events up to the 1:100 year event including an allowance for climate change.
- 8.8 The half drain time for the 30 year storm event is below 24 hours.
- 8.9 Water quality improvement will be provided to mitigate against any risk to any receiving waterbody.
- 8.10 Foul water will be discharge to the existing public foul sewer located beneath Barfield Park immediately southwest of the site. The existing foul drainage connection from the former dwelling will be reused if possible.
- 8.11 The proposed development is safe, will not increase flood risk elsewhere and will provide improvement to immediately adjacent sites by managing surface water from all rainfall events up to the 100 year plus climate change event.

9 List of Appendices, Images and Tables

Appendix 1	Site Location Plan
Appendix 2	Existing Site Layout Plan
Appendix 3	Sewer Records
Appendix 4	Extracts of Site Investigations
Appendix 5	Flood Maps and Correspondence
Appendix 6	Proposed Site Layout and Drained Areas Plan
Appendix 7	Preliminary Drainage Strategy Plan and Calculations
Appendix 8	Drainage Management and Maintenance Plan
Appendix 9	Surface Water Exceedance Route Plan
Image 1	Site Location
Table 1	Pollution Hazard Indices
Table 2	Pollution Mitigation Indices

Appendix 1
Site Location Plan



Appendix 2
Existing Site Layout Plan

MASH BARN LANE

ADJOINING PROPERTY

Brighton and Hove Albion Training ground

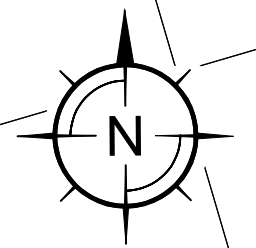
39

38

BARFIELD PARK

35

ADJOINING PROPERTY



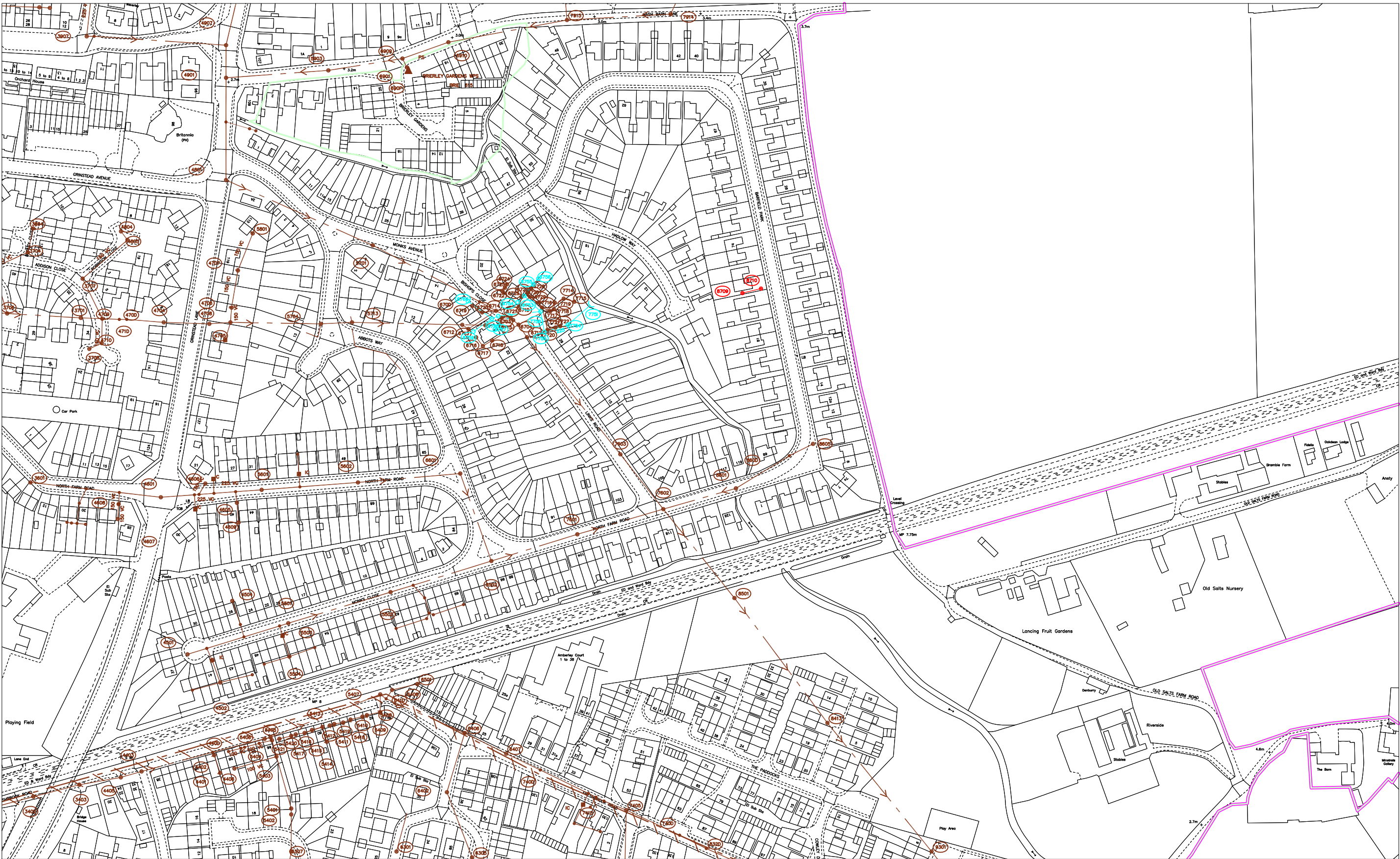
-2.5m 0 2.5m 5.0m 7.5m 10m

TITLE Existing Site Layout Plan			
SCALE 1:250		PROJECT No. 23592	
REPORT TYPE FRA		DRG. No. 02 A	

Appendix 3
Sewer Records

SEWER RECORDS PAGE 1 OF 2

104960



104383

518338

O.S. REF

TQ1804NE

Title: 142282_New Training Ground_1

Drawn by: roysaya

Scale: 1:2500

Date: 28/09/2012

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement
WARNING: Unknown (UNK) materials may Include Bonded Asbestos Cemen

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519278

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
0101X	3.23	3.23	225	VC	CIRC	543DX			100	VC	CIRC	8501X	2.27		450	VC	CIRC						
0102X	3.27	1.18	225	VC	CIRC	5501X	3.6	2.06	225	VC	CIRC	8601X	2.11	0.89	225	VC	CIRC						
0201X	2.7	2.13	300	VC	CIRC	5502X	3.29		225	VC	CIRC	9001X	5.88	2.61	300	VC	CIRC						
0202X	2.55	0.23	350	VC	CIRC	5503X			UNK	UNK	CIRC	9101X	6.12	1.88	300	VC	CIRC						
0203X	3.08	2.26	300	VC	CIRC	5504X			UNK	UNK	CIRC	9102X	6.83	4.67	150	VC	CIRC						
0204X	2.98	2.98	225	VC	CIRC	550DX			150	VC	CIRC	9103X	5.82	2.45	300	VC	CIRC						
0205X			225	VC	CIRC	551DX			UNK	UNK	CIRC	9301X			450	VC	CIRC						
0304X	2.02	2.02	150	VC	CIRC	552DX			UNK	UNK	CIRC	9311X	3.47	3.47	225	VC	CIRC						
0305X			525	VC	CIRC	553DX			150	VC	CIRC												
0306X			525	VC	CIRC	554DX			UNK	UNK	CIRC												
0307X			450	VC	CIRC	5601X	5.36	3.48	225	VC	CIRC												
030DX			UNK	UNK	CIRC	5602X	4.58	2.86	225	VC	CIRC												
030DY			350	UNK	CIRC	5604X			UNK	VC	CIRC												
3003X	2.13	0.29	200	VC	CIRC	561DX			225	VC	CIRC												
3004X			150	VC	CIRC	6104X	8.08	3.94	225	VC	CIRC												
301DX			150	VC	CIRC	6202X	7.39	5.81	150	VC	CIRC												
302DX			200	VC	CIRC	6204X	7.82	7.02	150	VC	CIRC												
3102X			100	VC	CIRC	6301X	5.91	4.21	150	VC	CIRC												
3103X			100	VC	CIRC	6302X	6.7	5.14	150	VC	CIRC												
3104X			100	VC	CIRC	6305X	5.53		150	VC	CIRC												
3105X			100	VC	CIRC	6402X	4.73	3.23	150	VC	CIRC												
4003X	1.99	0.5	200	VC	CIRC	6406X	3.8	1.94	225	VC	CIRC												
410AX			350	UNK	CIRC	6407X	3.88	1.85	225	VC	CIRC												
411AX			250	UNK	CIRC	6408X	3.53	2.28	150	VC	CIRC												
4406X			100	VC	CIRC	6501X	3.23	2.39	150	VC	CIRC												
442DX			100	VC	CIRC	6502X	3.4	1.21	225	VC	CIRC												
4504X			UNK	UNK	CIRC	650BX			UNK	UNK	CIRC												
451DX			UNK	UNK	CIRC	650DX			UNK	UNK	CIRC												
4605X			UNK	UNK	UNK	651BX			225	VC	CIRC												
4609X			150	VC	UNK	651DX			UNK	UNK	CIRC												
464DX			225	VC	CIRC	652DX			UNK	UNK	CIRC												
5111X	7.85	7.85	225	VC	CIRC	653DX			UNK	UNK	CIRC												
5111Y	7.85	7.85	225	VC	CIRC	654DX			UNK	UNK	CIRC												
5112X	8.02	4.24	225	VC	CIRC	6601X	3.79	2.17	225	VC	CIRC												
5113X	8.09	4.18	225	VC	CIRC	7101X	5.84	3.78	225	VC	CIRC												
5201X	7.7	4.59	225	VC	CIRC	7102X	6.36		225	VC	CIRC												
5301X	7.02	4.76	225	VC	CIRC	7103X	5.87		300	VC	CIRC												
5302X	6.35	5.51	150	VC	CIRC	7201X	6.79	5.42	150	VC	CIRC												
5303X	4.53	3.51	150	VC	CIRC	7301X	4.62	3.27	150	VC	CIRC												
5307X	4.33	3.29	150	VC	CIRC	730DX	1.3	1.3	225	VC	CIRC												
5311X	5.31	4.03	150	VC	CIRC	7405X	4.15	4.15	225	VC	CIRC												
5401X	4.7	3	150	VC	CIRC	7406X			UNK	UNK	UNK												
5402X	4.56	3.04	150	VC	CIRC	740DY	1.73		225	VC	CIRC												
5403X	4.67	3.97	150	VC	CIRC	741DX	1.63	1.63	225	VC	CIRC												
5404X	4.56	3.78	150	VC	CIRC	742DX			UNK	UNK	UNK												
5405X	4.46	2.65	225	VC	CIRC	743DX			UNK	UNK	UNK												
5406X	4.57	2.63	225	VC	CIRC	744DY			225	VC	CIRC												
5407X	3.79	2.13	225	VC	CIRC	74ADX			UNK	VC	CIRC												
5408X	3.9	3.15	150	VC	CIRC	74BDX			225	VC	CIRC												
5409X	4.2	3.43	150	VC	CIRC	7601X	2.67	0.9	225	VC	CIRC												
5410X	4.17	3.51	150	VC	CIRC	7602X	2.31	0.33	450	VC	CIRC												
5411X	4.28	3.76	150	VC	CIRC	8101X	6.29	4.17	225	VC	CIRC												
5412X	4.29	3.78	150	VC	CIRC	8102X	6.87	2.77	300	VC	CIRC												
5413X	4.19		150	UNK	UNK	8103X			150	VC	CIRC												
5414X	4.29	3.65	150	VC	CIRC	8104X			225	VC	CIRC												
5415X	4.45	3.67	150	VC	CIRC	8201X	6		150	VC	CIRC												
5415Y	4.45	3.68	150	VC	CIRC	8202X	5.6	3.73	150	VC	CIRC												
5416Y	4.45	3.72	150	VC	CIRC	8203X			UNK	UNK	CIRC												
5417X	4.52	3.83	150	VC	CIRC	8204X			UNK	UNK	CIRC												
5418X	4.2	3.52	150	VC	CIRC	8306X	4.82	2.47	150	VC	CIRC												
5419X	4.27	3.64	150	VC	CIRC	8307X	3.58	3.58	225	VC	CIRC												
541DX	2.11	2.11	225	VC	CIRC	830DX	0.7	0.7	225	VC	CIRC												
5420X	4.52	3.86	150	VC	CIRC	831DX	0.6	0.6	225	VC	CIRC												
5421X	4.56	3.9	150	VC	CIRC	832DX	1.2	1.2	225	VC	CIRC												
542DX			100	VC	CIRC	8413X	2.11		450	VC	CIRC												

LINE STYLES / COLOURS	MATERIALS	LEGEND - SEWERS
Brown Foul Foul Syphon Sewer Foul Vacuum Main Foul Rising Main	AK Alkathene BAC Bonded Asbestos Cement BRC Brick (Common) BRE Brick (Engineering) CC Concrete Box Culvert CI Cast Iron CO Concrete (In-Situ) CP Concrete (Pre-Cast) CSB Concrete Segments (bolted) CSU Concrete Segments (unbolted) DI Ductile Iron GRC Glass Reinforced Concrete GRP Glass Reinforced Plastic MAC Masonry in regular Courses MAR Masonry in random Courses PE Polyethylene PF Pitch Fibre PP Polypropylene PVC Polyvinyl Chloride RPM Reinforced Plastic Matrix SI Spun Iron ST Steel VC Vitrified Clay XXX Other ZZZ Unknown	Manhole (SW) Manhole (F&C) Lamp hole (SW) Lamp hole (F&C) Pumping Station (SW) Pumping Station (F&C) Side entry manhole (SW) Side entry manhole (F&C) Blind shaft (SW) Blind shaft (F&C) Ejector station (SW) Ejector station (F&C) Watertight door (SW) Watertight door (F&C) Flushing ch. Min-e (SW) Flushing ch. Min-e (F&C) Flushing ch. No-e (SW) Flushing ch. No-e (F&C) Demarcation Chamber Washout (SW) Washout (F&C) Rodding Eye (SW) Rodding Eye (F&C) Gauging point (SW) Gauging point (F&C) Intercept chamber (SW) Intercept chamber (F&C) Storm Tank (SW) Storm Tank (F&C) Vortex chamber (SW) Vortex chamber (F&C) Label ellipse Dummy/S24 manhole Outfall Penstock chamber Damboards Storm Overflow Backdrop manhole Other (s) Other Change in sewer (s) Change in sewer Reflex valve Flap valve Cascade Anode Valve Closed Valve Air Valve Hatch box (SW) Hatch box (F&C) Direction arrow Emptying valve Catchpit Soakaway Inlet Balancing Pond Wastewater treatment works Marine treatment works Outfall headworks Vent Vent column Tidal storage tank Blank end Head of Public Sewer Micro Pumping Station
Orange Building Over Agreement Area Dark Blue Treated Effluent Purple Sludge Sewer Catchment Section 104 Area Light Blue Surface Water Surface Water Rising Main Yellow Private Green Access Shaft Decommissioned		

Drawn by:	roysaya	
Title:	142282_New Training Ground_2	
Date:	28/09/2012	

Appendix 4

Extracts of Site Investigations

The Civil Engineering Practice

Via email only: stuart@civil.co.uk
13th January 2022
Our Ref.: 19786/LR

Dear Tom,

Re: 37 Barfield Park, Lancing, BN15 9DF

We are writing regarding the intrusive investigation undertaken at the above-named site.

Brief

The Soils Limited quotation (reference Q25328 dated 11th October 2021) set the scope of the investigation. The investigation was to comprise, 2No. machine excavated trial pits, 1No. at 0.50m below ground level (bgl) and 1No. at 1.25m bgl, with one day of infiltration testing in accordance with the principles of BRE DG365:2016. This was to be undertaken to inform the design of a surface water drainage system and disposal of treated effluent.

General

The site was located at 37 Barfield Park, Lancing, BN15 9DF, a site location plan has been included as Figure 1. The site was located upon the superficial Alluvium overlying the Newhaven Chalk Formation. The superficial Alluvium consists generally of silty clays with organic content, occasional lenses of sand, gravel and commonly pockets of peat. The Newhaven Chalk Formation consists of a soft, white and friable coccolithic limestone with large proportions of calcareous shell fragments and soft chalk with marl seams and flint nodules.

Previous intrusive investigation indicated Alluvium to be present between 2.90 – 4.20m bgl. It was therefore considered that the underlying chalk was too deep for a conventional soakaway infiltration test, particularly with groundwater encountered between 2.03 – 2.23m bgl post siteworks.

Site Works

Site works were undertaken on the 6th January 2022 and comprised the machine excavation of two trial pits, identified as TPSA1 to a depth of 0.50m bgl and TPSA2 to a depth of 1.25m bgl. All trial hole locations were selected by the client. Prior to excavation, all locations were scanned for services using a CAT and signal generator (Genny).

Following the construction of trial pits, infiltration testing in accordance with the principles of BRE DG 365:2016 were carried out.

A trial hole location plan is included as Figure 2.

Ground Conditions

The ground conditions encountered during the site investigation have been summarised in Table 1.

Made Ground (MG) Alluvium (ALV)

Table 1 – Summary of Ground Conditions

Strata	Depth Encountered (m bgl)		Typical Description
	Top	Base	
MG	0.00	0.56	Turf overlying brown slightly clayey, gravelly SILT. Gravel is fine to coarse sub-angular flint and brick with brick cobbles. Frequent rootlets.
ALV	0.56	>1.25 ^{1,2}	Brown slightly silty, slightly gravelly CLAY. Gravel is fine to coarse sub-angular flint. Rootlets noted.

Notes: ¹ encountered to the final depth of trial hole ² base of strata not encountered

Roots

Roots were encountered within both trial holes to their final depths 0.60m (TPSA1) and 1.25m bgl (TPSA2).

Roots may be found to greater depth at other locations on the site particularly close to trees and/or trees that have been removed both within the site and its close environs.

Groundwater

No groundwater was encountered during excavation of the trial pits TPSA1 and TPSA2, but groundwater monitoring was undertaken on the day of site work previously installed groundwater monitoring wells. WS1 and WS2 recorded groundwater at 1.86m bgl and 2.04m bgl, respectively.

Infiltration Testing

Infiltration testing was performed within both trial pits (TPSA1 and TPSA2) in order to provide guidance on the suitability of the ground for the adoption of a surface water drainage system. The tests were undertaken within the cohesive soils of the superficial Alluvium at a depth of 0.50m and 1.25m bgl in TPSA1 and TPSA2, respectively.

The test comprised piping fresh water via a water tanker into the open trial hole, the drop in water level over time was then recorded to give an indication of soakage potential. BRE DG365:2016 states that for an accurate infiltration rate to be obtained a soakage pit needs to be filled three times in quick succession. Each test is completed once 75% of the water present has drained away, in order to determine whether or not the underlying ground conditions may be suitable for surface water drainage.

Due to the cohesive nature of the superficial Alluvium the infiltration was relatively slow

within both TPSA1 and TPSA2. Reduction in the head of water was 44% over 4 hours (TPSA1), 34% over 5.5 hours (TPSA2), therefore only a single test was carried out within each of the trial holes.

Table 2 – Infiltration Test Results

Trial Hole (Test No.)	Test Stratum	Test Depth (m bgl)	Infiltration Rate (m/sec)	Notes
TPSA1 (I)	ALV	0.55	2.992E-06	Data extrapolated after 236min.
TPSA2 (I)	ALV	1.25	1.205E-06	Data extrapolated after 326min,

Notes: ALV-Alluvium,

Due to the relatively slow infiltration extrapolated rates of between 1.205×10^{-6} and 2.992×10^{-6} m/sec were calculated for the cohesive soils of the Alluvium.

Full results are included within Appendix A.

Conclusion

Given the very slow infiltration observed during the tests it is considered likely that alternative methods of surface water disposal (e.g. existing storm water drainage system, rainwater harvesting or a combination of both) should be considered.

The following attachments make up the remainder of this letter report.

Figure 1. Site Location Plan

Figure 2. Trial Hole Location Plan

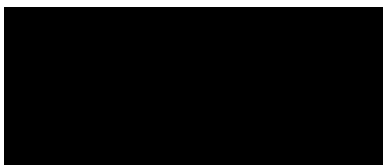
Appendix A. Field Data

Should you have any further questions please do not hesitate to contact the undersigned.

Yours sincerely,

T Rees-Blanchard BEng (Hons), MIMMM, FGS.

(trb@soilslimited.co.uk)



For and on behalf of Soils Limited.

Enc.

Figure I – Site location Plan**Figure number**

I

Title

Site Location Plan

Project

37 Barfield Park, Lancing, BN15 9DF

Date

January 2022

Client

The Civil Engineering Practice

Reference

19786

Figure 2. Trial Hole Location Plan**Figure number**

2

Title

Trial Hole Location Plan

Project

37 Barfield Park, Lancing, BN15 9DF

Date

January 2022

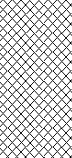
Client

The Civil Engineering Practice

Reference

19786

		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. TPSA1 Sheet 1 of 1	
Project Name: 37 Barfield Park				Project No.: 19786		Method:		Hole Type TP
Location: Lancing, West Sussex, BN15 9DF						Plant:		
Client: The Civil Engineering Practice				Trial Pit Length: 1.70m		Trial Pit Width: 0.60m		Scale 1:25
Dates: 06/01/2022				Level:		Co-ords:		Logged By JC
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	D		0.26			Turf overlying brown, slightly clayey, gravelly SILT. Gravel is fine to coarse sub-angular flint, frequent cobble brick. Occasional metallic fragments. Frequent rootlets. MADE GROUND	
	0.50	D		0.50			Brown slightly silty, slightly gravelly CLAY. Gravel is fine to coarse sub-angular flint. Rare rootlets.	
							End of Pit at 0.500m	
1 2 3 4 5								
General Remarks: Rootlets observed to 0.50m bgl.								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: No groundwater encountered.								

		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. TPSA2 Sheet 1 of 1	
Project Name: 37 Barfield Park				Project No.: 19786		Method:		Hole Type TP
Location: Lancing, West Sussex, BN15 9DF						Plant:		
Client: The Civil Engineering Practice				Trial Pit Length: 1.70m		Trial Pit Width: 0.60m		Scale 1:25
Dates: 06/01/2022				Level:		Co-ords:		Logged By JC
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	D					Turf overlying brown, slightly clayey, gravelly SILT. Gravel is fine to coarse sub-angular flint, frequent cobble brick. Occasional metallic fragments. Frequent rootlets. MADE GROUND	
	0.50	D		0.56			Brown slightly silty, slightly gravelly CLAY. Gravel is fine to coarse sub-angular flint. Rare rootlets.	
	1.00	D						
	1.25	D		1.25			End of Pit at 1.250m	
							1	
							2	
							3	
							4	
							5	
General Remarks: Rootlets observed to 1.25m bgl.								Sample Type D: Disturbed B: Bulk J: Jar W: Water
Groundwater Remarks: No groundwater encountered.								

Soakaway Calculations

Soakaway Test No.	TPSA1 Test 1
Contract:	37 Barfield Park
Contract No.	19786

Field Test

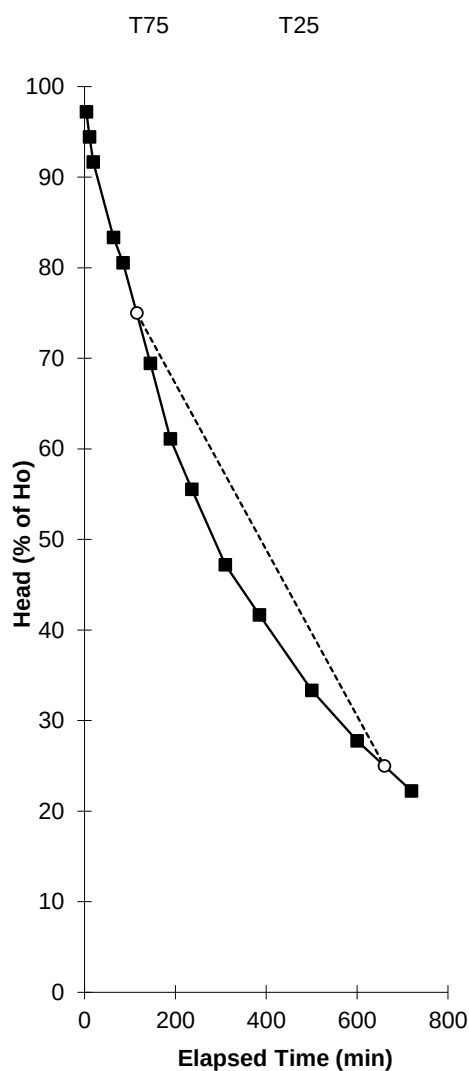
Trial Pit Log (include details of groundwater):
See trial Pit record

Depth of Pit	0.55 m
Width of Pit	0.60 m
Length of Pit	1.50 m
Depth of Pit Soaked	0.36 m
ap50	1.656 m2
Vp75-25	0.162 m3
t75-25	545.0 min
water used	0.3240 m3
f	2.992E-06 m/sec.

Field Data

[illegible]

T75	115.000	75
T25	660.000	25
T75-25	545.000	Derived from Best Fit



Comments

Extrapolated after 236min.

SOILS LIMITED

**Newton House, Cross Road, Tadworth
Surrey, KT20 5SR**

Telephone: 01737 814 221
Facsimile: 01737 812 557

Soakaway Calculations

Soakaway Test No.	TPSA2 Test 1
Contract:	37 Barfield Park
Contract No.	19786

Field Test

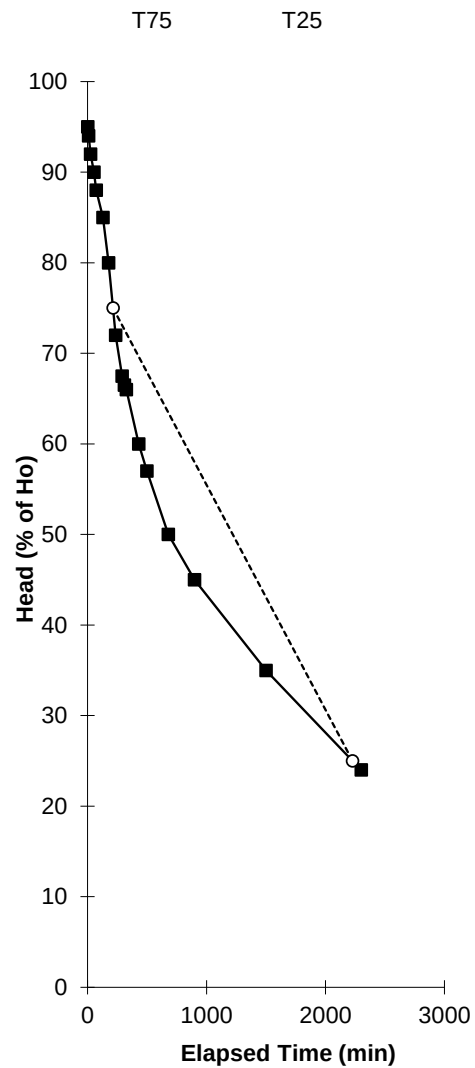
Trial Pit Log (include details of groundwater):
See trial Pit record

Depth of Pit	1.25 m
Width of Pit	0.60 m
Length of Pit	1.30 m
Depth of Pit Soaked	1.00 m
ap50	2.68 m ²
Vp75-25	0.39 m ³
t75-25	2013.0 min
water used	0.7800 m ³
f	1.205E-06 m/sec.

Field Data

Depth to	Elapsed	Head of	Head of
Water	Time	Water	Water
(m)	(min)	(% of Ho)	(m)
0.25	0	100	1
0.30	3	95	0.95
0.31	8	94	0.94
0.33	25	92	0.92
0.35	53	90	0.90
0.37	74	88	0.88
0.40	129	85	0.85
0.45	178	80	0.80
0.53	236	72	0.72
0.58	291	68	0.68
0.59	309	67	0.67
0.59	326	66	0.66
0.65	430	60	0.60
0.68	500	57	0.57
0.75	680	50	0.50
0.80	900	45	0.45
0.90	1500	35	0.35
1.01	2300	24	0.24

T75	214.250	75
T25	2227.273	25
T75-25	2013.023	Derived from Best Fit



Comments

Extrapolated after 326min.

SOILS LIMITED

Newton House, Cross Road, Tadworth
Surrey, KT20 5SR

Telephone: 01737 814 221
Facsimile: 01737 812 557

The Civil Engineering Practice

Via email only: stuart@civil.co.uk

4th May 2022

Our Ref.: 19786/GWM LR

Dear Stuart,

Re: 37 Barfield Park, Lancing, West Sussex, BN15 9DF

We are writing regarding the site works undertaken at the above-named site.

Brief

The Soils Limited quotation (reference Q25328 dated 11th October 2021) set the scope of the investigation. The investigation was to comprise, 2No. up to 5.00m deep windowless sampler boreholes, 1No. maximum depth achievable windowless sampler borehole, 2No. groundwater monitoring well standpipes with 6No. winter groundwater monitoring monthly post-site work visits in October to March 2022 at locations and depths determined by the client.

General

The site was located at 37 Barfield Park, Lancing, West Sussex, BN15 9DF, a site location plan has been included as Figure 1. A review of the BGS Geology 1:50,000 maps showed that the site was located upon the Newhaven Chalk Formation bedrock with overlying superficial Alluvium Deposits.

The Newhaven Chalk Formation is a soft white friable microporous limestone composed of coccolith biomicrites with a varying proportion of larger shell fragments. At various levels clay sized material occurs as marl seams and partings. Close to the surface the upper few metres are invariably discoloured brown, due to leaching from the overlying strata. The interface with any overlying stratum is invariably extremely irregular as a result of localised weathering and general solution. The overlying superficial Alluvium is the most recent river or estuarine deposit and generally comprises silty clays usually with an appreciable organic content. Lenses of sand and gravel are also commonly found, as are pockets of peat.

Site Works

Site works were undertaken on the 10th November 2021, which comprised 2No. deep windowless sampler boreholes, identified as WS1 and WS2 to depths of 4.70 - 5.00m below ground level (bgl) with 1No. maximum depth achievable windowless sampler borehole, identified as WS3 to a depth of 9.00m bgl, 2No. groundwater monitoring well standpipes to 4.70 - 5.00m bgl.

Prior to excavation, all trial hole locations were scanned for services using a Cat and signal generator (Genny).

A trial hole location plan is included as Figure 2.

Ground Conditions

The ground conditions encountered during the site investigation have been summarised in Table 1.

Topsoil/Made Ground (TS/MG)
Alluvium (ALV)
Newhaven Chalk Formation (NCK)

Table 1 – Summary of Ground Conditions

Strata	Depth Encountered (m bgl)		Typical Description
	Top	Base	
TS/MG	0.00	0.25-0.45	TS: Dark grey and dark brown slightly clayey slightly silty sandy GRAVEL. Gravel is angular to sub-rounded fine to coarse flint and brick (<5%). Frequent rootlets. MG: Greyish brown GRAVEL. Gravel is sub-angular to rounded fine to coarse tarmac and brick becoming firm dark brown gravelly CLAY. Gravel is angular fine to coarse flint and brick.
ALV	0.25-0.45	3.00-4.20	Firm yellowish brown and light brown sandy very gravelly CLAY. Gravel is angular to rounded fine to coarse flint and chalk.
NCK	3.00-4.20	5.00-9.00 ^{1,2}	Structureless CHALK. Recovered as soft to stiff white mottled cream gravelly CLAY. Gravel is sub-angular to rounded medium to coarse strong chalk with frequent black speckling. Grade Dm (<65% clasts).

Notes: ¹ encountered to the final depth of trial hole ² base of strata not encountered

The windowless sampler borehole logs are included in Appendix A.

Groundwater

Groundwater was encountered within all three of the windowless sampler boreholes (WS1-WS3) during drilling. Groundwater was struck between 3.00 – 3.70m bgl.

Wells were installed in two of the windowless sampler boreholes (WS1 and WS2) to allow for future groundwater monitoring on six occasions. Post site work monitoring visits were undertaken monthly from November to April 2022, the groundwater depths were recorded from the monitoring standpipes installed in each windowless sampler borehole (WS1 and WS2).

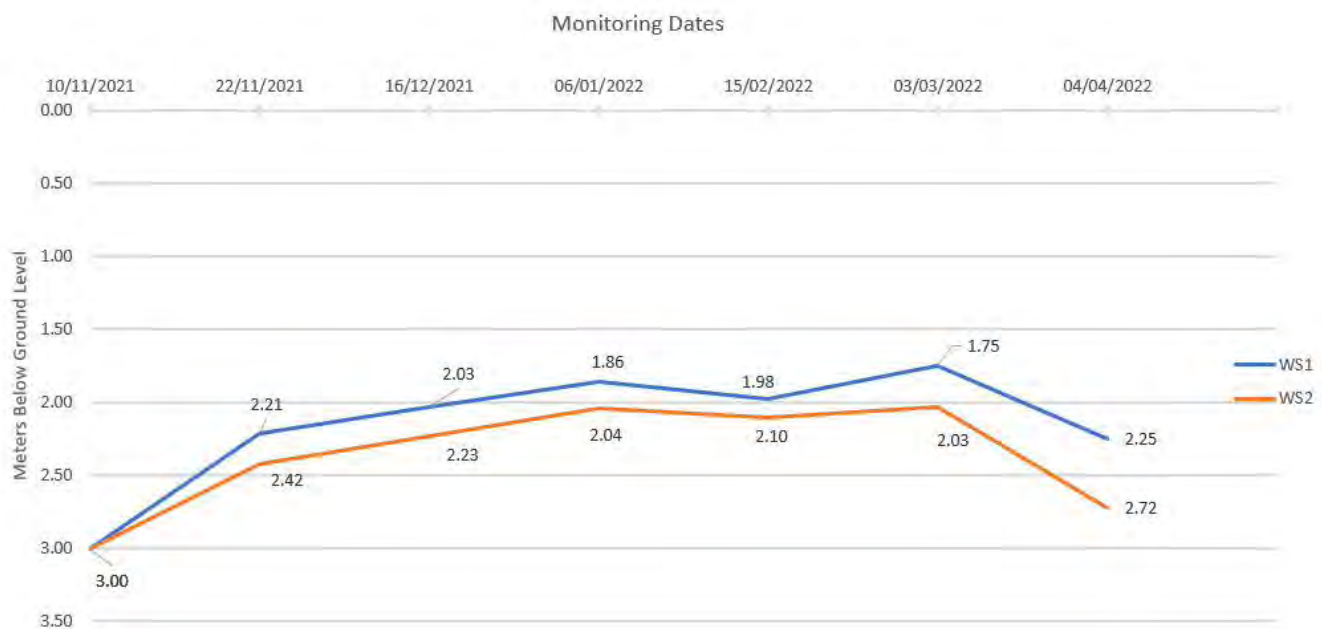
Groundwater records taken during the intrusive investigation and during the groundwater to date, are shown in Table 2 and displayed on Graph 1.

Table 2 – Groundwater Records and Monitoring Data

Trial Hole	Well Depth (m bgl)	Depth to Water (m bgl)						
		10.11.21 ¹	22.11.21 ²	16.12.21 ²	06.01.22 ²	15.02.22 ²	03.03.22 ²	04.04.22 ²
WS1	4.70	3.00	2.21	2.03	1.86	1.98	1.75	2.25
WS2	5.00	3.00	2.42	2.23	2.04	2.10	2.03	2.72

Note: ¹ Reading taken during drilling, ² Reading taken during monitoring

Graph 1 – Groundwater Record and Monitoring Data



37 Barfield Park Winter Groundwater Monitoring

In summary, the depth to groundwater gradually rose to its peak on the 3rd March 2022 between 1.75m (WS1) and 2.03m bgl (WS2), before dropping until the final monitoring visit on the 4th April 2022 to between 2.25m and 2.72m bgl within WS1 and WS4, respectively. It is noted a minor peak is seen during the January before the highest reading in March.

Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was conducted in November 2021 when groundwater levels should be rising from their annual minimum (lowest) elevation, which typically occurs around September to the annual maximum (highest) which typically occurs around March.

Figure I – Site location Plan**Figure number**

I

Title

Site Location Plan

Project

37 Barfield Park, Lancing, West Sussex, BN15 9DF

Date

May 2022

Client

The Civil Engineering Practice

Reference

19786

Figure 2. Trial Hole Location Plan

Figure number
2

Title
Trial Hole Location Plan

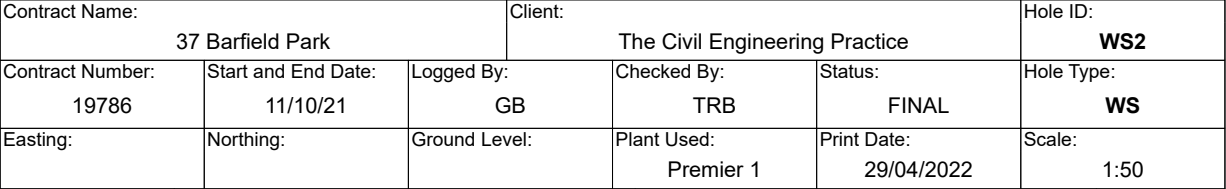
Project
37 Barfield Park, Lancing, West Sussex, BN15 9DF

Date
May 2022

Client
The Civil Engineering Practice

Reference
19786

	Contract Name: 37 Barfield Park				Client: The Civil Engineering Practice				Hole ID: WS1					
	Contract Number: 19786		Start and End Date: 11/10/21		Logged By: GB		Checked By: TRB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: Premier 1		Print Date: 29/04/2022		Scale: 1:50			
Weather:			Termination:					Sheet 1 of 1						
Samples & In Situ Testing					Strata Details							Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.10	D					Dark grey and dark brown slightly clayey slightly silty GRAVEL. Gravel is angular to sub-rounded fine to medium flint, <5% brick and rare shell fragments. Frequent rootlets. TOPSOIL.								
0.40	D			0.25										
				0.50		Dark brown slightly gravelly clayey SILT. Gravel is angular to sub-angular fine to coarse flint and <5% brick. Frequent rootlets. ALLUVIUM								
0.80	D			(0.90)										
1.30	D			1.40		Stiff brown mottled dark grey slightly gravelly silty CLAY. Gravel is angular fine to medium flint. Rare rootlets. ALLUVIUM						1		
1.60	D			(0.60)										
				2.00		Very soft brown mottled dark grey slightly gravelly silty CLAY. Gravel is angular to sub-angular fine to medium flint. ALLUVIUM						2		
2.30	D			(0.60)										
2.70	D			2.60		Light brown sandy, very gravelly CLAY. Gravel is angular to sub-rounded fine to coarse flint and chalk. Sand is coarse. ALLUVIUM						3		
3.20	D			(1.60)										
3.70	D					Structureless cream CHALK recovered as firm yellowish brown mottled brownish grey slightly gravelly CLAY. Gravel is angular to rounded fine to coarse chalk. NEWHAVEN CHALK FORMATION						4		
3.90	D			4.20										
4.30	D			(0.50)		End of Borehole at 4.70m						5		
				4.70										
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Roots observed to 1.70m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
					0.00	1.00	PLAIN	19	3.00			20	2.70	Groundwater was struck at 3.00m rising to 2.70m bgl.
					1.00	4.70	SLOTTED	19						
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														



Samples & In Situ Testing	Strata Details	Groundwater
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[illegible][illegible]

	Contract Name: 37 Barfield Park				Client: The Civil Engineering Practice			Hole ID: WS3						
	Contract Number: 19786		Start and End Date: 11/10/21		Logged By: GB		Checked By: TRB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: Premier 1		Print Date: 29/04/2022		Scale: 1:50			
Weather:				Termination:								Sheet 1 of 1		
Samples & In Situ Testing					Strata Details							Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	D			(0.30)		Greyish brown GRAVEL. Gravel is sub-angular to rounded fine to coarse tarmac and brick. Black lining material at 0.15m and 0.30m bgl. MADE GROUND.								
0.40	D			0.30										
0.45														
0.80	D					Soft to firm brown mottled dark grey slightly silty slightly gravelly CLAY. Gravel is angular to rounded fine to coarse flint and chalk. Frequent rootlets. ALLUVIUM						1		
1.30	D			(1.25)										
1.80	D			1.70										
2.10	D			(0.65)		Yellowish brown very gravelly CLAY. Gravel is sub-angular to rounded fine to medium flint and chalk. ALLUVIUM						2		
2.40	D			2.35										
2.90	D			(0.85)										
3.40	D			3.20		Structureless CHALK. Recovered as soft to stiff of white mottled cream and yellowish brown gravelly CLAY. Gravel is sub-angular to rounded medium to coarse strong chalk with frequent black speckling and flint. Grade Dm. NEWHAVEN CHALK FORMATION						3		
3.90	D													
4.40	D			(2.60)										
4.90	D											4		
5.40	D													
5.90	D			5.80										
6.40	D					Structureless CHALK. Recovered as 40% CLAY matrix: Angular to rounded medium to coarse Gravel sized clasts. Clasts are extremely weak to strong with depth. Soft to firm off white and cream matrix. Occasional angular to sub-rounded medium to coarse gravel sized flint. Grade Dc. NEWHAVEN CHALK FORMATION						6		
6.90	D													
7.40	D			(3.20)										
7.90	D											7		
8.40	D													
8.90	D			9.00										
					End of Borehole at 9.00m						9			
											10			
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Roots observed to 0.90m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
									3.70			40	2.40	Groundwater was struck at 3.70m rising to 2.40m bgl.
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														