



**PROPOSED RESIDENTIAL DEVELOPMENT AT LAND EAST OF
COLLEGE ROAD, CAMPDOWN**

FLOOD RISK ASSESSMENT

JUNE 2023

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Contents

1.0	Executive Summary	2
2.0	Introduction	3
3.0	Proposed Development Site	4
3.1	Site Location	4
3.2	Existing Topography	4
3.3	Development Proposals	5
3.4	Existing Geological Information	5
3.5	National Policy Context	5
3.6	Local Planning Policies	6
3.7	Existing Flood Defences	6
3.8	NPPF Flood Zone and Vulnerability	6
4.0	Flood Risk to the Site	6
4.1	Strategic Flood Risk Assessment	6
4.2	Existing Information on Flooding	7
4.3	Climate Change	9
5.0	Surface Water Management	11
5.1	Existing Surface Water Drainage Regime	11
5.2	Design Principles	11
5.3	Sustainable Drainage Systems	12
6.0	Foul Water Drainage Strategy	18
7.0	Conclusions	18

Appendices

Appendix A Site Location Plan
Appendix B Topographical Survey
Appendix C Site Layout Plan
Appendix D Geotechnical Information
Appendix E Proposed Surface Water Strategy
Appendix F Micro Drainage Hydraulic Model

1.0 Executive Summary

Rogers Cory Partnership Limited have been instructed on behalf of Dandara Southern Developments to prepare a Flood Risk Assessment (FRA) in accordance with the guidance set out in the Department of Communities and Local Government National Planning Policy Framework (NPPF).

This report summaries the methodology and results of the FRA in relation to the proposed residential development at the Land East of College Road, Campdown, Purbrook, Waterlooville.

With reference to the Environment Agency's Flood Map for Planning, the site is confirmed to be located in Flood Zone 1 (an area with low probability of flooding from rivers and seas). This report therefore focuses on the surface water management in line with Environment Agency (EA) standing advice, the NPPF, and Hampshire County Council Planning Policies.

This report has therefore been prepared in support of a planning application for the development site for planning permission sought for 628 residential units.

The report also aims to assess potential flood risk sources to and from the site and detail the drainage strategy for implementation on the scheme.

2.0 Introduction

Rogers Cory Partnership Limited have been instructed on behalf of Dandara Southern Developments Ltd to prepare a Flood Risk Assessment (FRA) and surface water drainage strategy in support of planning application for the proposed residential development at the Land East of College Road at Waterlooville.

The development site seeks planning permission from Havant Borough Council for the proposal of residential units with their private gardens, access, services and associated development infrastructure.

The National Planning Policy Framework (NPPF) was published in March 2012 by the Department of Communities and Local Government and replaced all planning policy statements including Planning Policy Statement 25 (PPS 25): Development and Flood Risk. The NPPF set out the Government's planning policy for England and how these are expected to be applied. The Planning Practice Guidance (PPG), published in March 2014, provides additional guidance and retains key elements of the now superseded PPS 25.

Initial searches into the Environment Agency's (EA) website has identified the development site to be located mainly within a flood zone 1 where the risk of flooding is very low. In this respect requirements in the NPPF (foot note 55) states the following:

"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."

The EA's standing advice (published in March 2014 and updated February 2017) highlights that a FRA is required to ensure flood risk to the proposed development is considered as well as the impact the development will have elsewhere on people and property. In addition the FRA should consider the risk of flooding from other sources (groundwater, overland flow, sewers).

The PPG sets out the objectives of a site specific FRA as to establish the following:

- *"Whether the proposed development is likely to be affected by current or future flooding from any source;*
- *Whether it will increase flood risk elsewhere;*
- *Whether the measures proposed to deal with these effects and risks are appropriate;*

- *The evidence for the local planning authority to apply (if necessary) the Sequential Test, and;*
- *Whether the development will be safe and pass the Exception Test, if applicable.”*

As such this report has been prepared in accordance with the requirements of the NPPF, PPG and EA Guidance.

3.0 Proposed Development Site

3.1 Site Location

The overall site is located north of A27 Highway and adjacent to the A3(M). (Refer to **Figure 1** below). The approximate centre of the site is at Ordnance Survey (OS) Grid Reference 469059; 107075. (See **Appendix A**).

The approximate size of the development is 15.77ha and located northeast of Portsmouth. It is bounded to the east by A3(M) highway, to the west by educational establishments and College Road, to the south by greenfield land and north by woodland. The existing site comprises of open fields with a local ordinary watercourse which runs along the southern boundary.

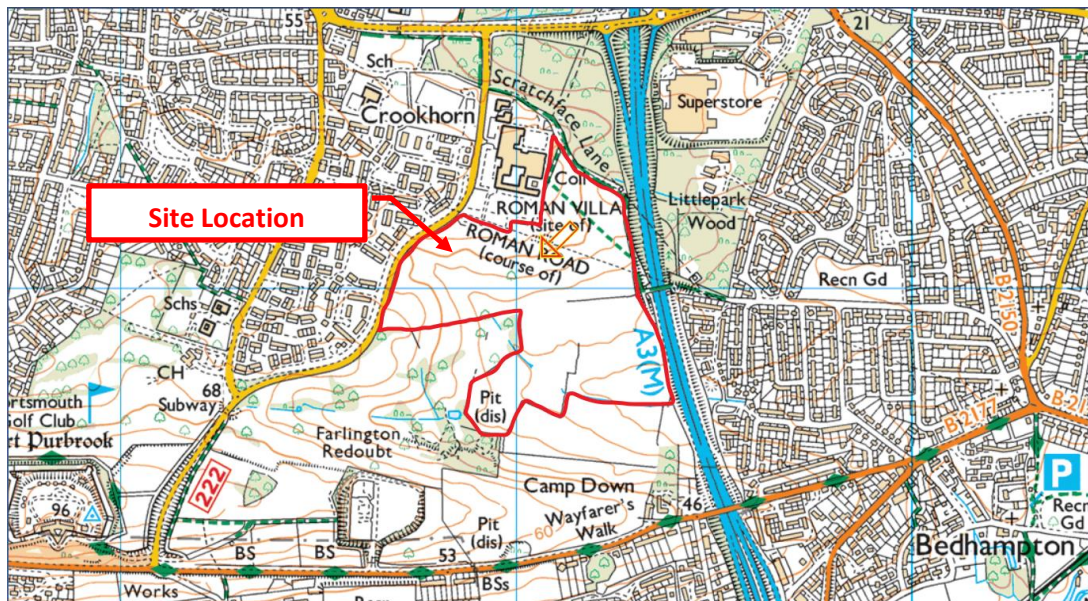


Figure 1: Site Location

3.2 Existing Topography

A Topographical survey was carried out by Sitaline Geomatic Surveyors in September 2016 and is related to Ordnance Survey Datum.

The survey shows levels across the site generally falling in a southerly and easterly direction towards A3(M), ranging from 61.32m AOD at the western point to 25.25m AOD at the south eastern corner. (See **Appendix B**).

3.3 Development Proposals

The proposed development comprises of 628 residential dwellings with private gardens, access, services and associated development infrastructure. (see **Appendix C**).

3.4 Existing Geological Information

Based on the British Hydrogeological Survey Maps, the site is largely located over the London Clay Formation, comprising of Clay, Silt and Sand, whilst the southern portion of the site is located over the Lambeth Group comprising of Clay, Silt and Sand. There is a localized seam of the Bognor Sand Member formation which comprises of sand which crosses the central part of the site... There is a Superficial Head Deposits over this bedrock geology. Within the southern part of the site. An initial site investigation carried out by RSK in October 2016 has indicated groundwater levels ranging from 1.20 to 2.5mbgl. Infiltration testing carried out indicated very low permeability rates

The EA groundwater vulnerability maps indicates that the site lies within the InnerZone – subsurface activity only (Zone 1c) groundwater protection zone with the south eastern part of the site within Zone 1 Groundwater source protection zone. The superficial deposit is designated as a Secondary (undifferentiated), whilst the majority of the site is not located over and designate bedrock aquifer, a small portion along the southern boundary is noted to lie within the Secondary A bedrock aquifer which is described as “permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers”

Details and extracts of the borehole logs and factual ground investigations can be found in **Appendix D**.

3.5 National Policy Context

National policy regarding flood risk is contained within the National Planning Policy Framework (updated July 2021) and Planning Practice Guidance (updated 20th August 2021)

The Department for Environment, Food and Rural Affairs (DEFRA) released the Non-statutory technical standards for sustainable drainage systems in March 2015. The document sets out non-statutory technical standards for SuDS to be read in conjunction with the NPPF and PPG.

As of the 15th April 2015, Hampshire County Council as the Lead Local Flood Authority (LLFA) has now become a statutory consultee on all major planning

applications and as such will assess planning applications in respect of surface water drainage and sustainable drainage systems which was previously the responsibility of the Environment Agency. The LLFA's primary duties will be to ensure that flood risks from surface water run-off, groundwater and ordinary watercourses are identified and managed properly. The use of SuDS will be a material consideration in planning conditions and as such the proposed use of SuDS will need to be demonstrated on all major developments unless it can be demonstrated otherwise.

3.6 Local Planning Policies

As the site is located within Havant administrative boundary, any future development would need to accord with the policies set out in the Havant Borough Council Strategic Flood Risk Assessment (2018).

3.7 Existing Flood Defences

The site does not benefit from any current flood defences.

3.8 NPPF Flood Zone and Vulnerability

The Planning Practice Guidance (Table 1) confirms the flood zone Classification based upon the probability of flooding. The site is shown to lie mainly within Flood Zone 1.

Table 2 of the Planning Practice Guidance confirms the 'Flood Risk Vulnerability Classification' of a site, depending on its proposed use. The classification is then applied to Table 3 to determine whether:

- The proposed development is suitable for the flood zone in which it is located
- An Exception Test is required for the proposed development.

The proposed development is classified as 'More Vulnerable' according to the NPPF and suited for the flood zone in which it is located.

4.0 Flood Risk to the Site

The degree of detail appropriate to an FRA depends upon the scale and potential impact of the proposed development to and from the surrounding boundaries. In this case, the applicant has the intention of re-developing an area of land which is located mainly within Flood Zone 1 considered low risk of flooding from fluvial and tidal sources.

4.1 Strategic Flood Risk Assessment

The National Planning Policy Framework confirms that Regional Planning Bodies (RPBs) or local planning authorities (LPAs) should prepare strategic Flood Risk Assessments (SFRAs) in consultation with the EA. The SFRA is then used to refine information on areas liable to flooding by taking into account other sources of

flooding and the impacts associated with climate change in addition to the EA flood map data.

The document informs the Council's policies in the emerging Local Development framework and a strategic approach to the allocation of sites for development and the future management of flood risk, in line with the National Planning Policy Framework.

The Partnership for Urban South Hampshire (PUSH) is made up of 10 local planning authorities within Hampshire. Atkins were commissioned in 2006 to undertake a Strategic Flood Risk Assessment (SFRA), which was divided into two stages.

The first stage of the SFRA included for the collation of data and production of scoping appraisal. This stage also provided a high-level analysis of flood risk within each sub-region. This stage was developed to assist in assessing the feasibility of the PUSH housing allocation.

4.2 Existing Information on Flooding

Fluvial Flood Risk

Based on a review of the EA's Flood Zone maps (see **Figure 2**), the development site appears to lie wholly within Flood Zone 1, considered to be at low risk from fluvial and tidal flooding.

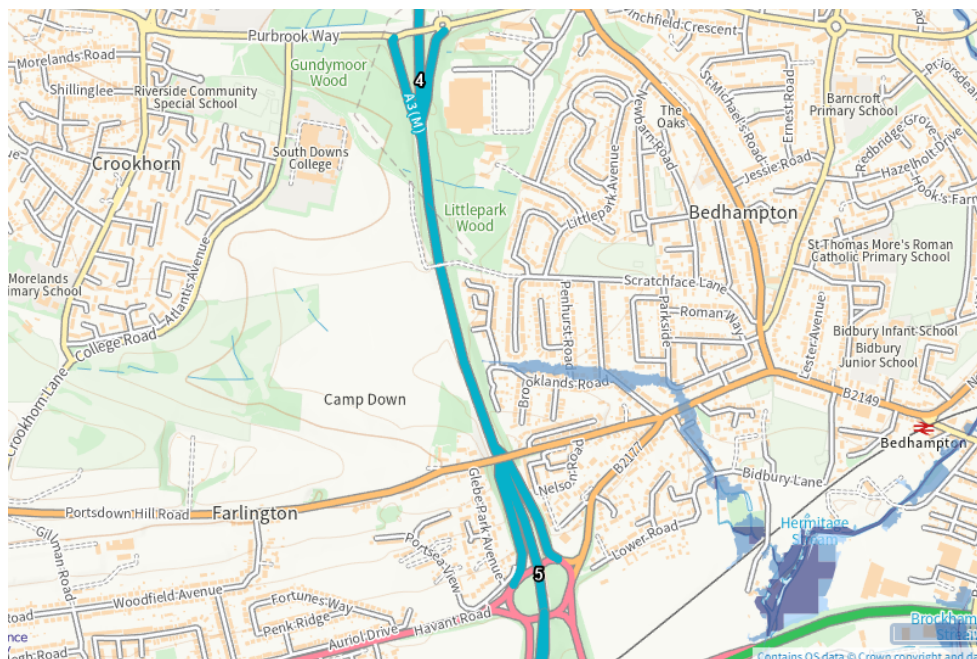


Figure 2: Extract of Flood Zone Map from DEFRA gov.uk website

Surface Water Flood Risk

The risk of surface water flooding to the site is low. There are localised overland flow routes shown on the DEFRA flood risk maps, which indicate the potential for overland flow routes which follow the existing topography of the land in the southern and south western part of the site. This assessment has been made on the information provided within the EA maps for surface water flooding (DEFRA.gov.uk) in conjunction with a review of the topography of the site and appropriate mitigation measures have been incorporated into the development proposals.

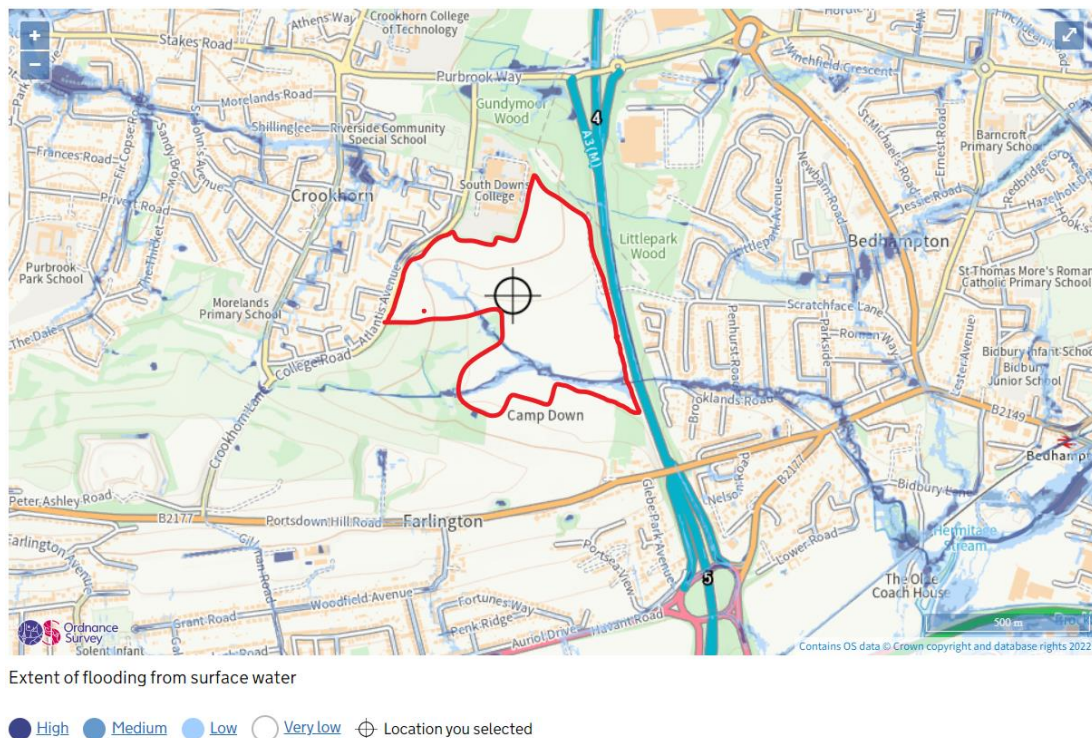


Figure 3: Extract of the EA's risk of surface water flooding from DEFRA gov.uk website

Ground Water Flooding

Searches of the EA groundwater map confirm that the site does not fall within any groundwater protection zones. A review of the SFRA suggests there are no records of groundwater flooding at the site.

Furthermore, the groundwater monitoring carried out to date indicate that the risk of groundwater flooding to this site should be considered as low and can be mitigated through the onsite final design levels.

4.3 Climate Change

As of the 19th February 2016 (updated May 2022), the EA has updated guidance on the application of climate changes allowances for the following:

- peak river flow by river basin district
- peak rainfall intensity
- sea level rise
- offshore wind speed and extreme wave height

Peak river flow allowances are now to be based on River Basin areas thus making them more geographically relevant, based on the range of predicted allowances.

Rainfall – increases in peak rainfall over time is to be assessed on two scenarios to assess the sensitivity of the areas as per table 1 below

East Hampshire Management Catchment peak rainfall allowances	3.3% annual exceedance rainfall event 2050s	3.3% annual exceedance rainfall event 2070s	1%annual exceedance rainfall event 2050s	1%annual exceedance rainfall event 2070s
Upper end	+35%	+40%	+40%	+45%
Central	+20%	+25%	+20%	+25%

Table 1: Extract from DEFRA website for East Hampshire Management Catchment peak rainfall allowances

As a conservative approach, a lifetime of the development should be considered of up to 100 years (i.e. up to 2123) when assessing flood risk for residential developments. According to Table 1 above, an increase of 45% on the peak rainfall intensity should be expected. To mitigate any residual risk at the site as a result of climate change, an appropriate climate change allowance (i.e. 45% increase in rainfall intensity) will therefore be considered and accommodated within the design strategy for managing surface water run-off.

4.4 The Sequential Test

The sequential test approach is aimed to steer new development to areas of lowest probability of flooding. In this regard to determine the suitability and classification of the development, as a check of the proposed scheme, consultation has been made to tables 2 and 3 of the NPPF.

Table 2 of the NPPF technical guidance determines that the proposed development is considered to be a 'more vulnerable' land class usage, in terms of flood risk, as illustrated in Figure 4.

More vulnerable - Hospitals. - Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. - Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. - Non-residential uses for health services, nurseries and educational establishments. - Landfill and sites used for waste management facilities for hazardous waste⁶. - Sites used for holiday or short-let caravans and camping, <i>subject to a specific warning and evacuation plan</i>.⁷

Figure 4: Extract of Table 2: Flood Risk Vulnerability Classification

Table 3 of the NPPF considers sites providing a 'more vulnerable' land-class usage in a Flood Risk Zone 1 area as acceptable in terms of compatibility (see Figure 4):

Table 3: Flood risk vulnerability and flood zone 'compatibility'

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	*	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	*	*	*

Key: ✓ Development is appropriate.
 * Development should not be permitted.

Figure 5: Table 3 - Flood Risk Vulnerability and Flood Zone 'Compatibility'

5.0 Surface Water Management

Hampshire County Council (HCC) are the Lead local flood Authority for Havant Borough Council and statutory consultee on surface water management on all planning applications within the County.

The surface water management section should ensure that there is no adverse impact on flood risk elsewhere as a result of a change in the surface water runoff regime from the development.

The drainage strategy has been developed with the above key items in consideration. Infiltration has not been deemed suitable based on the current geology of the site. The use of both attenuation basins along with bio-retention areas within the basins are proposed within the surface water drainage scheme.

5.1 Existing Surface Water Drainage Regime

The existing site is greenfield with no existing drainage features. Any existing exceedance flows would continue south and south eastwards overland to the existing watercourse which runs along the southern boundary.

5.2 Design Principles

Key design principles in the following guidance documents steer the approach to managing surface water runoff at sites:

- Building Regulations hierarchy of drainage (H3);
- Interim Code of Practice for SuDS; and
- CIRIA best practice guidance, including the use of the 'SUDS management train'

Building Regulations hierarchy of drainage outlines the preferred methods for the disposal of surface water with infiltration methods being the preferred option. If this is not possible the next favoured option is to drain to an existing watercourse. If neither of these options are feasible, the regulations state that rainwater discharge should be directed to a sewer.

The Interim Code of Practice for SUDS provides guidance about the hydraulic design criteria for Sustainable drainage systems. This in general refers to both peak rate of runoff and the volume of runoff, post development. Prior to mitigation measures such as the use of SuDS attenuation features, both the volume and peak rate of runoff may increase post development.

The design principles for surface water management extend beyond simple hydraulic criteria. CIRIA guidance promotes the use of the SUDS management train, a concept where SUDS techniques are used to treat, convey and store surface

water runoff. This approach is considered as part of the SUDS selection methodology.

5.3 Sustainable Drainage Systems

To drain the development in a sustainable manner whilst complying with the requirements of the NPPF, the scheme should seek to adopt an appropriate form(s) of sustainable urban drainage systems (SuDS).

SuDS techniques comprise of implementation of infiltration drainage devices to discharge surface water to the underlying soil stratum (where ground conditions permit). These may be in the form of conventional soakaways, infiltration basins and ponds, filter strips, bio-retention areas, swales, permeable surfaces, green roofs, over-sized pipes/tanks or geo-cellular attenuation units.

An additional 45% storage provision should be provided as an allowance for any potential climate change impact (as stated in Table 1: Peak rainfall intensity allowance in small and urban catchment associated with a residential scheme).

The SuDS philosophy is steered to maximize the benefits and minimise the negative impacts of surface water runoff from developed areas. CIRIA C753 The SuDS Manual determines the design criteria for SuDS to be based upon water quantity, water quality, amenity and biodiversity. Table 7.1 of The SuDS Manual assesses each SuDS component to the delivery of the design criteria. Where broadly ranking the SuDS, components depicted in Table 7.2 by applying a score for the deliverance of the design criteria, a theoretical SuDS hierarchy can be determined for the selection of SuDS against the design criteria as represented in Table 3.

SuDS in the form of an attenuation basins with bio-retention areas have been incorporated within the scheme. It has therefore been concluded that the SuDS design criteria as described in the SuDS Manual has been met and accords with current best practice.

SuDS Component	Potential of delivering SuDS Design Criteria
Infiltration Systems	High ↓ Low
Swales	
Bioretention systems	
Pervious Pavements	
Detention Basins	
Trees	
Green Roofs	
Ponds and Wetlands	
Filter Drains	
Filter Strips	
Rainwater Harvesting Systems	
Proprietary Treatment Systems	
Attenuation Storage Tanks	

Table 2: Theoretical SuDS Hierarchy

Infiltration Drainage

Based on the existing geology of the site full infiltration drainage has not been deemed suitable for this site.

Existing Watercourses

There is an existing watercourse which runs along the eastern, western and southern boundary of the site which currently accommodates run-off from the existing site.

In reviewing the hierarchy for a proposed outfall and constraints associated with the development we have determined the proposed discharge from the residential site will continue to the existing watercourse in the southern boundary to closely replicate the existing drainage regime and greenfield discharge arrangement.

5.4 Surface Water Drainage Strategy

In view of the requirements of the NPPF, PPG, HCC the design parameters and constraints associated with redeveloping this site, a surface water drainage strategy design has been devised and hydraulically modeled to demonstrate that the scheme can be suitably implemented without increasing the level of flood risk, when the surface water drainage system experiences a 1:100 year rainfall event (including climate change).

The surface water drainage scheme has been designed to ensure:

- A reduction in the pre-development site discharge for peak storm events.
- Sustainable Urban Drainage systems are wholly incorporated within the scheme.
- Consideration is given for the improvement of water quality within the design.
- The designed drainage scheme can satisfactorily retain a critical 1 in 100 Year storm event with climate change.

Having taken into consideration the above points, a scheme has been devised and hydraulically modelled based on attenuation techniques with a restricted discharge to the existing watercourse at the predevelopment Greenfield run-off rates. A copy of the proposed surface water strategy can be found in **Appendix E**.

5.4.1 Access Roads, Shared Surfaces, Private Drives and Roof Drainage

The proposed run-off from the access roads, drives and parking bays will be conveyed to the new below ground surface water network via trapped gullies. Rainfall run-off from the roofs of the new properties will discharge directly into the below ground surface water network

The surface water network will convey the flows, under gravity, westwards and southwards towards the new series of attenuation basin with bio-retention areas which will provide attenuation of the restricted flows prior to discharging to the existing watercourse south of the residential portion of the site.

5.4.2 Flow Control

A maximum overall development discharge is proposed to be limited to the Mean Annual Average greenfield equivalent run-off rate (Q_{bar})

The hydraulic models of the proposed surface water networks, incorporating the SUDs attenuation basins and flow control devices can be found in **Appendix F**.

The hydraulic calculations have been simulated under various scenarios up to and included the critical 1 in 100 Year storm event with additional 45% allowance for

climate change. The simulations confirm that the storm can be managed and maintained within the site without flooding.

The hydraulic model of the proposed surface water network, incorporating the SuDS attenuation systems can be found in **Appendix F**.

The hydraulic calculations have been simulated under various scenarios up to and included the critical 1 in 100 Year storm event with additional 45% allowance for climate change plus an additional 10% to account for urban creep. The simulations confirm that the storm can be managed and maintained within the site without offsite flooding.

Impermeable Development Area (Ha)	Q1 Year (L/sec)	Q30 Year (L/Sec)	Q100 Year Plus Climate (L/Sec)
23.449	120	120	120.7

Table 3: Summary of Post Development Runoff with mitigation measures

5.4.3 Water Quality

It is important to address issues with regards to quality when considering surface water management. As the surface water is proposed to be discharge to the existing downstream watercourses, treatment is proposed as part of a SuDS Management Train in accordance with the recommendations of the SuDS Manual (CIRIA 753) and as required by the LLFA.

Chapter 26 of the CIRIA SuDS Manual (2015) provides guidance on methods that should be used to design SuDS to meet the water quality design criteria and good practice design standards. Diffuse urban pollution is a significant factor in compromising groundwater and receiving water standards that are required under the EA Water Framework Directive. Chapter 4 of the SuDs Manual summarises factors, which influence pollution levels in urban run-off. This summary is presented in **Table 4 below**:

Factors influencing pollution levels in urban run-off
The amount and type of pollution washed off a surface will depend on many things including: - Planning activities on, above and adjacent to the surface that affect the deposition of pollutants, their retention on the surface and the extent to which they are mixed with runoff (including pollution prevention strategies) - Unplanned activities (accidents and spillages) that can cause temporary unexpected high pollution concentrations

- The surface location and type, affecting wash-off rates and contaminant movement mechanisms
- The drainage path
- The length of the dry weather period before the rainfall event
- The intensity and the duration of the rainfall, and the associated flow velocities

Any further pollutant transformations occurring during residence and conveyance within gullies, chambers, pipe or channel networks, gravels, soils and vegetation and quiescent bodies of water.

Table 4: Extract of Box 4.1 of the SuDS Manual (CIRIA 753)

Table 4.3 of the SuDS Manual classifies the pollution hazard level for residential sites, including residential car parks, low traffic roads as being “low” and thus only requiring a “Simple index approach” in terms of the requirements for the discharge to surface waters, including coasts and estuaries.

The SuDS Manual summarises the steps for the simple index approach:

Step 1 – *Allocated suitable pollution hazard indices for the proposed land use*

Step 2 – *Select SuDS with a total pollution mitigation index that equals or exceeds the pollution index*

Step 3 – *Where the discharge to a protected surface waters or groundwater, consider the need for a more precautionary approach*

The SuDS Manual describes “protected surface waters” as protected surface water resources, which include those designated for drinking water abstraction or for other environmental protection reasons

Table 26.2 of the SuDS manual notes the following pollution hazard indices for residential land use development:

Land Use	Pollution Hazard Level	Total suspended solids (TSS)	Metals	Hydrocarbons
Individual property driveways, residential car parks, low traffic roads (eg. cul-de sacs, home zones and general access roads) and non-residential car parking with infrequent change (eg schools, offices)ie. Less than 300 vehicle movements/day	Low	0.5	0.4	0.4

Figure 6: Extract of Table 26.2 of SuDS Manual (2015)

Table 26.3 of the SuDS Manual provides details of the SuDS pollution mitigation indices for various types of SuDS components

Type of SuDS component	Mitigation indices		
	TSS	Metals	Hydrocarbons
Filter Strip	0.4	0.4	0.5
Filter Drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable Paving	0.7	0.6	0.7
Detention Basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8

Figure 7: Extract of Table 26.3 of SuDS Manual (2015)

As such the total SuDS mitigation index (figure 7) must be greater than the pollution hazard index (figure 6), furthermore when used in combination of two or more SuDS components, a factor of 0.5 is used to account for the reduced performance of the secondary or tertiary components associated with the already reduced inflow of concentration, therefore:

$$\text{Total SuDS mitigation index} = \text{mitigation index}_1 + 0.5(\text{mitigation index}_2)$$

As such all the run-off from the development site is proposed to be conveyed through attenuation basin and bioretention areas thus providing a far greater SuDS mitigation index than what is required to meet the minimum standards

Long Term Maintenance

Consideration has been given to the long-term maintenance of the proposed drainage structures. SuDS permeable pavements and SuDS basins and all associated external pipework, chambers and manholes will be the responsibility of a management company.

A detailed maintenance schedule will be provided by the designers during the detailed design stage of the surface water proposals.

Exceedance

Whilst the drainage system has been designed to a very high standard (1 in 100 Year storm event including climate change), it is possible that a more extreme event will occur and that the design standard for the system will be exceeded. It is best

practice to design the drainage system to shed water, primarily into landscaped and other areas, therefore reducing the risk of flooding areas of built development during extreme events.

A strategy for directing overland flows for the site will be confirmed using overland flow modeling as part of the detailed design once key ground levels or development levels across the site have been finalized.

6.0 Foul Water Drainage Strategy

Southern Water Utility Services Limited are the Local Sewerage Authority in this area. The development proposals will seek to discharge to the existing Southern Water public sewer network located within the eastern part of the development.

The proposed connection to the existing foul water network will be carried out under a Section 106 Agreement with Southern Water.

All domestic foul drainage should be designed in accordance with Part H of the Building Regulations

7.0 Conclusions

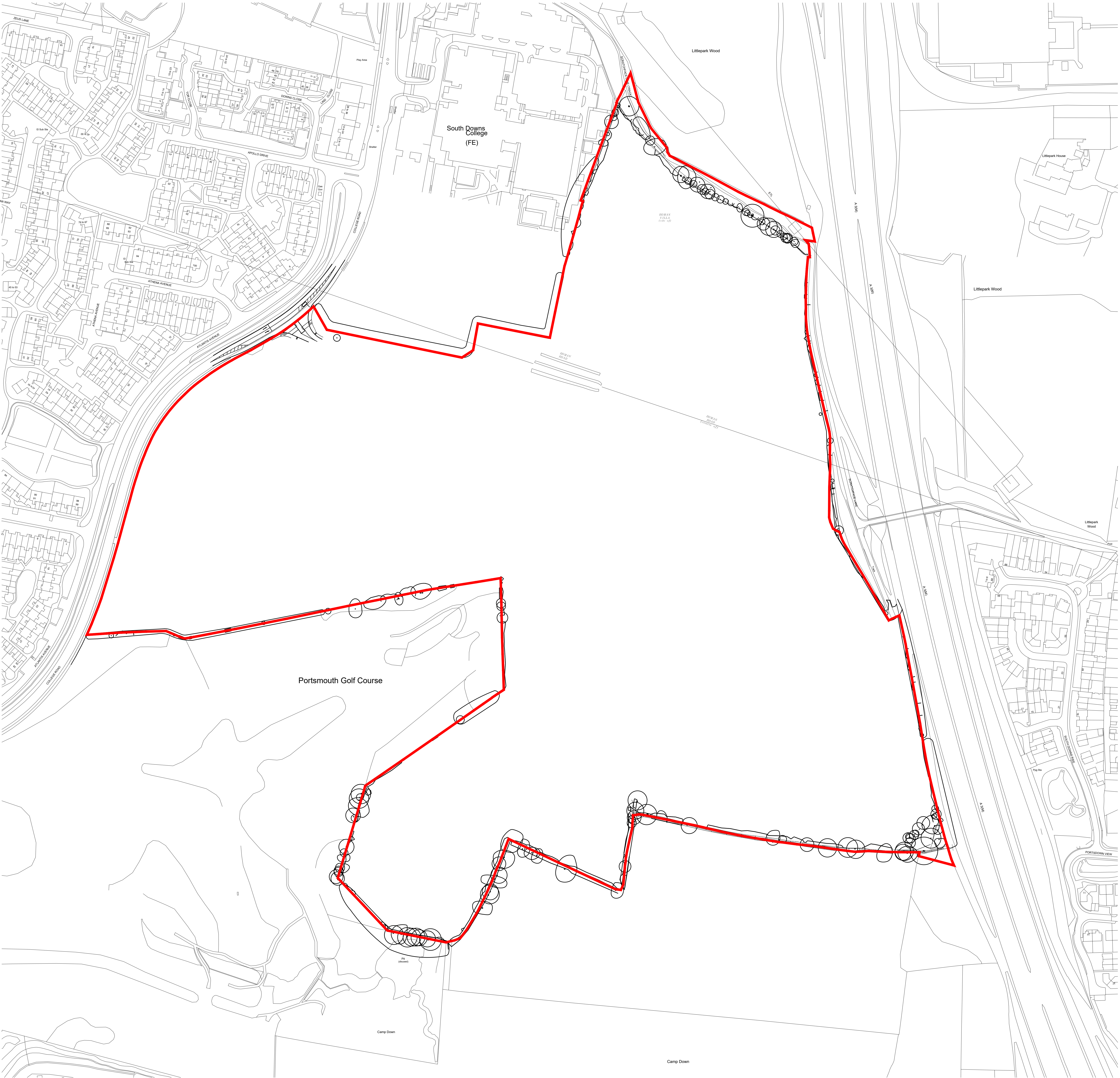
A preliminary design surface water drainage strategy has been prepared and hydraulically modelled which demonstrates that the redevelopment proposals can be successfully implemented and designed to withstand the impact of a 1:100 year rainfall event (including 45% climate change allowance), in accordance with the NPPF, PPG and HCC requirements

In view of this assessment, the report concludes that:

- i. That the site is located mainly within Flood Zones 1;
- ii. The Development and its occupants are not at an increased risk of flooding;
- iii. The Development does not increase the risk of flooding elsewhere;
- iv. The Development can be drained in a sustainable manner utilizing SuDS techniques;
- v. The Development will satisfactorily manage and maintain a 1 in 100 Year storm event with allowance for climate change.

The findings of this report identify the opportunity to promote the sustainable re-use of existing resources and potential to implement an appropriate SUDS strategy.

Appendix (A)
Site Location Plan



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1:1250 Location Plan
Site Boundary
66.102ac / 26.751ha
what3words:
///this.latest.doing

Scale @ A0
0 10 20 30 40 50m
Scale 1:1250
North

Rev Date Drawn Checked

Date: NOVEMBER 2022
Drawn by: MAH Checked by: BB
Dwg No: CB_62_265_000 Rev: -

Project: CAMPDOWN, RURBROOK, PORTSMOUTH
Title: SITE LOCATION PLAN
Client: dandara
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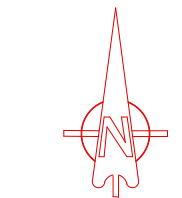
Appendix (B)
Topographical Survey

TREES	
a	Ash
al	Alder
ap	Apple
b	Beech
cb	Clay
ch	Cherry
co	Corn
cy	Cypress
el	Elm
eu	Eucalyptus
f	Fruit
hc	Hornbeam
hw	Hawthorn
la	Larch
lm	Lime
mg	Magnolia
m	Maple
ok	Oak
po	Pine
r	Road
ro	Road
m	Road
sd	Silver Birch
sp	Sweet Chestnut
sv	Sycamore
w	Willow
y	Yew
Dia / Sp / Ht	

KEY	
BT	British Telecom
CB	Control Box
CL	Cable
CTV	Cable Television
EL	Electric
EP	Electric Pole
EV	Electric Valve
GV	Gas Stop Valve
HVC	High Voltage Cable
I	Insulation
IP	Insulation Point
IR	Iron
LM	Lamp Post
M	Manhole
MR	Manhole
O	Overhead
R	Road
RNP	Road Name Plate
SA	Scotway
SV	Stop Valve (Unidentified)
TS	Telephone
TH	Telephone
TL	Telephone
TP	Telephone
UL	Unidentified
VM	Water Meter
WSV	Water Stop Valve

FENCES	
BWF	Barbed Wire Fence
CBF	Closest Based Fence
CLF	Chain Link Fence
CP	Concrete Post
CWF	Chicken Wire Fence
DF	Ditch Fence
PF	Post & Rail Fence
SP	Steel Post
WVF	Wire Mesh Fence
WPF	Wood Panel Fence

STN	EASTINGS	NORTHINGS	LEVEL	TYPE
BASE	8984.974	7144.382	56.35	PCM
1	8713.754	7055.888	52.71	Nail
2	8806.837	7156.249	55.00	Nail
3	8670.692	6964.540	57.92	Nail
4	9046.184	7163.487	59.32	Peg
5	9076.400	7137.344	46.79	Nail
6	9356.760	7001.073	41.89	Nail
7	9300.079	6879.774	35.19	PCM
8	9164.847	6880.035	35.87	PCM
9	8933.760	6794.921	38.44	Peg
10	9008.334	6977.596	40.51	Peg
11	8728.277	6899.907	58.43	Nail
12				



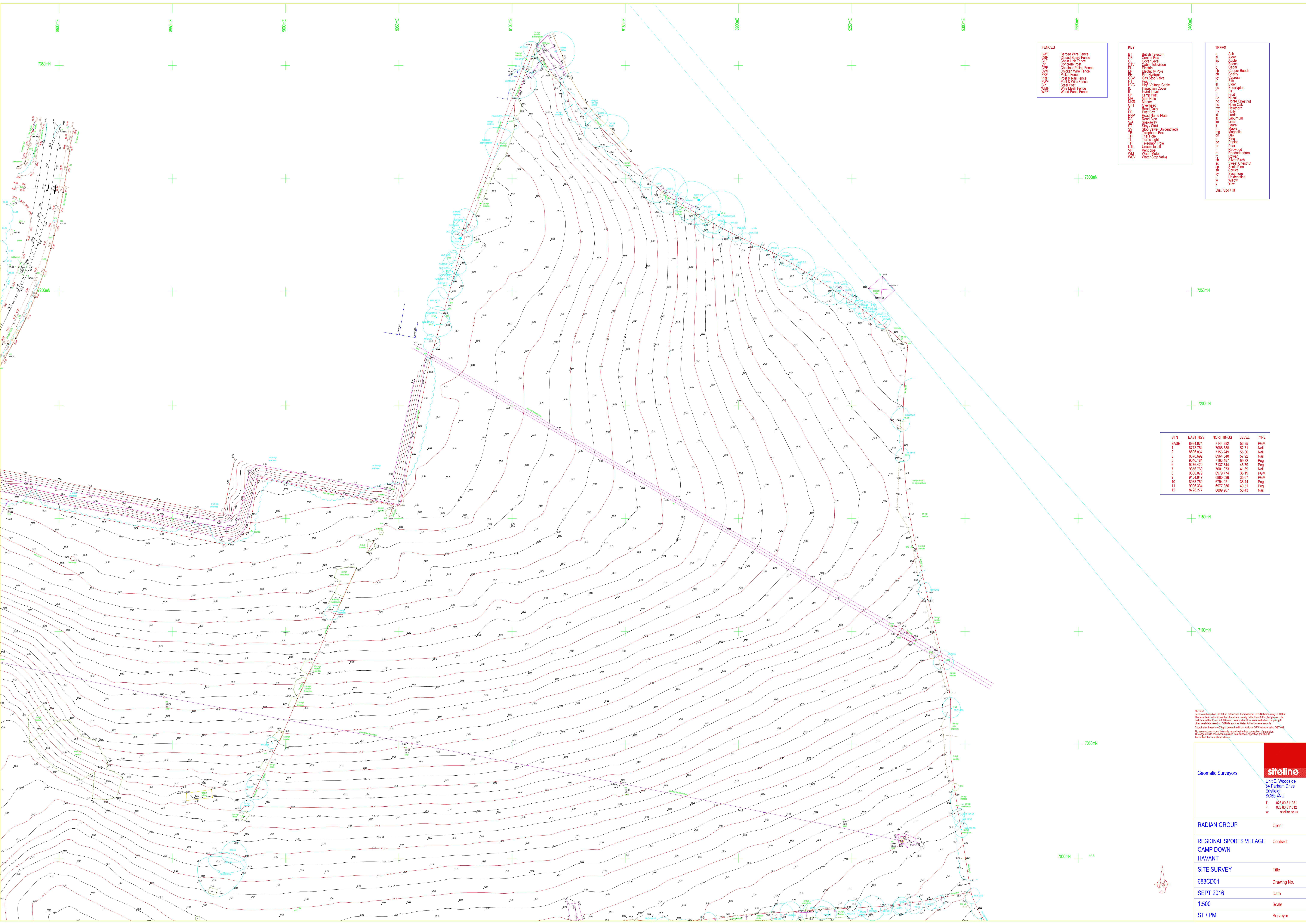
NOTES:
Levels are based on OS datum determined from National GPS Network using OSTN02.
The level is to be used as a guide only and should be confirmed when comparing to other data.
Coordinates based on OS grid determined from National GPS Network using OSTN02.
No responsibility is accepted for any errors or omissions.
Damage claims have been referred to the relevant authority and should be referred to at all times.

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RADIAN GROUP	Client
REGIONAL SPORTS VILLAGE CAMP DOWN HAVANT	Contract
SITE SURVEY	Title
688CD01	Drawing No.
SEPT 2016	Date
1:500	Scale
ST / PM	Surveyor



FENCES	
BWF	Barbed Wire Fence
CBF	Crossed Board Fence
CLF	Chain Link Fence
CPF	Concrete Post
CPF	Chestnut Paling Fence
CWF	Crossed Wire Fence
PKF	Picket Fence
PPF	Post & Rail Fence
SPF	Split Post
WMF	Wire Mesh Fence
WFF	Wood Felled Fence

KEY	
BT	British Telecom
CB	Control Box
CLV	Cable Level
CTV	Cable Television
ELB	Electric
ELP	Electricity Pole
FSV	Fire Hydrant
HT	High
HVC	High Voltage Cable
IC	Inspection Cover
IL	Invert Level
LI	Lamp Post
LMH	Lamp Hole
MMR	Manhole
OH	Overhead
OP	Post Box
RAP	Road Name Plate
RS	Road Sign
SA	Scotland
ST	Stop Valve (Unidentified)
ST	Strut
TB	Telephone Box
TH	Trail Hole
TL	Traffic Light
TP	Telegraph Pole
UTL	Unable to Lift
VP	Vertebrate
WM	Water Meter
WSV	Water Stop Valve

TREES	
a	Ash
al	Alder
ap	Apple
b	Beech
c	Cedar
cb	Copper Beech
ch	Cherry
cy	Cypress
e	Elder
el	Eucalyptus
fr	Fr
h	Hazel
hz	Hornbeam
ho	Horn Oak
hw	Hawthorn
hy	Holly
l	Larch
lb	Laburnum
m	Maple
ma	Magnolia
ok	Oak
p	Poplar
po	Poplar
pr	Pine
r	Rosewood
ro	Rosewood
sc	Sweet Chestnut
su	Spruce
u	Unidentified
w	Willow
y	Yew
Dia / Spd / Ht	

STN	EASTINGS	NORTHINGS	LEVEL	TYPE
BASE	8984 974	7144 382	56.35	PGM
1	8713 754	7395 588	52.71	Nail
2	8806 837	7156 249	55.00	Nail
3	8670 682	6964 240	57.52	Nail
5	8346 184	7163 487	55.32	Peg
6	8276 420	7137 344	46.79	Peg
7	8356 763	7301 013	41.59	Nail
8	8300 079	6979 774	35.19	PGM
9	8164 247	6880 026	35.67	PGM
10	8163 780	6794 521	38.44	Peg
11	8006 334	6977 956	40.51	Peg
12	8728 277	6899 937	54.43	Nail

NOTES:
Levels are based on OS datum determined from National GPS Network using OS6042.
The level is to traditional benchmarks is usually better than 120m, but please note
that the level is to 120m and datum should be measured when comparing
other level data based on OS6042 or other datum.
Coordinates based on OS grid determined from National GPS Network using OS6042.
No assumptions should be made regarding the interpretation of features.
Changes shown have been taken from further inspection and should
be verified if of critical importance.

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RADIAN GROUP

Client

REGIONAL SPORTS VILLAGE

Contract

CAMP DOWN

HAVANT

SITE SURVEY

Title

688CD01

Drawing No.

SEPT 2016

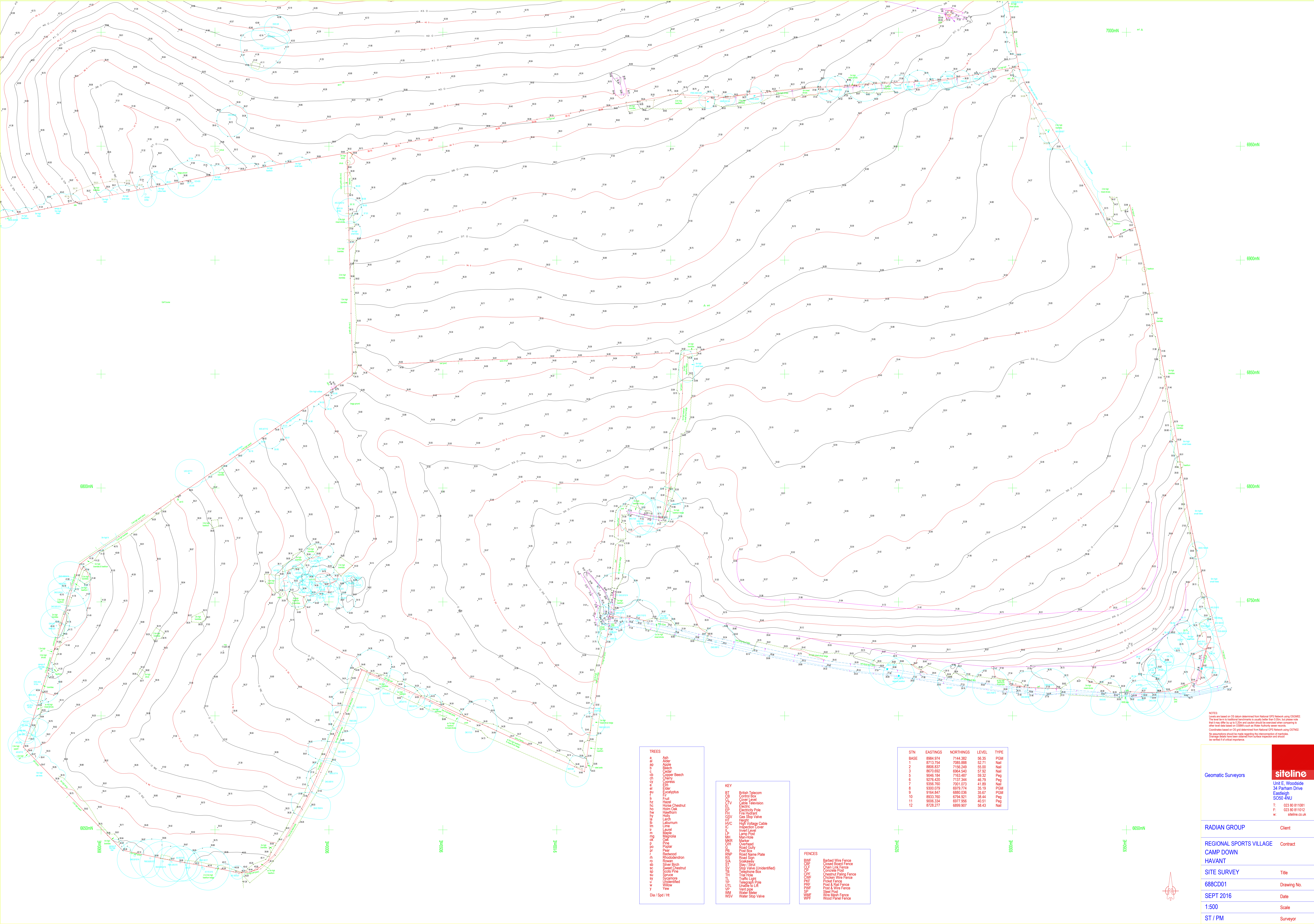
Date

1:500

Scale

ST / PM

Surveyor



NOTES:
The data was derived from National Grid Network using OS2015
The level is to traditional benchmarks is usually better than 1:20, but please note
that the data is to be used as a guide only and should be verified where necessary
Coordinates based on OS grid and derived from National Grid Network using OS2015
No assumptions should be made regarding the interpretation of the map
Changes made have been indicated from the original map and should
be verified if of critical importance.

TREES	
a	Alder
ap	Apple
c	Cedar
cb	Copper Birch
ch	Cherry
e	Elm
eu	Eucalyptus
f	Fruit
h	Hazel
hc	Horse Chestnut
h	Horn Oak
hw	Hawthorn
h	Horn
l	Larch
la	Laurel
l	Lime
m	Magnolia
o	Oak
p	Pine
po	Poplar
pr	Pear
rh	Rhododendron
o	Olive
sb	Silver Birch
sc	Sweet Chestnut
so	Soft Pine
u	Unidentified
w	Willow
oia / spd / h	

KEY	
BT	British Telecom
CB	Cover Level
CTV	Cable Television
EL	Electric
EP	Electric Pole
FH	Fire Hydrant
GSV	Gas Stop Valve
HVC	High Voltage Cable
I	Inspection Cover
L	Lamp Post
LP	Lamp Post
M	Manhole
OH	Overhead
OP	Post Office
PP	Post Box
RP	Road Name Plate
RS	Road Sign
S	Somerset
ST	Stop Valve (Unidentified)
SV	Stop Valve
TB	Telephone Box
TH	Traffic Light
TL	Traffic Light
TP	Telegraph Pole
UTL	Unusable to Lift
V	Valve
WM	Water Meter
WV	Water Stop Valve

FENCES	
RWF	Barbed Wire Fence
CBF	Closed Barbed Fence
CLF	Chain Link Fence
CP	Concrete Post
CF	Chestnut Fencing
CWF	Chicken Wire Fence
PCF	Picket Fence
PPF	Post & Rail Fence
RF	Rail & Wire Fence
WMF	Wire Mesh Fence
WPF	Wood Panel Fence

STN	EASTINGS	NORTHINGS	LEVEL	TYPE
BASE	6984.974	7144.382	56.35	PGM
1	8713.754	7085.888	52.71	Nail
2	8806.837	7156.249	55.00	Nail
3	8870.692	6964.540	57.92	Nail
4	8846.184	7163.497	58.52	Peg
5	8278.420	7137.344	46.79	Peg
6	8356.760	7001.073	41.89	Nail
7	8300.078	6978.774	35.19	PGM
8	9164.847	6880.036	35.67	PGM
9	8533.760	6794.921	38.44	Peg
10	9006.334	6977.556	40.51	Nail
11	8728.277	6899.907	58.43	Nail

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RADIAN GROUP

Client

CAMP DOWN

Contract

HAVANT

SITE SURVEY

Title

688CD01

Drawing No.

SEPT 2016

Date

1:500

Scale

ST / PM

Surveyor

Appendix (C)

Proposed Site Layout

REF	NAME	DESCRIPTION	SQ.FT	HEIGHT	NO	CALC
-----	------	-------------	-------	--------	----	------

SUB TOTAL	440	466167
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OAK	OAKHAM	4 BEDROOM HOUSE	1180	2.0	2	2360
-----	--------	-----------------	------	-----	---	------

SUB TOTAL	188	146970
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GRAND TOTAL	628	613137
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Appendix (D)
Geotechnical Report

WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH1
Contract Ref: 28720	Start: 07.09.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results				
	0.10-0.20	1	ES			MADE GROUND: (Firm) orange brown sandy slightly gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to medium of brick. (Topsoil)	(0.35)	
	0.50	2	D			Firm medium strength orange brown mottled grey slightly sandy CLAY. Sand is fine. (HEAD DEPOSITS)	0.35	
	0.50		V	c _r =66				
	1.00-1.45	1	SPT	N=10				
	1.10		V	c _r =66				
	1.50	3	D					
	2.00-2.45	2	SPT	N=16				
	2.50	4	D					
	3.00-3.45	3	SPT	N=23		... Below 3.00m bgl, high strength		
							3.45	
						Borehole terminated at 3.45m depth.		

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m depth	
All dimensions in metres						Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson
						Logged By:	RSpeight
						Checked By:	

WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH2
Contract Ref: 28720	Start: 02.08.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				MADE GROUND: (Firm) orange brown sandy slightly gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to medium of brick. (Topsoil)	(0.35)	
	0.50	2	D				Firm medium strength orange brown mottled grey sandy CLAY. Sand is fine. (HEAD DEPOSITS)	0.35	
	0.50		V	$c_u=57$					
	1.00		V	$c_u=67$					
	1.50	3	D					(2.65)	
							... Below 2.00m bgl, orange red brown mottled grey,		
	2.30		V	$c_u=80$			... Below 2.30m bgl, high strength		
	2.50	4	D					3.00	
							Borehole terminated at 3.00m depth.		

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
						1. No groundwater was encountered 2. Borehole backfilled with arisings upon completion	
All dimensions in metres						Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor		Drilled By:	Michael O'Shea
						Logged By:	RSpeight
						Checked By:	AGS

WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH3
Contract Ref: 28720	Start: 07.09.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				MADE GROUND: Grass over friable sandy gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (Topsoil)	(0.30)	
	0.50	2	D				Firm medium strength orange brown mottled grey slightly sandy gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (HEAD DEPOSITS)	(0.60)	
	0.60		V	c _v =45				0.90	
	1.00-1.45	1	SPT	N=11			Firm medium strength orange red brown mottled grey slightly sandy CLAY. Sand is fine. (HEAD DEPOSITS)	(1.10)	
	1.40		V	c _v =61				2.00	
	1.50	3	D						
	2.00-2.45	2	SPT	N=7			Firm medium strength orange brown mottled grey slightly sandy silty CLAY. (HEAD DEPOSITS)	(1.45)	
	2.30		V	c _v =41					
	2.50	4	D						
	3.00-3.45	3	SPT	N=7				3.45	
							Borehole terminated at 3.45m depth.		

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m depth			
All dimensions in metres						Scale:	1:25		
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson	Logged By:	RSpeight
						Checked By:			AGS

WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH4
Contract Ref: 28720	Start: 02.08.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				MADE GROUND: Grass over friable sandy gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (Topsoil)	(0.30)	
	0.50	2	D				Firm medium strength orange brown mottled grey sandy slightly gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to medium of flint. (HEAD DEPOSITS)	(0.70)	
	0.80	V		c _u =44			Firm grey brown slightly sandy CLAY with occasional flint gravel. Sand is fine. Gravel is angular to subrounded fine to medium. (HEAD DEPOSITS)	1.00	
	1.40	3	D				... Between 1.20 and 1.25m bgl, gravel band with water.	(1.00)	
	2.40	4	D				... Between 1.90 and 2.00m bgl, gravel band with water. Firm orange grey brown mottled sandy silty CLAY. Sand is fine. (HEAD DEPOSITS)	2.00 (1.00)	
							Borehole terminated at 3.00m depth.	3.00	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. Groundwater was encountered between 1.20-1.25m 2. Borehole backfilled with arisings upon completion			
All dimensions in metres						Scale:	1:25		
Method Used: Tracked window sampling	Plant Used: Archway Competitor			Drilled By: Michael O'Shea	Logged By: RSpeight	Checked By:			

WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH5
Contract Ref: 28720	Start: 07.09.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water Backfill & Instru- mentation	Description of Strata	Depth (Thick- ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results				
	0.10-0.20	1	ES			MADE GROUND: Grass over friable sandy gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (Topsoil)	(0.30)	
	0.50	2	D			Firm medium strength orange brown grey mottled silty CLAY. (HEAD DEPOSITS)	0.30	
	0.50		V	c _v =67				
						... Below 0.80m bgl, flint gravel with red orange clay band.		
	1.00-1.45	1	SPT	N=10				
						... Below 1.40m bgl, grey brown with occasional decomposed plant matter and flint gravel.		
	1.50	3	D					
	1.60		V	c _v =60				
	2.00-2.45	2	SPT	N=10				
	2.70	4	D					
	3.00-3.45	3	SPT	N=8				
						Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m	
Method Used: Tracked window sampling						Scale: 1:25	
Plant Used: Archway Competitor+		Drilled By: ADavidson		Logged By: RSpeight		Checked By:	

WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH6
Contract Ref: 28720	Start: 02.08.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				MADE GROUND: Grass over friable sandy gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (Topsoil)	(0.30)	
	0.50	2	D				Firm medium to high strength orange brown mottled grey slightly sandy CLAY. (HEAD DEPOSITS)	0.30	
	0.60		V	c _v =58					
	0.90		V	c _v =75					
	1.00-1.45	1	SPT	N=11					
	1.50		V	c _v =89			... At 1.60m bgl, single flint gravel, subrounded, coarse.		
	1.60	3	D						
	2.00-2.45	2	SPT	N=12			... Below 2.00m bgl, firm to stiff red orange brown grey mottled.	(3.15)	
	2.50		V	c _v =89					
	2.60	4	D						
	3.00-3.45	3	SPT	N=12					
								3.45	
							Borehole terminated at 3.45m depth.		

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Rootlets to 1.00m depth 3. Borehole backfilled with arisings upon completion			
All dimensions in metres						Scale:	1:25		
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor		Drilled By:	Michael O'Shea	Logged By:	RSpeight
						Checked By:			

WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH7
Contract Ref: 28720	Start: 07.09.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				MADE GROUND: Grass over friable sandy gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (Topsoil)	(0.30)	
	0.50	2	ES				MADE GROUND: Orange brown sandy slightly gravelly CLAY with occasional pockets of grey clay. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (Reworked Natural)	(0.70)	
	1.10-1.20	3	ES				MADE GROUND: (Firm) grey brown silty slightly gravelly CLAY. Gravel is subrounded to subangular fine to coarse of brick and clinker.	(0.50)	
	1.70		V	c _u =35			Soft becoming firm low strength orange brown mottled grey silty CLAY. (HEAD DEPOSITS)	(1.50)	
	2.30	4	D					3.00	
							Borehole terminated at 3.00m depth.		

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m	
All dimensions in metres						Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson
						Logged By:	RSpeight
						Checked By:	AGS



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH8
Contract Ref: 28720	Start: 03.08.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.00-0.20	1	ES				TOPSOIL: Light brown slightly clayey SAND. Sand is fine.	0.20	
	0.50	2	D				Dense orange brown very silty clayey fine SAND. (BOGNOR SAND MEMBER) ... At 0.60m bgl, single subangular coarse flint gravel.		
	1.00-1.45	1	SPT	N=38					
	1.30	3	D						
	2.00-2.45	2	SPT	N=41					
	2.50	4	D						
	3.00-3.45	3	SPT	N=40					
							Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
						1. No groundwater was encountered 2. Borehole backfilled with arisings upon completion	
All dimensions in metres						Scale:	1:25
Method Used: Tracked window sampling	Plant Used: Archway Competitor			Drilled By: Michael O'Shea	Logged By: RSpeight	Checked By:	

WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH9
Contract Ref: 28720	Start: 07.09.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				TOPSOIL: Brown sandy gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to coarse of flint.	(0.35)	
	0.50	2	D				Firm medium to high strength orange brown mottled grey silty CLAY. (HEAD DEPOSITS)	0.35	
	0.50		V	c _r =65					
	1.00-1.45	1	SPT	N=7			... Below 1.00m bgl, occasional orange brown silty sand parting.		
	1.15		V	c _r =66					
	1.40	3	D						
	1.80		V	c _r =76				(3.10)	
	2.00-2.45	2	SPT	N=8			... Below 2.00m bgl, red orange brown grey mottled.		
	2.60	4	D						
	3.00-3.45	3	SPT	N=17					
							Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m	
All dimensions in metres						Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson
						Logged By:	RSpeight
						Checked By:	



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH10
Contract Ref: 28720	Start: 07.09.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				TOPSOIL: Brown sandy gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to coarse of flint.	(0.30)	
	0.50	2	D				Firm medium strength orange brown mottled grey slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse of flint. (HEAD DEPOSITS)	0.30	
	0.50		V	c _r =52					
	1.30	3	D				Below 1.00m bgl, red brown orange grey mottled and no gravel.		
	1.30		V	c _r =53					
	2.50	4	D						
	2.50		V	c _r =63					
							Borehole terminated at 3.00m depth.	3.00	

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
						1. No groundwater was encountered 2. Borehole backfilled with arisings upon completion	
All dimensions in metres						Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson
						Logged By:	RSpeight
						Checked By:	



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH11
Contract Ref: 28720	Start: 03.08.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				TOPSOIL: Brown sandy gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to coarse of flint.	0.20	
	0.40	2	D				Firm brown sandy gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to coarse of flint. (HEAD DEPOSITS)	(0.30) 0.50	
	0.70 0.80	3	V D	c _u =46			Firm medium strength orange grey brown mottled slightly sandy silty CLAY with occasional silty sand partings. (HEAD DEPOSITS)		
	1.00-1.45	1	SPT	N=8					
	1.50 1.60	4	V D	c _u =63					
	2.00-2.45	2	SPT	N=11			... Below 2.00m bgl, red orange grey brown mottled.	(2.95)	
	2.50 2.50	5	D V	c _u =64					
	3.00-3.45	3	SPT	N=13					
							Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
						1. No groundwater was encountered 2. Borehole backfilled with arisings upon completion	
All dimensions in metres						Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor		Drilled By:	Michael O'Shea
						Logged By:	RSpeight
						Checked By:	



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH12
Contract Ref: 28720	Start: 03.08.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				TOPSOIL: Red brown grey mottled sandy CLAY.	(0.30)	
	0.40	2	D				Firm medium strength orange brown grey mottled sandy CLAY. (HEAD DEPOSITS)	0.30	
	0.50		V	c _v =72					
	1.40	3	D					(1.40)	
	1.50		V	c _v =65				1.70	
	1.90	4	D				Orange brown silty SAND. (BOGNOR SAND MEMBER)		
	2.50	5	D				... Below 2.00m bgl, slightly damp.	(1.30)	
								3.00	
							Borehole terminated at 3.00m depth.		

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
						1. No groundwater was encountered 2. Borehole backfilled with arisings upon completion	
All dimensions in metres						Scale:	1:25
Method Used: Tracked window sampling	Plant Used: Archway Competitor			Drilled By: Michael O'Shea	Logged By: RSpeight	Checked By:	



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH13
Contract Ref: 28720	Start: 07.09.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results				
	0.10-0.20	1	ES			TOPSOIL: Red brown grey mottled sandy CLAY.	(0.30)	
						Firm medium strength orange brown mottled grey slightly sandy silty CLAY. Sand is fine. (HEAD DEPOSITS)	0.30	
	0.50	2	D				(0.70)	
	0.50	V		c _v =50			1.00	
	1.00-1.45	1	SPT	N=8		Firm medium strength red orange brown grey mottled CLAY. (LAMBETH GROUP) ... Below 1.00m bgl, red orange brown grey mottled.		
	1.50	3	D					
	1.50	V		c _v =65				
	2.00-2.45	2	SPT	N=10			(2.45)	
	2.70	4	D			... Below 2.50m bgl, becoming fissured with no sand.		
	3.00-3.45	3	SPT	N=16			3.45	
						Borehole terminated at 3.45m depth.		

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m	
All dimensions in metres						Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson
						Logged By:	RSpeight
						Checked By:	AGS



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH14
Contract Ref: 28720	Start: 03.08.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				TOPSOIL: Red brown grey mottled sandy CLAY.	(0.30)	
	0.60	2	D				Orange brown slightly sandy gravelly CLAY. Sand is fine. Gravel is angular to subangular medium to coarse of flint. (HEAD DEPOSITS)	(0.80)	
	1.30	3	D				Firm high strength red grey mottled slightly sandy slightly gravelly CLAY. Sand is fine. Gravel is angular to rounded fine to coarse of flint. (LAMBETH GROUP)	1.10	
	1.60		V	$c_u \geq 120$			... Below 1.50m bgl, becoming stiff to very stiff with no gravel.	(1.90)	
	2.40	4	D					3.00	
							Borehole terminated at 3.00m depth.		

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Borehole backfilled with arisings upon completion			
All dimensions in metres						Scale:	1:25		
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor		Drilled By:	Michael O'Shea	Logged By:	RSpeight
						Checked By:			

WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH15
Contract Ref: 28720	Start: 07.09.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results				
	0.10-0.20	1	ES			TOPSOIL: Red brown grey mottled sandy CLAY.	(0.30)	
	0.50	2	D			Soft orange grey brown mottled very sandy slightly gravelly CLAY. Sand is fine. Gravel is angular to subangular fine to medium of flint. (HEAD DEPOSITS)	(0.70)	
	1.00-1.45	1	SPT	N=24		Grey high strength orange mottled clayey SAND with rare flint gravel and occasional band of clay. Gravel is angular to subangular fine to coarse. (HEAD DEPOSITS)	1.00	
	1.40	3	D					
	2.00-2.45	2	SPT	N=16		... Below 2.00m bgl, medium strength.	(2.45)	
	2.70	4	D					
	3.00-3.45	3	SPT	N=9			3.45	
						Borehole terminated at 3.45m depth.		

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
						1. Groundwater encountered between 2.00-2.50m 2. Gas and groundwater monitoring well installed to 3.00m depth.	
All dimensions in metres						Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson
						Logged By:	RSpeight
						Checked By:	



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH16
Contract Ref: 28720	Start: 07.09.16 End: 04.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water Backfill & Instru- mentation	Description of Strata	Depth (Thick- ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results				
	0.10-0.20	1	ES			Grass over firm medium strength orange brown mottled grey slightly sandy silty CLAY with occasional silty sand partings. Sand is fine. (HEAD DEPOSITS)		
	0.50	2	D					
	0.50		V	$c_v=75$				
	1.00-1.45	1	SPT	N=10		... Below 1.00m bgl, becoming sandy silty clay.		
	1.20		V	$c_v=54$				
	1.40	3	D					
	2.00-2.45	2	SPT	N=18				
	2.50	4	D					
	3.00-3.45	3	SPT	N=18				
						Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks		
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)			
						1. No groundwater was encountered 2. Roots present to 0.80m 3. Gas and groundwater monitoring well installed to 3.00m		
All dimensions in metres						Scale:	1:25	
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson	Logged By: RSpeight
						Checked By:		



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH17
Contract Ref: 28720	Start: 07.09.16 End: 04.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results				
	0.10-0.20	1	ES			TOPSOIL: Firm brown sandy gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to medium of chalk and rare brick.	0.25	
	0.50	2	D			Firm medium to high strength orange brown slightly sandy CLAY. Sand is fine. Occasional mottled grey. (HEAD DEPOSITS)		
	0.50		V	c _r =64				
	1.00-1.45	1	SPT	N=10				
	1.20		V	c _r =71				
	1.30	3	D					
	1.60		V	c _r =86			(3.20)	
	2.00-2.45	2	SPT	N=13		Below 2.00m bgl, occasional pockets of fine to medium sand.		
	2.40	4	D					
	3.00-3.45	3	SPT	N=13				
							3.45	
						Borehole terminated at 3.45m depth.		

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m depth	
All dimensions in metres						Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson
						Logged By:	RSpeight
						Checked By:	

WINDOW SAMPLE LOG

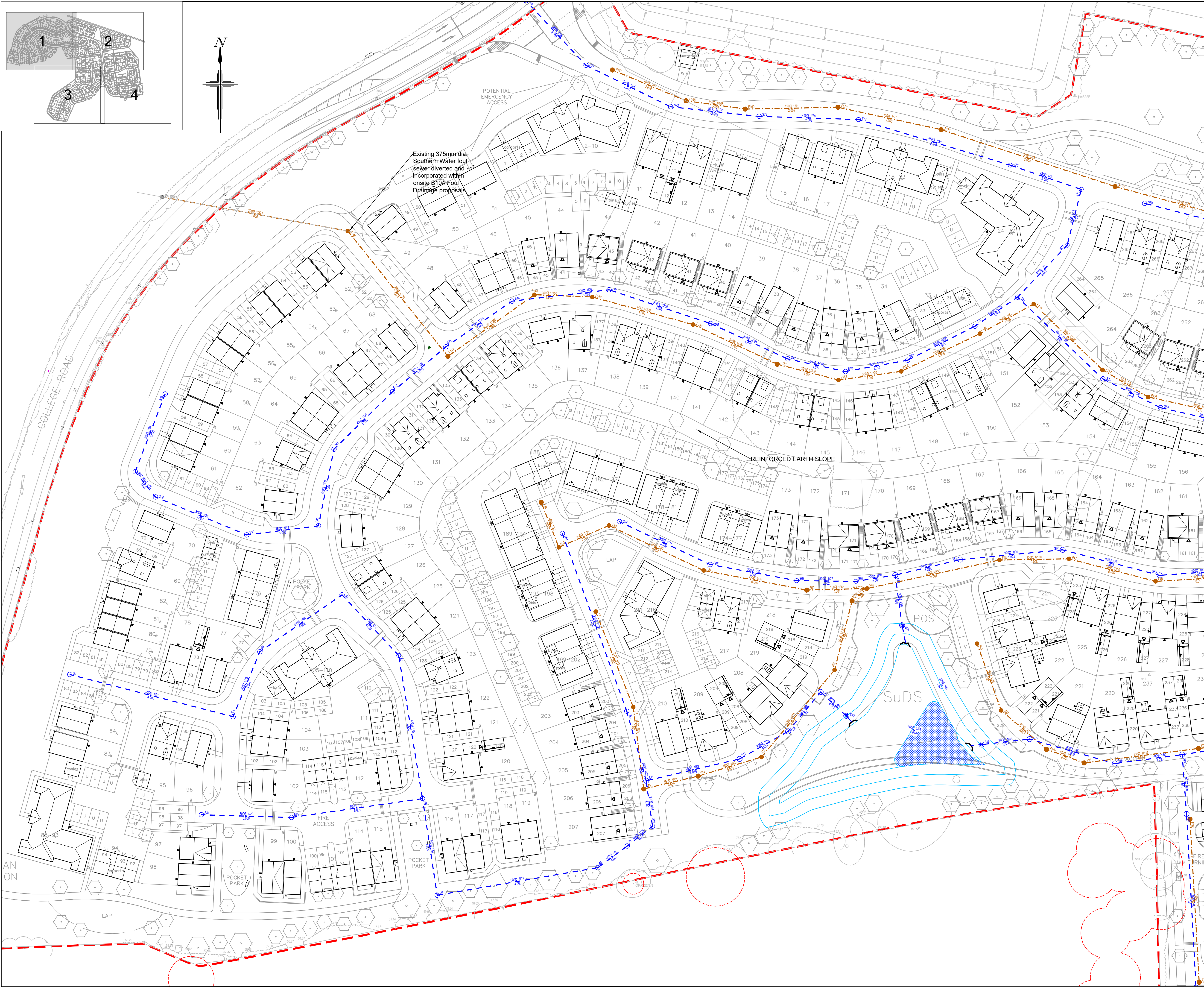
Contract: Campdown		Client: Radian		Window Sample: BH18
Contract Ref: 28720	Start: 07.09.16 End: 04.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results				
	0.10-0.20	1	ES			TOPSOIL: Brown grey mottled slightly sandy silty CLAY.	0.25	
	0.40	2	D			Firm medium strength orange brown grey mottled sandy silty CLAY. Sand is fine. (HEAD DEPOSITS)		
	0.50		V	c _r =43				
	0.80		V	c _r =48				
	1.00-1.45	1	SPT	N=9		Below 1.00m bgl, red brown grey mottled, slightly sandy.		
	1.20	3	D					
	1.40		V	c _r =70				
	1.90		V	c _r =75				
	2.00-2.45	2	SPT	N=11				
	2.30	4	D					
	3.00-3.45	3	SPT	N=12				
						Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)		
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m depth	
All dimensions in metres						Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson
						Logged By:	RSpeight
						Checked By:	

Appendix (E)

Proposed Surface and Foul Water Drainage Strategy



NOTES

1. All dimensions are in metres unless stated otherwise.
2. Do not scale from this drawing. Only written dimensions are to be used.
3. Site layout based on Cooper Baillie Sketch Layout drawing no: CB_62_265_001, revision A, dated 06/06/2023
4. Drainage strategy is indicative only and subject to further design development.
5. Only strategic main drainage are shown. Private connections are not shown at this stage.
6. All construction to be in accordance with Design & Construction Guidelines and Southern Water specific requirements.

KEY

Site Boundary

MAIN DRAINAGE KEY

Existing Foul Sewer Manhole

Adoptable Foul Sewer

Adoptable Surface Water Sewer

Wet Pond

Proposed Headwall

Proposed SuDS basins

(Subject to Detailed Design)

Proposed Surface Water Swale

(Subject to Detailed Design)

Root Protection Areas
(Based on Barrel Tree Consultancy Tree Constraints Plan,
drawing number 22062-1 A, issued to RCP in .dwg format on
26/10/2022.)

Any proposed works within Root Protection Areas are subject to supervision and approval by the Arboriculturist.

CDM NOTES

1. EXISTING SERVICES. Depth of existing services must be determined prior to works commencing. The contractor is responsible for establishing underground services in accordance with HSE Guidance note HS (G) 47. Any services which would be within the proposed construction layers must be lowered to below the sub-base.

Rev. Date Details By Chkd Appd



Site:- Roman Fields
Campdown,
Purbrook

Drawing Title:-
Drainage Strategy
Layout

Sheet 1 of 4

Date: June 2023 Scales: 1:500 at A1
Drawn: TRS Checked: TRS Approved: TS

Drawing No. DAN/E4993/013

FOR INFORMATION ONLY

