



**PROPOSED RESIDENTIAL DEVELOPMENT  
THE FAIRWAYS, LYMINGE**

**FLOOD RISK ASSESSMENT &  
DRAINAGE STRATEGY**

**MARCH 2023**

# Document Control Sheet

**Project name:** The Fairways, Lyminge

**Project ref:** PEN/E5069

**Report Title** Flood Risk Assessment

**Doc. ref:** TRS/PEN/E5069/18144

**Date:** 1<sup>st</sup> March 2023

|              | Name          | Position | Signature | Date       |
|--------------|---------------|----------|-----------|------------|
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| Revision | Date | Description | Prepared | Approved |
|----------|------|-------------|----------|----------|
|          |      |             |          |          |

## Flood Risk Assessment

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## 1.0 Executive Summary

Rogers Cory Partnership Limited has prepared this Flood Risk Assessment (FRA) in accordance with the guidance set out in the Department for Communities and Local Government National Planning Policy Framework (NPPF).

This report summarises the methodology and results of the FRA in relation to the planning application to support the new re-planning application for the residential development of up to 47 residential dwellings and outline consent for 2 self-build plots.

The site currently benefits from planning consent for a residential development of up to 28 residential dwellings and outline consent for 2 self-build plots per the planning permission 20/1397/FH

According to data supplied by the Environment Agency (EA), the site lies wholly within Flood Zone 1 considered a low risk of flooding from fluvial sources. This report therefore focuses on the site-specific flood risk assessment and surface water management in line with the requirements of the Environment Agency and Kent County Council.

The study will also examine the effects of the development on adjacent parcels of land.

A surface water drainage strategy has been developed and hydraulically modelled incorporating sustainable urban drainage systems (SuDS) in line with the NPPF and EA standing advice. The strategy is based on a reduction in the surface water run-off rates thus ensuring that the development does not increase the risk of flooding from the site during peak storm events.

## 2.0 Introduction

Rogers Cory Partnership Limited have been instructed on behalf of Pentland Homes to prepare an addendum to the existing Flood Risk Assessment (FRA) in support of a planning application for the new development comprising up to 49 residential dwellings

The development site has approved planning permission from Folkestone and Hythe District Council for the residential led development; but now seeks permission for change of density to from 30 to 49 dwellings

The National Planning Policy Framework (NPPF) was published in July 2018 and revised in February 2019 by the Department of Housing, 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 lie mainly within flood zone 1, considered to be at low risk of flooding from rivers or sea. In this respect requirements in the NPPF (foot note 20) states the following:

*"site-specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1; all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency); and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding."*

The EA Guidance Note 3 (April 2012) 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;*

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- *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 site is located off Canterbury Road approximately 500m south east of the centre of Lyminge. The site is bounded by Surgery to the north, a golf course to the south and East Brook on the east with National Grid reference 616416, 140526 (See **Appendix A**).

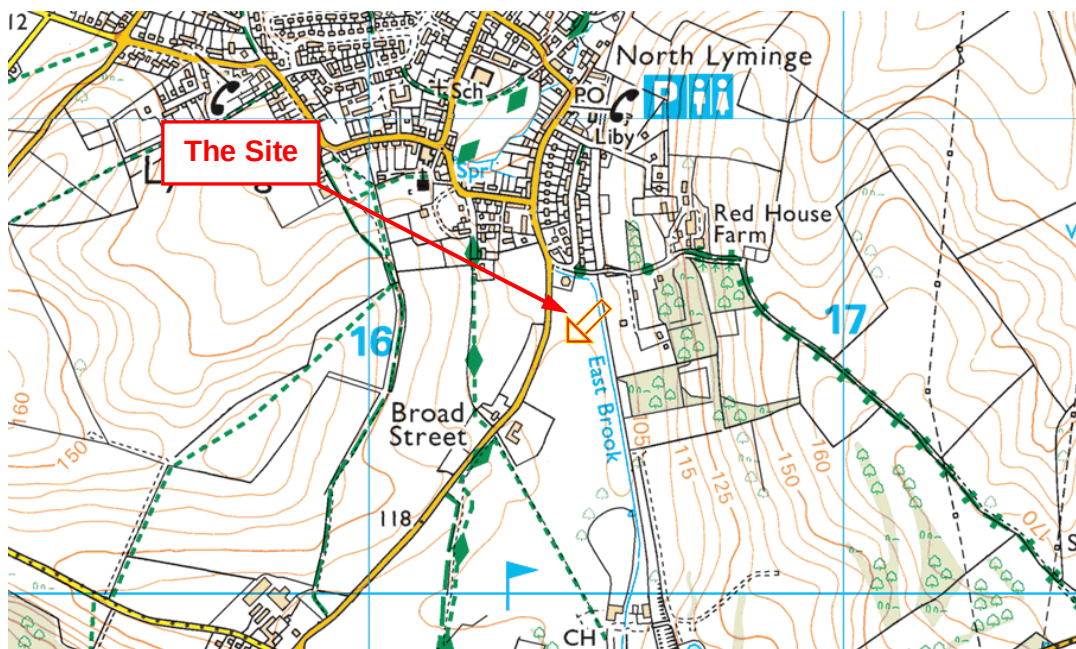


**Figure 1- Site Location and Extent**

#### 3.2 Existing Topography

A topographical survey was carried out by JC White Geomatics Limited in July 2017 (updated November 2020) in August 2016 and is related to Ordinance Survey Datum.

The survey generally shows levels ranging from approximately 106.43mAOD in the southern part of the site to the lowest point of 100.95mAOD at the northern boundary. (See **Appendix B**).

### 3.3 Development Proposals

The proposed residential development of 47 new dwellings as well as 2 no. self builds. A copy of the proposed site layout is presented in **Appendix C**.

### 3.4 Existing Geological Information

According to existing British Geological Survey (BGS) maps the site is located over the West Melbury Marly Chalk Formation with a superficial Head deposit in the northern parts of the site

Intrusive ground investigations carried out by Ground and Environmental Services Limited in August 2018 indicate the in-situ ground as comprising of Made Ground/Topsoil to 0.3-0.4mbgl over head Deposits 0.8-2.6mbgl which comprise of soft and firm mid brown slightly silty sandy clay with random find to coarse gravel. The West Melbury Chalk Member was not proven on site

Groundwater was measured at depths ranging from 1.05 to 3.1mbgl. Infiltration testing was carried out in two locations and indicated very low soakage potential therefore concluding that infiltration drainage would not be feasible.

### 3.5 National Policy Context

National policy regarding flood risk is contained within the National Planning Policy Framework and Technical guidance which was issued by the Department of Housing, Communities and Local Government in March 2012 and subsequently was published in July 2018 and revised in February 2019 by the Department of Housing, Communities and Local Government. The Environment Agency's latest revision of their Flood Risk Standing Advised (FRSA) (version 3.1) was released in April 2012.

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 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.

## 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 developing an area of land which is located mainly wholly within Flood Zone 1, considered the lowest risk of flooding from fluvial sources.

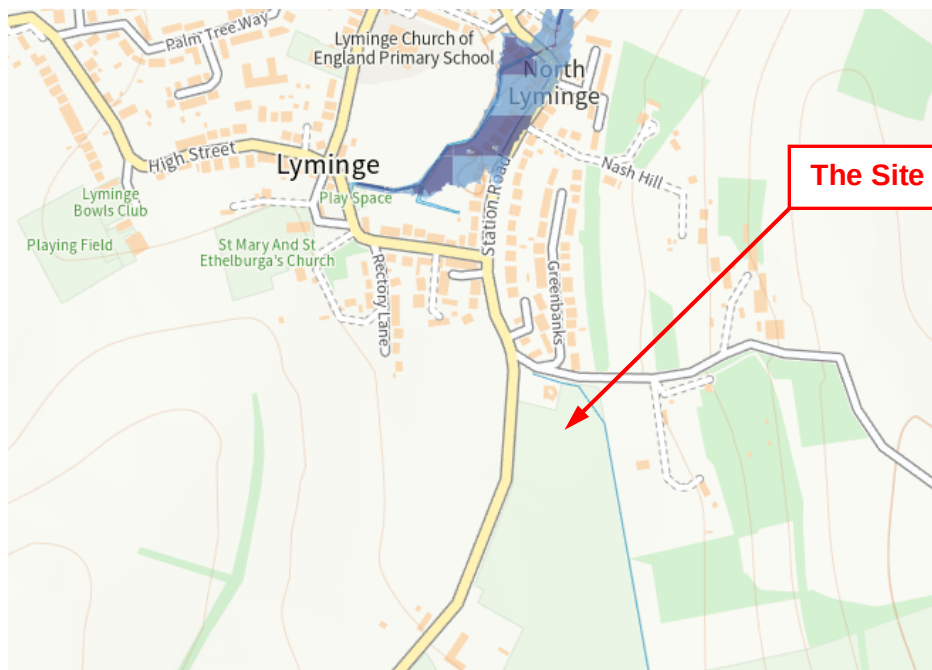


**Figure 2- Extract from DEFRA .GOV.UK Website- Flood Map for Planning (Rivers and Sea)**

### 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 Strategic Flood Risk Assessment (July 2015) was produced by Herrington Consulting Limited on behalf of Folkestone, Hythe & Romney Marsh Shepway District Council.

## 4.2 Existing Information on Flooding

### Fluvial and Tidal Flood Risk

According to the EA Flood Map, see **figure 2**, the site appears to be located wholly within Flood Zone 1 considered low risk of flooding from fluvial or tidal sources.

It is noted that an existing ordinary watercourse, the East Brook, runs along the eastern boundary of the site. Whilst this is not a main river the effects of the potential of this watercourse flooding has been reviewed by the risk of surface water flood maps which deem the risk to the development as low.

The development proposals have sought to provide a clear corridor alongside this watercourse to aid with future maintenance and clearance works of this watercourse.

### Sewer Flood Risk

There are no recorded incidences of sewer flooding within the vicinity of the site. Any potential future risk to the proposed development from sewer flooding events is considered low in the context that the finished levels on the site will be designed to ensure that any overland flow is directed away from the buildings and not pose a risk to people or property.

### Surface Water Flood Risk

Searches of the EA Risk of Flooding from Surface Water flood map confirm that the site lies mainly outside the of any risk of flooding from surface water. There are parts of the site along the eastern boundary considered to have low to medium risk of flooding from surface water but this is confined within the East Brook.



**Figure 3 Extract: – Extract from GOV.UK Risk of Surface Water Flood Risk Maps**

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### Groundwater Flood Risk

A review of the groundwater levels indicates that the risk of groundwater flooding to the development is low.

Any potential residual risk to the new development will be mitigated through the detailed design of the finished ground levels which will seek to have building floor levels above the existing ground levels and ensure adequate falls away from the building to protect both building and people.

### 4.3 Climate Change

As of the 19<sup>th</sup> 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

| <b>Stour Management Catchment peak rainfall allowances</b> | <b>3.3% annual exceedance rainfall event<br/>2050s</b> | <b>3.3% annual exceedance rainfall event<br/>2070s</b> | <b>1%annual exceedance rainfall event<br/>2050s</b> | <b>1%annual exceedance rainfall event<br/>2070s</b> |
|------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| <b>Upper end</b>                                           | +20%                                                   | +40%                                                   | +45%                                                | +45%                                                |
| <b>Central</b>                                             | +20%                                                   | +40%                                                   | +20%                                                | +20%                                                |

**Table 1: Extract from DEFRA website for Stour 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

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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.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>More vulnerable</b></p> <ul style="list-style-type: none"> <li>Hospitals.</li> <li>Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.</li> <li><b>Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.</b></li> <li>Non-residential uses for health services, nurseries and educational establishments.</li> <li>Landfill and sites used for waste management facilities for hazardous waste<sup>6</sup>.</li> <li>Sites used for holiday or short-let caravans and camping, <i>subject to a specific warning and evacuation plan.</i><sup>7</sup></li> </ul> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**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'**

## 4 Surface Water Management

Kent County Council (KCC) are the Lead local flood Authority for Folkestone and Hythe District 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 intrusive investigations carried out onsite. The use of both attenuation basins, ponds as well as offline attenuation tanks are proposed within the surface water drainage scheme.

### 5.1 Existing Surface Water Drainage Regime

A base line hydrology plan has been produced to review the current surface water run-off from this Greenfield site and into the existing ordinary watercourses along its northern boundary. This plan is presented as **Appendix E**.

### 5.2 Pre Development Run Off

The historic Greenfield run-off rate is based on the IH Report 124 'Flood estimation for small catchments' (Marshall and Bayliss, 1994).

The following baseline parameters were used to determine the sites historic Greenfield run off rates:

SAAR (mm): 800

Soil: 0.45

Region 7

Area: 0.9448ha (impermeable area of proposed site)

Return Period: 100 Year

The historic Greenfield run-off rates have been summarised in Table 2 below:

| Area (Ha) | QBar Urban (L/sec) | Q1 Year (L/Sec) | Q30 Year (L/Sec) | Q100 Year (L/Sec) |
|-----------|--------------------|-----------------|------------------|-------------------|
| 0.9448    | 4.9                | 4.1             | 11               | 15.5              |

**Table 2: Summary of Greenfield runoff rates and volumes**

### 5.3 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.

### 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

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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 as well as attenuation tanks 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.

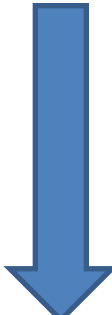
| SuDS Component                | Potential of delivering SuDS Design Criteria                                                                                  |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Infiltration Systems          | <div style="text-align: center;">  </div> |
| 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     |                                                                                                                               |
|                               | Low                                                                                                                           |

**Table 3: Theoretical SuDS Hierarchy**

### Infiltration Drainage

Intrusive ground investigations carried out indicate that the underlying strata consists of firm clay and silt with low permeability. As such full infiltration drainage has not been deemed suitable for this site.

### Existing Watercourses

There is an existing watercourse which runs along the eastern and northern 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 northern 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, KCC 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 F**.

### 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, northwards towards a new attenuation basin and bio-retention area which will provide attenuation of the restricted flow prior to discharging to the existing watercourse north of the site. Additional attenuation is provided within below ground tanks and a basin in the southern part 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 (Qbar)

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

The hydraulic calculations have been simulated under various scenarios up to and including 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 J**.

The hydraulic calculations have been simulated under various scenarios up to and including 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) |
|-----------------------------------|-----------------|------------------|--------------------------------|
| 0.9448                            | 4.9             | 4.9              | 4.9                            |

**Table 5: 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 6 below**:

| Factors influencing pollution levels in urban run-off                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The amount and type of pollution washed off a surface will depend on many things including:</p> <ul style="list-style-type: none"> <li>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)</li> </ul> |

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- 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 6: 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. | Low                    | 0.5                          | 0.4    | 0.4          |

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|                                     |  |  |  |  |
|-------------------------------------|--|--|--|--|
| Less than 300 vehicle movements/day |  |  |  |  |
|-------------------------------------|--|--|--|--|

**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

|                        | Mitigation indices |        |              |
|------------------------|--------------------|--------|--------------|
| Type of SuDS component | 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:

**Total SuDS mitigation index = mitigation index<sub>1</sub> + 0.5(mitigation index<sub>2</sub>)**

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.

#### 5.4.4 Long Term Maintenance

Consideration has been given to the long-term maintenance of the proposed drainage structures. SuDS attenuation basins, bio retention areas, granular filter drainage 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.

#### 5.4.5 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. Based on the strategic finished floor levels and topographical survey it has however been possible to demonstrate the anticipated exceedance flow routes which can be found in **Appendix H**.

### 5 Foul Water Drainage Strategy

The proposed foul water discharge generated by the site has been calculated at 2.26l/s (based on 49 dwellings at 4000l/dwelling/day) in accordance with Sewers for Adoption

The proposed foul water drainage will be conveyed via new below ground sewers to a new onsite pumping station and discharge to the existing Southern Water public foul sewer located in Greenbanks

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

## 6 Conclusion

This site-specific flood risk assessment has demonstrated that the development proposals is appropriate in terms of flood risk and the provision of flood mitigation measures.

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 climate change), in accordance with the NPPF, PPG and KCC requirements

The development's surface water discharge is proposed to be attenuated to the pre-development Greenfield run-off rates through the use of SuDS techniques and re-use of existing resources.

In view of this assessment, the report concludes that:

- i. That whilst the site is located wholly within Flood Zone 1, considered low risk of
- 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**



## **Appendix (B)**

### **Topographical Survey**



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# LEGEND

**SERVICES**

AV AIR VENT  
CAJB CABLE JUNCTION BOX  
CATV CABLE TELEVISION COVER  
CD CABLE DUCT  
CIP CABLE INSPECTION POINT  
EIC ELECTRIC INSPECTION COVER  
EJB ELECTRIC JUNCTION BOX  
EP ELECTRICITY POLE  
ER EARTHING ROD  
FH FIRE HYDRANT  
GIC GAS INSPECTION COVER  
GJB GAS JUNCTION BOX  
GV GAS VENT  
JB JUNCTION BOX  
Mk(E) SERVICE MARKER (ELECTRIC)  
Mk(G) SERVICE MARKER (GAS)  
Mk(W) SERVICE MARKER (WATER)  
OHW OVERHEAD WIRE  
SC(G) STOP COCK (GAS)  
SC(W) STOP COCK (W)  
STP SUPPORT FOR TELEPHONE POLE  
SV STOP VALVE  
TIC TELEPHONE INSPECTION COVER  
TJB TELEPHONE JUNCTION BOX  
TP TELEPHONE POLE  
WIC WATER INSPECTION COVER  
WM WATER METER

**LEVEL**

DPC DAMP PROOF COURSE  
THL THRESHOLD LEVEL  
T.O.C TOP OF CHIMNEY  
T.O.W TOP OF WALL  
WL WATER LEVEL

**INTERNAL**

CLG CEILING LEVEL  
DHL DOOR HEAD LEVEL  
FL FLOOR LEVEL  
SCLG SUSPENDED CEILING LEVEL  
USB UNDERSIDE OF BEAM  
WCL WINDOW CILL LEVEL  
WHL WINDOW HEAD LEVEL

**DRAINAGE**

BO BACK DROP  
BL BASE/BED LEVEL  
CL COVER LEVEL  
CP CATCH PIT  
DC DRAINAGE CHANNEL  
DP DOWN PIPE  
G GULLY  
IC INSPECTION COVER  
IL INVERT LEVEL  
MH(C) MANHOLE (COMBINED)  
MH(F) MANHOLE (FOUL)  
MH(S) MANHOLE (SURFACE WATER)  
RE RODDING EYE  
RWP RAIN WATER PIPE  
SEG SIDE ENTRY GULLY  
SVP SOIL VENT PIPE  
UTL UNABLE TO LIFT  
VP VENT PIPE  
WO WASH OUT

**FEATURES**

B BOLLARD  
BH BORE HOLE  
BP BRICK PILLAR  
BS BUS STOP  
CPS CONCRETE PAVING SLABS  
FB FLOWER BED  
LB LITTER BIN  
LC LIGHTING COLUMN  
P POST  
PB POST BOX  
RNP ROAD NAME PLATE  
RS ROAD SIGN  
RW RETAINING WALL  
SP SIGN POST  
SU STEP(S) UP  
TCB TELEPHONE CALL BOX  
TH THIAL HOLE  
TS TREE STUMP

**CONTROL**

OSBM ORDNANCE SURVEY BENCH MARK  
STN SURVEY STATION  
TBM TEMPORARY BENCH MARK

● TREE (girth/spread/height/species/no. of boles)  
→ DIRECTION OF LEAN  
① PHOTOGRAPH NUMBER, LOCATION & DIRECTION

— GATE — GATES

— FENCE —

— BUILDING —

— OVER HEAD BUILDING LINE —

— FACE OF WALL —

— BACK OF RETAINING WALL —

— LINE —

— CHANGE OF SURFACE —

— EDGE OF UNDERGROWTH —

↑ BANKING

— TOP OF BANK —

— BOTTOM OF BANK —

— KERB —

— DROP KERB —

— VERGE —

— CONTOUR WITH VALUE —

— OVER HEAD WIRE —

— TREE LINE —

FOR FUTURE SURVEY WORK OR SETTING OUT, J. C. WHITE GEOMATICS LIMITED QUOTED SURVEY CONTROL COORDINATES & LEVELS MUST BE USED, UNDER NO CIRCUMSTANCES SHOULD ANY OTHER SURVEYED POINTS ON THE DRAWING BE USED OTHER THAN AS A GROSS ERROR CHECK.

TREE GIRTHS AND SPREADS ARE QUOTED AS A MEAN SIZE, AND SHOWN TO SCALE.

WHILST EVERY EFFORT IS MADE TO IDENTIFY TREE SPECIES AND GAUGE HEIGHTS, NO RESPONSIBILITY CAN BE TAKEN FOR THE ACCURACY OF THIS INFORMATION.

WHILST EVERY EFFORT IS MADE TO ENSURE THAT PIPE DIAMETERS, INVERT LEVELS AND DRAINAGE TYPES ARE CORRECT, THE ACCURACY OF THIS INFORMATION CANNOT BE GUARANTEED, AND IT IS STRONGLY RECOMMENDED THAT EXISTING INFORMATION IS CHECKED PRIOR TO THE COMMENCEMENT OF ANY DETAILED DESIGN AND CONSTRUCTION WORKS.

LEVELS AT KERB LINES ARE CHANNEL LEVELS.

ALL LEVELS ARE RELATED TO ORDNANCE DATUM DERIVED USING OS ACTIVE RINEX DATA.

ALL COORDINATES ARE BASED ON A LOCAL GRID CENTERED ON AN OS ACTIVE RINEX DERIVED COORDINATE FOR STN 1. ALL COORDINATES HAVE BEEN COMPUTED USING A SCALE FACTOR OF 1.00000.

DUE TO THE UNMAINTAINED NATURE OF SOME AREAS OF THE SITE, IT CANNOT BE GUARANTEED THAT ALL FEATURES HAVE BEEN SURVEYED.

CONTOUR INTERVAL 0.5 METRES.

ORDNANCE SURVEY DIGITAL DATA IS SHOWN IN GREY.

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EXTENT OF SHEPWAY DISTRICT COUNCIL  
PREFERRED OPTION LAND

## Sheet Layout

| CONTROL SCHEDULE |            |            |         |             |
|------------------|------------|------------|---------|-------------|
| STATION          | EASTING    | NORTHING   | HEIGHT  | DESCRIPTION |
| 1                | 616476.527 | 140488.233 | 104.653 | Peg         |
| 2                | 616400.715 | 140491.471 | 106.062 | Peg         |
| 3                | 616450.699 | 140630.985 | 102.799 | Peg         |
| 4                | 616405.972 | 140626.834 | 102.981 | Peg         |
| 5                | 616385.227 | 140547.330 | 104.663 | Peg         |
| 6                | 616324.562 | 140433.885 | 105.978 | Nail        |
| 7                | 616350.008 | 140494.755 | 103.956 | Nail        |
| 8                | 616370.778 | 140560.043 | 102.590 | Nail        |
| 9                | 616386.451 | 140692.230 | 100.989 | Nail        |
| 10               | 616375.171 | 140607.145 | 102.030 | Peg         |
| 11               | 616376.433 | 140541.456 | 101.736 | Peg         |
| 12               | 616378.216 | 140674.475 | 101.273 | Nail        |
| 13               | 616484.815 | 140679.090 | 107.876 | Nail        |
| 14               | 616451.264 | 140675.724 | 105.291 | Peg         |

C Additional survey at entrance to the surgery and the golf course area re-surveyed within given extents. Sep'22 LOC

B Survey extended to South & Entrance set out. Nov' 20 JS

A Extent of preferred option land added. Aug 17 LH

REV DESCRIPTION DATE INITIAL

**J. C. WHITE**

Geomatics Limited

Shrine Barn, Shrine Farm, Sandling Road, Postling, Hythe, Kent, CT21 4HE

Tel : 01303 261212 Fax : 01303 264040

Email : survey@jcwhite.co.uk Web site : www.jcwhite.co.uk

- GPS Surveys
- Volumetric Surveys
- Topographical Surveys
- Measured Building Surveys
- Laser Scanning

- Setting Out
- Boundary Disputes
- Engineering Surveys
- Deformation & Settlement Surveys
- Scan to BIM Modelling

CLIENT

Pentland Homes Ltd.

JOB TITLE

Land at Etchinghill Golf Course,  
Canterbury Road, Lyrminge,  
Kent, CT18 8NS

DRAWING TITLE

Topographical  
Survey

JOB No. 17/00/130

DATE July 2017

SURVEYED BY L.H./P.V.

DRAWN BY L.Hogben

SCALE 1:500

DWG. No. 3

REV. No. C

CAD PLOT DATE 09.03.2023

ORIGINAL SHEET SIZE A0

CADFILE NAME 1700130 - Land at Etchinghill Golf Course. Lyrminge REV C\_01.dwg

## **Appendix (C)**

### **Feasibility Study – Site Layout Plan**



| Notes: |
|--------|
| XXX    |

PLANNING LAYOUT KEY:

- 1.8m High Brick wall
- 1.8m High Close boarded timber fence
- 1.1m High Rail
- 0.9m High Chestnut Fencing
- Affordable dwellings
- Block paving
- Private Drives
- Existing vegetation retained
- Refuse collection point
- Timber cycle store
- Gate

| Pentland Homes | Lyminge re sketch 4 |      |         |       |            | ARCHITECTURE |
|----------------|---------------------|------|---------|-------|------------|--------------|
| Reference      | Floor Area (Sqft)   | Beds | Storeys | Total | Total Sqft | % of Mix     |
| Private        |                     |      |         |       |            |              |
| 2 BEDS         |                     |      |         |       |            |              |
| Barnham        | 749                 | 2    | 2       | 3     | 2247       | 6.4          |
| Wingham        | 792                 | 2    | 2       | 4     | 3168       | 8.5          |
| 3 BEDS         |                     |      |         |       |            |              |
| Asham          | 943                 | 3    | 2       | 8     | 7544       | 17.0         |
| Hadlow         | 1029                | 3    | 2       | 3     | 3087       | 6.4          |
| 4 BEDS         |                     |      |         |       |            |              |
| Palmarsh       | 1022                | 4    | 2       | 2     | 2044       | 4.3          |
| Leitham        | 1191                | 4    | 2       | 1     | 1191       | 2.1          |
| Chilham        | 1250                | 4    | 2       | 1     | 1250       | 2.1          |
| Halling        | 1400                | 4    | 2       | 2     | 2800       | 4.3          |
| Marden         | 1571                | 4    | 2       | 1     | 1571       | 2.1          |
| Monkton        | 1575                | 4    | 2       | 2     | 3150       | 4.3          |
| Ryesh          | 1600                | 4    | 2       | 5     | 8000       | 10.6         |
| 6 BEDS         |                     |      |         |       |            |              |
| Downs          | 1925                | 5    | 2       | 1     | 1925       | 2.1          |
| Brasted        | 2000                | 5    | 2       | 4     | 8000       | 8.5          |
| Sub-Total      |                     |      |         | 37    | 48977      | 78.7         |
| Affordable     |                     |      |         |       |            |              |
| TYPE A         | 636                 | 1    | 2       | 3     | 1908       | 6.4          |
| TYPE B         | 778                 | 1    | 2       | 3     | 2334       | 6.4          |
| Ash            | 792                 | 2    | 2       | 1     | 792        | 2.1          |
| TYPE 3.1       | 903                 | 3    | 2       | 2     | 1806       | 4.3          |
| Palmarsh       | 1022                | 4    | 2       | 1     | 1022       | 2.1          |
| Sub-Total      |                     |      |         | 14    | 7866       | 21.3         |
| Total          |                     |      |         | 47    | 53839      |              |

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |          |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----------|
| PA5  | Layout updated to suit highway consultants comments                                                                                                                                                                                                                                                                                                                                                                                                                    | SSH | 07.03.23 |
| PA4  | Application boundary amended as per client comments.                                                                                                                                                                                                                                                                                                                                                                                                                   | LS  | 03.03.23 |
| PA3  | Plot 4 & 5 moved to clients comermnts                                                                                                                                                                                                                                                                                                                                                                                                                                  | SSH | 15.02.23 |
| PA2  | Scheme updated to suit new layout to suit client comments                                                                                                                                                                                                                                                                                                                                                                                                              | SSH | 01.02.23 |
| PA1  | Cycle stores removed from Chartham plots. Entry feature removed. Schedule updated to suit changes to Chartham and Thurnham house types. Turning head adjacent to plots 37-39 amended to suit tracking. Bins to plot 5-7 amended. Visitor bays moved to suit visibility splay adjacent to plot 19. Gate added to path serving plot 32. Private driveways hatched to indicate block paving material. Boundary introduced at north edge of site. All to clients comments. | LS  | 25.11.22 |
| REV: | DESCRIPTION:                                                                                                                                                                                                                                                                                                                                                                                                                                                           | BY: | DATE:    |

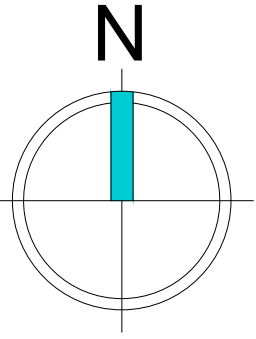
# STEN

## ARCHITECTURE

STEN Architecture Ltd  
The Studio  
Harrison Street  
Wakefield  
WF1 1PS  
Tel: 01924 950985

Web: [www.sten-architecture.co.uk](http://www.sten-architecture.co.uk)  
Twitter: @STEN\_arch  
Facebook: [stenarchitectureltd](https://www.facebook.com/stenarchitectureltd)  
Linkedin: Sten Architecture

|                               |                        |                                                                                       |                 |
|-------------------------------|------------------------|---------------------------------------------------------------------------------------|-----------------|
| CLIENT:                       |                        |  |                 |
| SITE: Broad Street<br>Lyminge |                        |                                                                                       |                 |
| TITLE: Planning Layout        |                        |                                                                                       |                 |
| SCALE AT A1:<br>1:500         | DATE:<br>11.10.22      | DRAWN:<br>BMS                                                                         | CHECKED:<br>SSH |
| PROJECT NO:<br>2234           | DRAWING NO:<br>2234.01 | REVISION:<br>PA5                                                                      |                 |



## **Appendix (D)**

### **Geotechnical Information**





# Ground and Environmental Services Limited

Unit 2 Montpelier Business Park  
Dencora Way, Ashford  
Kent TN23 4FG

T: 01233 646237

Hole ID. WS1

## Installation Details & Readings

Sheet: 1 of 2

|                                                                                                                                                       |  |                                                                                                                                     |  |                                                      |                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------|-----------------------------------------|
| Equipment & Methods.<br>Premier 110 Compact<br>_Backfill: 35mm diameter standpipe                                                                     |  | Project Name: Etchinghill Golf - Golf Course<br>Project Location: Canterbury Road, Lyminge, Kent, England<br>Client: Pentland Homes |  | Job No:<br>11997                                     |                                         |
| Co-ordinates:<br>E:<br>N:                                                                                                                             |  | Ground Level (m):                                                                                                                   |  | Date Started:02/07/2018<br>Date Completed:02/07/2018 |                                         |
| Installation Date : 02/07/2018      Depth to TOP Response Zone : 1 (m)<br>Installation Type : SP                  Depth to BASE Response Zone : 4 (m) |  |                                                                                                                                     |  | Installation<br>Diagram                              | Depth Related<br>Remarks<br>(Elevation) |
|                                                                                                                                                       |  |                                                                                                                                     |  | Bentonite                                            | 0.5                                     |
|                                                                                                                                                       |  |                                                                                                                                     |  | 1 (-1.00)                                            | 35mm standpipe<br>with gravel annulus   |
| Notes: For explanation of symbols and abbreviations, see Key Sheet.                                                                                   |  |                                                                                                                                     |  | Compiled By:                                         | Checked By:                             |
|                                                                                                                                                       |  |                                                                                                                                     |  | CS                                                   | MP                                      |
|                                                                                                                                                       |  |                                                                                                                                     |  | Scale:                                               | Approved By:                            |
|                                                                                                                                                       |  |                                                                                                                                     |  | FIG No.                                              |                                         |



# Ground and Environmental Services Limited

Unit 2 Montpelier Business Park  
Dencora Way, Ashford  
Kent TN23 4FG

T: 01233 646237

Hole ID. WS1

## Installation Details & Readings

Sheet: 2 of 2

|                                                                                                                                                   |  |                                                                                                                                             |  |                                                      |                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------|-----------------------------------------|
| Equipment & Methods.<br>Premier 110 Compact<br>_Backfill: 35mm diameter standpipe                                                                 |  | Project Name: Etchinghill Golf - Golf Course<br><br>Project Location: Canterbury Road, Lyminge, Kent, England<br><br>Client: Pentland Homes |  | Job No:<br><br>11997                                 |                                         |
| Co-ordinates:<br>E:<br>N:                                                                                                                         |  | Ground Level (m):                                                                                                                           |  | Date Started:02/07/2018<br>Date Completed:02/07/2018 |                                         |
| Installation Date : 02/07/2018      Depth to TOP Response Zone : 1 (m)<br>Installation Type : SP              Depth to BASE Response Zone : 4 (m) |  |                                                                                                                                             |  | Installation<br>Diagram                              | Depth Related<br>Remarks<br>(Elevation) |
|                                                                                                                                                   |  |                                                                                                                                             |  |                                                      | 4      ( -4.00 )                        |
|                                                                                                                                                   |  |                                                                                                                                             |  |                                                      |                                         |
|                                                                                                                                                   |  |                                                                                                                                             |  |                                                      |                                         |
|                                                                                                                                                   |  |                                                                                                                                             |  |                                                      |                                         |
|                                                                                                                                                   |  |                                                                                                                                             |  | Compiled By:                                         | Checked By:                             |
|                                                                                                                                                   |  |                                                                                                                                             |  | CS                                                   | MP                                      |
|                                                                                                                                                   |  |                                                                                                                                             |  | Scale:                                               | Approved By:                            |
|                                                                                                                                                   |  |                                                                                                                                             |  | FIG No.                                              |                                         |
| Notes: For explanation of symbols and abbreviations, see Key Sheet.                                                                               |  |                                                                                                                                             |  |                                                      |                                         |

GSG PIEZO/STANDPIPE LOG LOGS.GPJ | GSG-AGS3-STD TEMPLATE.GDT 6/8/18





# Ground and Environmental Services Limited

Unit 2 Montpelier Business Park  
Dencora Way, Ashford  
Kent TN23 4FG

Tel: 01233 646237

Window  
Sampler Log No. WS3

Sheet: 1 of 1

| Equipment & Methods.<br>Premier 110 Compact<br>Backfill: 35mm diameter standpipe |     |      |        | Project Name: Etchinghill Golf - Golf Course<br>Project Location: Canterbury Road, Lyminge, Kent, England<br>Client: Pentland Homes |                                                                                                                                                                      | Job No:<br>11997                                     |        |                   |
|----------------------------------------------------------------------------------|-----|------|--------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------|-------------------|
| Co-ordinates:<br>E:<br>N:                                                        |     |      |        | Ground Level (m):                                                                                                                   |                                                                                                                                                                      | Date Started:02/07/2018<br>Date Completed:02/07/2018 |        |                   |
| Samples and In situ Testing                                                      |     |      |        | Field Records                                                                                                                       | DESCRIPTION                                                                                                                                                          | Reduced Level (m)                                    | Legend | Depth (Thick) (m) |
| Depth (m)                                                                        | No. | Type | Result |                                                                                                                                     |                                                                                                                                                                      |                                                      |        |                   |
| 0.40- 0.50                                                                       |     | TUB  |        | 1,1/2,1,2,3                                                                                                                         | TOP SOIL: grey and brown sandy slightly gravelly clay, Sand is subangular fine to medium. Gravel is subangular fine to coarse flint. Roots to 3mm diameter           | -0.40                                                |        | (0.40)            |
| 0.90- 1.00                                                                       |     | D    |        |                                                                                                                                     | Firm to stiff (medium strength) brown very sandy CLAY, Sand is subangular fine to medium<br><b>(Head)</b>                                                            | -1.40                                                |        | 0.40              |
| 1.75- 2.00                                                                       |     | D    | CN=8   |                                                                                                                                     | Firm light grey and light brown silty slightly gravelly CLAY, Gravel is subangular fine to coarse flint. Chalk gravel<br><b>(West Melbury Chalk Formation)</b>       | -1.95                                                |        | 1.40              |
| 2.50- 2.60                                                                       |     | D    |        | 2,2/3,4,4,4                                                                                                                         | Stiff (high strength) light brown clayey slightly gravelly SILT, Gravel is subangular fine to coarse flint. Gravel of chalk<br><b>(West Melbury Chalk Formation)</b> | -2.50                                                |        | 1.95              |
| 3.70- 3.90                                                                       |     | D    | CN=15  |                                                                                                                                     | Firm (medium strength) light grey clayey SILT, Chalk marl<br><b>(West Melbury Chalk Formation)</b>                                                                   | -4.00                                                |        | 2.50              |
|                                                                                  |     |      |        | 1,2/2,2,2,2                                                                                                                         |                                                                                                                                                                      |                                                      |        | (1.50)            |
|                                                                                  |     |      |        | 1,3/2,4,4,4                                                                                                                         |                                                                                                                                                                      |                                                      |        | 4.00              |
| Remarks:                                                                         |     |      |        |                                                                                                                                     |                                                                                                                                                                      | Logged By:                                           |        | Checked By:       |
|                                                                                  |     |      |        |                                                                                                                                     |                                                                                                                                                                      | CS                                                   |        | MP                |
|                                                                                  |     |      |        |                                                                                                                                     |                                                                                                                                                                      | Scale: 1:25                                          |        | Approved By:      |
| Notes: For explanation of symbols and abbreviations, see Key Sheet.              |     |      |        |                                                                                                                                     |                                                                                                                                                                      | FIG No.                                              |        |                   |



# Ground and Environmental Services Limited

Unit 2 Montpelier Business Park  
Dencora Way, Ashford  
Kent TN23 4FG

T: 01233 646237

Hole ID. WS3

## Installation Details & Readings

Sheet: 1 of 1

|                                                                                  |  |                                                                                                                                     |  |                                                                           |  |
|----------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------|--|
| Equipment & Methods.<br>Premier 110 Compact<br>Backfill: 35mm diameter standpipe |  | Project Name: Etchinghill Golf - Golf Course<br>Project Location: Canterbury Road, Lyminge, Kent, England<br>Client: Pentland Homes |  | Job No:<br>11997                                                          |  |
| Co-ordinates:<br>E:<br>N:                                                        |  | Ground Level (m):                                                                                                                   |  | Date Started:02/07/2018<br>Date Completed:02/07/2018                      |  |
| Installation Date : 02/07/2018<br>Installation Type : SP                         |  |                                                                                                                                     |  | Depth to TOP Response Zone : 1 (m)<br>Depth to BASE Response Zone : 4 (m) |  |
|                                                                                  |  |                                                                                                                                     |  | Installation Diagram                                                      |  |
|                                                                                  |  |                                                                                                                                     |  | Depth Related Remarks (Elevation)                                         |  |
|                                                                                  |  |                                                                                                                                     |  | Bentonite                                                                 |  |
|                                                                                  |  |                                                                                                                                     |  | 0.5                                                                       |  |
|                                                                                  |  |                                                                                                                                     |  | 1 (-1.00)                                                                 |  |
|                                                                                  |  |                                                                                                                                     |  | 35mm standpipe with gravel annulus                                        |  |
|                                                                                  |  |                                                                                                                                     |  | End of Hole 4.00 m                                                        |  |
|                                                                                  |  |                                                                                                                                     |  | (-4.00)                                                                   |  |
| Notes: For explanation of symbols and abbreviations, see Key Sheet.              |  |                                                                                                                                     |  | Compiled By:                                                              |  |
|                                                                                  |  |                                                                                                                                     |  | CS                                                                        |  |
|                                                                                  |  |                                                                                                                                     |  | Checked By:                                                               |  |
|                                                                                  |  |                                                                                                                                     |  | Scale:                                                                    |  |
|                                                                                  |  |                                                                                                                                     |  | Approved By:                                                              |  |
|                                                                                  |  |                                                                                                                                     |  | FIG No.                                                                   |  |

GSG PIEZO/STANDPIPE LOG LOGS.GPJ GSG-AGS3-STD TEMPLATE.GDT 6/8/18

|  <b>Ground and Environmental Services Limited</b><br>Unit 2 Montpelier Business Park<br>Dencora Way, Ashford<br>Kent TN23 4FG<br>Tel: 01233 646237 |     |      |        |               | <b>Window Sampler Log No. WS4</b><br>Sheet: 1 of 1                                                                                                         |                   |                                                                                      |                   |  |                  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|--------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------|-------------------|--|------------------|--|
| Equipment & Methods.<br>Premier 110 Compact<br>_Backfill: Arisings                                                                                                                                                                 |     |      |        |               | Project Name: Etchingill Golf - Golf Course<br>Project Location: Canterbury Road, Lyminge, Kent, England<br>Client: Pentland Homes                         |                   |                                                                                      |                   |  | Job No:<br>11997 |  |
| Co-ordinates:<br>E:<br>N:                                                                                                                                                                                                          |     |      |        |               | Ground Level (m):                                                                                                                                          |                   | Date Started:02/07/2018<br>Date Completed:02/07/2018                                 |                   |  |                  |  |
| Samples and In situ Testing                                                                                                                                                                                                        |     |      |        | Field Records | DESCRIPTION                                                                                                                                                | Reduced Level (m) | Legend                                                                               | Depth (Thick) (m) |  |                  |  |
| Depth (m)                                                                                                                                                                                                                          | No. | Type | Result |               |                                                                                                                                                            |                   |                                                                                      |                   |  |                  |  |
| 0.40- 0.50                                                                                                                                                                                                                         |     | TUB  |        |               | TOP SOIL: grey and brown sandy slightly gravelly clay, Sand is subangular fine to medium. Gravel is subangular fine to coarse flint. Roots to 3mm diameter | -0.30             |   | (0.30)            |  |                  |  |
| 0.50- 0.60                                                                                                                                                                                                                         |     | D    |        |               | Firm to stiff (medium strength) brown very sandy CLAY, Sand is subangular fine to medium<br><b>(Head)</b>                                                  |                   |   | 0.30              |  |                  |  |
| 0.90- 1.00                                                                                                                                                                                                                         |     | D    | CN=12  | 2,2/3,3,3,3   | Firm (medium strength) light grey with light brown clayey SILT, Chalk marl<br><b>(West Melbury Chalk Formation)</b>                                        | -0.80             |   | 0.80              |  |                  |  |
| 1.50- 1.60                                                                                                                                                                                                                         |     | D    |        |               | ...from 1.20 becoming light grey                                                                                                                           |                   |   |                   |  |                  |  |
| 2.70- 2.90                                                                                                                                                                                                                         |     | D    | CN=15  | 2,2/3,4,4,4   |                                                                                                                                                            |                   |   | (2.20)            |  |                  |  |
|                                                                                                                                                                                                                                    |     |      | CN=18  | 2,3/4,4,5,5   |                                                                                                                                                            | -3.00             |  | 3.00              |  |                  |  |
|                                                                                                                                                                                                                                    |     |      |        |               | <b>End of W/S 3.00 m</b><br>(Thickness of basal layer not proven)                                                                                          |                   |                                                                                      |                   |  |                  |  |
| Remarks:                                                                                                                                                                                                                           |     |      |        |               |                                                                                                                                                            | Logged By:        |                                                                                      | Checked By:       |  |                  |  |
|                                                                                                                                                                                                                                    |     |      |        |               |                                                                                                                                                            | CS                |                                                                                      | MP                |  |                  |  |
|                                                                                                                                                                                                                                    |     |      |        |               |                                                                                                                                                            | Scale: 1:25       |                                                                                      | Approved By:      |  |                  |  |
|                                                                                                                                                                                                                                    |     |      |        |               |                                                                                                                                                            | FIG No.           |                                                                                      |                   |  |                  |  |
| Notes: For explanation of symbols and abbreviations, see Key Sheet.                                                                                                                                                                |     |      |        |               |                                                                                                                                                            |                   |                                                                                      |                   |  |                  |  |



# Ground and Environmental Services Limited

Unit 2 Montpelier Business Park  
Dencora Way, Ashford  
Kent TN23 4FG

Tel: 01233 646237

## Window Sampler Log No. WS5

Sheet: 1 of 1

| <b>Equipment &amp; Methods.</b><br>Premier 110 Compact<br>Backfill: 35mm diameter standpipe |     |          |        | <b>Project Name:</b> Etchingill Golf - Golf Course<br><b>Project Location:</b> Canterbury Road, Lyminge, Kent, England<br><b>Client:</b> Pentland Homes |                                                                                                                                                            | <b>Job No:</b><br>11997                                              |                                                                   |                          |
|---------------------------------------------------------------------------------------------|-----|----------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------|
| <b>Co-ordinates:</b><br>E:<br>N:                                                            |     |          |        | <b>Ground Level (m):</b>                                                                                                                                |                                                                                                                                                            | <b>Date Started:</b> 02/07/2018<br><b>Date Completed:</b> 02/07/2018 |                                                                   |                          |
| Samples and In situ Testing                                                                 |     |          |        | Field Records                                                                                                                                           | DESCRIPTION                                                                                                                                                | Reduced Level (m)                                                    | Legend                                                            | Depth (Thick) (m)        |
| Depth (m)                                                                                   | No. | Type     | Result |                                                                                                                                                         |                                                                                                                                                            |                                                                      |                                                                   |                          |
| 0.40- 0.50<br>0.50- 0.60                                                                    |     | TUB<br>D |        | 1,0/1,1,1,2                                                                                                                                             | TOP SOIL: grey and brown sandy slightly gravelly clay, Sand is subangular fine to medium. Gravel is subangular fine to coarse flint. Roots to 3mm diameter | -0.30                                                                |                                                                   | (0.30)<br>0.30           |
| 0.90- 1.00                                                                                  |     | D        |        |                                                                                                                                                         | Soft to firm brown sandy slightly gravelly CLAY, Sand is subangular fine to medium. Gravel is angular fine to coarse flint<br><b>(Head)</b>                |                                                                      |                                                                   | (1.30)                   |
| 1.50- 1.60                                                                                  |     | D        | CN=5   |                                                                                                                                                         | ...from 1.56 becoming light grey                                                                                                                           |                                                                      | -1.60                                                             |                          |
| 1.90- 2.00                                                                                  |     | D        |        | 1,1/1,2,2,2                                                                                                                                             | Firm (medium strength) light grey with light brown clayey SILT, Chalk marl<br><b>(West Melbury Chalk Formation)</b>                                        |                                                                      |                                                                   | (1.40)                   |
| 2.70- 2.90                                                                                  |     | D        | CN=7   |                                                                                                                                                         |                                                                                                                                                            |                                                                      | -3.00                                                             |                          |
|                                                                                             |     |          | CN=9   | 1,2/2,2,2,3                                                                                                                                             |                                                                                                                                                            |                                                                      | <b>End of W/S 3.00 m</b><br>(Thickness of basal layer not proven) |                          |
| <b>Remarks:</b>                                                                             |     |          |        |                                                                                                                                                         |                                                                                                                                                            | <b>Logged By:</b><br>CS                                              |                                                                   | <b>Checked By:</b><br>MP |
|                                                                                             |     |          |        |                                                                                                                                                         |                                                                                                                                                            | <b>Scale:</b><br>1:25                                                |                                                                   | <b>Approved By:</b>      |
|                                                                                             |     |          |        |                                                                                                                                                         |                                                                                                                                                            | <b>FIG No.</b>                                                       |                                                                   |                          |
| Notes: For explanation of symbols and abbreviations, see Key Sheet.                         |     |          |        |                                                                                                                                                         |                                                                                                                                                            |                                                                      |                                                                   |                          |



# Ground and Environmental Services Limited

Unit 2 Montpelier Business Park  
Dencora Way, Ashford  
Kent TN23 4FG

T: 01233 646237

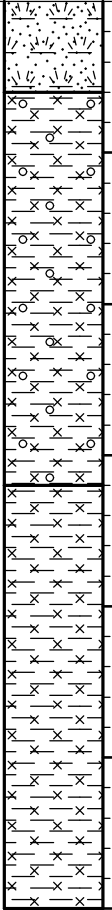
Hole ID. WS5

## Installation Details & Readings

Sheet: 1 of 1

|                                                                                                                                                   |  |                                                                                                                                             |  |                                                      |                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------|-----------------------------------------|
| Equipment & Methods.<br>Premier 110 Compact<br>_Backfill: 35mm diameter standpipe                                                                 |  | Project Name: Etchinghill Golf - Golf Course<br><br>Project Location: Canterbury Road, Lyminge, Kent, England<br><br>Client: Pentland Homes |  | Job No:<br><br>11997                                 |                                         |
| Co-ordinates:<br>E:<br>N:                                                                                                                         |  | Ground Level (m):                                                                                                                           |  | Date Started:02/07/2018<br>Date Completed:02/07/2018 |                                         |
| Installation Date : 02/07/2018      Depth to TOP Response Zone : 1 (m)<br>Installation Type : SP              Depth to BASE Response Zone : 3 (m) |  |                                                                                                                                             |  | Installation<br>Diagram                              | Depth Related<br>Remarks<br>(Elevation) |
|                                                                                                                                                   |  |                                                                                                                                             |  | Bentonite                                            |                                         |
|                                                                                                                                                   |  |                                                                                                                                             |  | 0.5                                                  |                                         |
|                                                                                                                                                   |  |                                                                                                                                             |  | 1 (-1.00)                                            |                                         |
|                                                                                                                                                   |  |                                                                                                                                             |  | 35mm standpipe<br>with gravel annulus                |                                         |
|                                                                                                                                                   |  |                                                                                                                                             |  | End of Hole 3.00 m<br><br>(-3.00)                    |                                         |
| Notes: For explanation of symbols and abbreviations, see Key Sheet.                                                                               |  |                                                                                                                                             |  | Compiled By:                                         | Checked By:                             |
|                                                                                                                                                   |  |                                                                                                                                             |  | CS                                                   | MP                                      |
|                                                                                                                                                   |  |                                                                                                                                             |  | Scale:                                               | Approved By:                            |
|                                                                                                                                                   |  |                                                                                                                                             |  | FIG No.                                              |                                         |

GSG PIEZO/STANDPIPE LOG LOGS.GPJ GSG-AGS3-STD TEMPLATE.GDT 6/8/18

|  <div> <b>Ground and Environmental Services Limited</b><br/> Unit 2 Montpelier Business Park<br/> Dencora Way, Ashford<br/> Kent TN23 4FG<br/> Tel: 01233 646237 </div> |     |      |        |               | <b>Window Sampler Log No. WS6</b><br>Sheet: 1 of 1                                                                                                                                                    |                   |                                                                                      |                                                                      |  |                         |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|--------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------|--|-------------------------|--|
| <b>Equipment &amp; Methods.</b><br>Premier 110 Compact<br>Backfill: Arisings                                                                                                                                                                            |     |      |        |               | <b>Project Name:</b> Etchinghill Golf - Golf Course<br><b>Project Location:</b> Canterbury Road, Lyminge, Kent, England<br><b>Client:</b> Pentland Homes                                              |                   |                                                                                      |                                                                      |  | <b>Job No:</b><br>11997 |  |
| <b>Co-ordinates:</b><br>E:<br>N:                                                                                                                                                                                                                        |     |      |        |               | <b>Ground Level (m):</b>                                                                                                                                                                              |                   |                                                                                      | <b>Date Started:</b> 02/07/2018<br><b>Date Completed:</b> 02/07/2018 |  |                         |  |
| Samples and In situ Testing                                                                                                                                                                                                                             |     |      |        | Field Records | DESCRIPTION                                                                                                                                                                                           | Reduced Level (m) | Legend                                                                               | Depth (Thick) (m)                                                    |  |                         |  |
| Depth (m)                                                                                                                                                                                                                                               | No. | Type | Result |               |                                                                                                                                                                                                       |                   |                                                                                      |                                                                      |  |                         |  |
| 0.40- 0.50                                                                                                                                                                                                                                              |     | TUB  |        | 1,0/1,1,1,2   | TOP SOIL: grey and brown sandy slightly gravelly clay, Sand is subangular fine to medium. Gravel is subangular fine to coarse flint. Roots to 3mm diameter                                            | -0.30             |  | (0.30)                                                               |  |                         |  |
| 0.50- 0.60                                                                                                                                                                                                                                              |     | D    |        |               | Soft to firm brown sandy slightly gravelly CLAY, Sand is subangular fine to medium. Gravel is angular fine to coarse flint. Roots up to 1mm diameter to 1.6m<br><b>(West Melbury Chalk Formation)</b> |                   |                                                                                      | 0.30                                                                 |  |                         |  |
| 0.90- 1.00                                                                                                                                                                                                                                              |     | D    |        | CN=5          |                                                                                                                                                                                                       |                   |                                                                                      | (1.30)                                                               |  |                         |  |
| 1.50- 1.60                                                                                                                                                                                                                                              |     | D    |        |               |                                                                                                                                                                                                       |                   |                                                                                      | 1.60                                                                 |  |                         |  |
| 1.90- 2.00                                                                                                                                                                                                                                              |     | D    |        | CN=6          | Firm (medium strength) light grey with light brown clayey SILT, Chalk marl<br><b>(West Melbury Chalk Formation)</b>                                                                                   | -1.60             |                                                                                      | 1.60                                                                 |  |                         |  |
| 2.70- 2.90                                                                                                                                                                                                                                              |     | D    |        |               | ...from 2.50 becoming light grey                                                                                                                                                                      |                   |                                                                                      | (1.40)                                                               |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        | CN=9          |                                                                                                                                                                                                       | -3.00             |                                                                                      | 3.00                                                                 |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                                                       |                   |                                                                                      |                                                                      |  |                         |  |
| <b>Remarks:</b>                                                                                                                                                                                                                                         |     |      |        |               | <b>End of W/S 3.00 m</b><br>(Thickness of basal layer not proven)                                                                                                                                     |                   |                                                                                      |                                                                      |  |                         |  |
| Notes: For explanation of symbols and abbreviations, see Key Sheet.                                                                                                                                                                                     |     |      |        |               | <b>Logged By:</b><br>CS                                                                                                                                                                               |                   | <b>Checked By:</b><br>MP                                                             |                                                                      |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               | <b>Scale:</b><br>1:25                                                                                                                                                                                 |                   | <b>Approved By:</b>                                                                  |                                                                      |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               | <b>FIG No.</b>                                                                                                                                                                                        |                   |                                                                                      |                                                                      |  |                         |  |



# Ground and Environmental Services Limited

Unit 2 Montpelier Business Park  
Dencora Way, Ashford  
Kent TN23 4FG

T: 01233 646237

Hole ID. WS7

## Installation Details & Readings

Sheet: 1 of 1

|                                                                                                                                                             |  |                                                                                                                                                          |  |                                                                      |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------|--|
| <b>Equipment &amp; Methods.</b><br>Premier 110 Compact<br>_Backfill: 35mm diameter standpipe                                                                |  | <b>Project Name:</b> Etchinghill Golf - Golf Course<br><b>Project Location:</b> Canterbury Road, Lyminge, Kent, England<br><b>Client:</b> Pentland Homes |  | <b>Job No:</b><br>11997                                              |  |
| <b>Co-ordinates:</b><br>E:<br>N:                                                                                                                            |  | <b>Ground Level (m):</b>                                                                                                                                 |  | <b>Date Started:</b> 02/07/2018<br><b>Date Completed:</b> 02/07/2018 |  |
| <b>Installation Date :</b> 02/07/2018 <b>Depth to TOP Response Zone :</b> 1 (m)<br><b>Installation Type :</b> SP <b>Depth to BASE Response Zone :</b> 4 (m) |  |                                                                                                                                                          |  | <b>Installation Diagram</b>                                          |  |
|                                                                                                                                                             |  |                                                                                                                                                          |  |                                                                      |  |
|                                                                                                                                                             |  |                                                                                                                                                          |  |                                                                      |  |
|                                                                                                                                                             |  |                                                                                                                                                          |  |                                                                      |  |
|                                                                                                                                                             |  |                                                                                                                                                          |  |                                                                      |  |
|                                                                                                                                                             |  |                                                                                                                                                          |  |                                                                      |  |
|                                                                                                                                                             |  |                                                                                                                                                          |  | <b>Compiled By:</b><br>CS                                            |  |
|                                                                                                                                                             |  |                                                                                                                                                          |  | <b>Checked By:</b><br>MP                                             |  |
|                                                                                                                                                             |  |                                                                                                                                                          |  | <b>Scale:</b>                                                        |  |
|                                                                                                                                                             |  |                                                                                                                                                          |  | <b>Approved By:</b>                                                  |  |
|                                                                                                                                                             |  |                                                                                                                                                          |  | <b>FIG No.</b>                                                       |  |
| <b>Notes:</b> For explanation of symbols and abbreviations, see Key Sheet.                                                                                  |  |                                                                                                                                                          |  |                                                                      |  |

GSG PIEZO/STANDPIPE LOG LOGS.GPJ GSG-AGS3-STD TEMPLATE.GDT 6/8/18



# Ground and Environmental Services Limited

Unit 2 Montpelier Business Park  
Dencora Way, Ashford  
Kent TN23 4FG

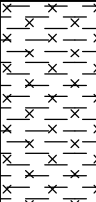
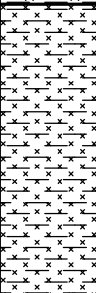
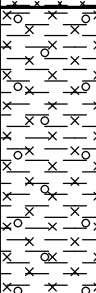
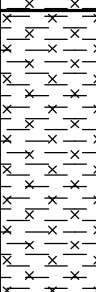
Tel: 01233 646237

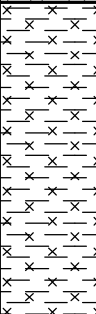
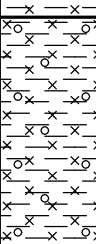
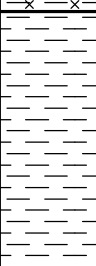
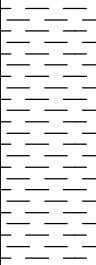
Window

Sampler Log No. WS7

Sheet: 1 of 1

| Equipment & Methods.<br>Premier 110 Compact<br>Backfill: 35mm diameter standpipe |     |          |        | Project Name: Etchinghill Golf - Golf Course<br>Project Location: Canterbury Road, Lyminge, Kent, England<br>Client: Pentland Homes |                                                                                                                                                                      |                                                            | Job No:<br>11997                                     |                   |  |
|----------------------------------------------------------------------------------|-----|----------|--------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------|-------------------|--|
| Co-ordinates:<br>E:<br>N:                                                        |     |          |        | Ground Level (m):                                                                                                                   |                                                                                                                                                                      |                                                            | Date Started:02/07/2018<br>Date Completed:02/07/2018 |                   |  |
| Samples and In situ Testing                                                      |     |          |        | Field Records                                                                                                                       | DESCRIPTION                                                                                                                                                          | Reduced Level (m)                                          | Legend                                               | Depth (Thick) (m) |  |
| Depth (m)                                                                        | No. | Type     | Result |                                                                                                                                     |                                                                                                                                                                      |                                                            |                                                      |                   |  |
| 0.40- 0.50<br>0.50- 0.60                                                         |     | TUB<br>D |        |                                                                                                                                     | TOP SOIL: grey and brown sandy slightly gravelly clay, Sand is subangular fine to medium. Gravel is subangular fine to coarse flint. Roots to 3mm diameter           | -0.30                                                      |                                                      | (0.30)<br>0.30    |  |
| 0.90- 1.00                                                                       |     | D        | CN=5   | 1,1/1,1,2,1                                                                                                                         | Soft to firm brown silty slightly sandy CLAY, Sand is subangular fine to medium. Roots up to 1mm diameter to 1.0m. roots up to 5mm diameter to 0.5m<br><b>(Head)</b> |                                                            |                                                      |                   |  |
| 1.50- 1.60                                                                       |     | D        |        |                                                                                                                                     |                                                                                                                                                                      |                                                            |                                                      | (2.30)            |  |
| 2.60- 2.80                                                                       |     | D        | CN=4   | 1,1/1,1,1,1                                                                                                                         |                                                                                                                                                                      | -2.60                                                      |                                                      | 2.60<br>(0.20)    |  |
|                                                                                  |     |          |        |                                                                                                                                     | <b>(West Melbury Chalk Formation)</b>                                                                                                                                | -2.80                                                      |                                                      | 2.80              |  |
|                                                                                  |     |          |        |                                                                                                                                     | Firm (medium strength) light grey clayey SILT, Chalk marl<br><b>(West Melbury Chalk Formation)</b>                                                                   |                                                            |                                                      |                   |  |
|                                                                                  |     |          | CN=8   | 1,1/2,2,2,2                                                                                                                         | ...from 3.10 becoming stiff with frequent gravel sized marl fragments                                                                                                |                                                            |                                                      | (1.20)            |  |
|                                                                                  |     |          |        |                                                                                                                                     | ...from 3.50 moist                                                                                                                                                   |                                                            |                                                      |                   |  |
| 3.70- 3.90                                                                       |     | D        |        |                                                                                                                                     |                                                                                                                                                                      | -4.00                                                      |                                                      | 4.00              |  |
|                                                                                  |     |          | CN=7   | 1,1/1,2,2,2                                                                                                                         |                                                                                                                                                                      |                                                            |                                                      |                   |  |
| Remarks:                                                                         |     |          |        |                                                                                                                                     |                                                                                                                                                                      | End of W/S 4.00 m<br>(Thickness of basal layer not proven) |                                                      |                   |  |
|                                                                                  |     |          |        |                                                                                                                                     |                                                                                                                                                                      |                                                            |                                                      |                   |  |
|                                                                                  |     |          |        |                                                                                                                                     |                                                                                                                                                                      |                                                            |                                                      |                   |  |
|                                                                                  |     |          |        |                                                                                                                                     |                                                                                                                                                                      |                                                            |                                                      |                   |  |
|                                                                                  |     |          |        |                                                                                                                                     |                                                                                                                                                                      | Logged By:<br>CS                                           |                                                      | Checked By:<br>MP |  |
|                                                                                  |     |          |        |                                                                                                                                     |                                                                                                                                                                      | Scale:<br>1:25                                             |                                                      | Approved By:      |  |
|                                                                                  |     |          |        |                                                                                                                                     |                                                                                                                                                                      | FIG No.                                                    |                                                      |                   |  |
| Notes: For explanation of symbols and abbreviations, see Key Sheet.              |     |          |        |                                                                                                                                     |                                                                                                                                                                      |                                                            |                                                      |                   |  |

|  <div> <b>Ground and Environmental Services Limited</b><br/> Unit 2 Montpelier Business Park<br/> Dencora Way, Ashford<br/> Kent TN23 4FG<br/> Tel: 01233 646237 </div> |     |      |        |               | <b>Window</b><br><b>Sampler Log No. WS8</b><br>Sheet: 1 of 1                                                                                               |                                                                   |                                                                                       |                           |  |                         |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|--------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------|--|-------------------------|--|
| <b>Equipment &amp; Methods.</b><br>Premier 110 Compact<br>_Backfill: Arisings                                                                                                                                                                           |     |      |        |               | <b>Project Name:</b> Etchinghill Golf - Golf Course<br><b>Project Location:</b> Canterbury Road, Lyminge, Kent, England<br><b>Client:</b> Pentland Homes   |                                                                   |                                                                                       |                           |  | <b>Job No:</b><br>11997 |  |
| <b>Co-ordinates:</b><br>E:<br>N:                                                                                                                                                                                                                        |     |      |        |               | <b>Ground Level (m):</b>                                                                                                                                   |                                                                   | <b>Date Started:</b> 04/06/2018<br><b>Date Completed:</b> 04/06/2018                  |                           |  |                         |  |
| Samples and In situ Testing                                                                                                                                                                                                                             |     |      |        | Field Records | DESCRIPTION                                                                                                                                                | Reduced Level (m)                                                 | Legend                                                                                | Depth (Thick) (m)         |  |                         |  |
| Depth (m)                                                                                                                                                                                                                                               | No. | Type | Result |               |                                                                                                                                                            |                                                                   |                                                                                       |                           |  |                         |  |
| 0.40                                                                                                                                                                                                                                                    |     | TUB  |        | 1,1/1,1,2,2   | TOP SOIL: grey and brown sandy slightly gravelly clay, Sand is subangular fine to medium. Gravel is subangular fine to coarse flint. Roots to 3mm diameter | -0.30                                                             |    | (0.30)                    |  |                         |  |
| 0.70- 0.80                                                                                                                                                                                                                                              |     | D    |        |               | Soft to firm mid brown slightly clayey friable SILT rare sub angular coarse flint gravels many roots down to 1m up to 2mm in diameter. <b>(Head)</b>       |                                                                   |    | (0.70)                    |  |                         |  |
| 1.50- 1.60                                                                                                                                                                                                                                              |     | D    | SN=6   |               | Firm mid brown slightly silty CLAY with rare sub angular coarse flint gravels. <b>(Head)</b>                                                               | -1.00                                                             |   | (1.00)                    |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        | 1,1/1,1,2,3   |                                                                                                                                                            |                                                                   |                                                                                       |                           |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      | SN=7   |               | Firm light brown gravelly CLAY/SILT, Gravels composed of sub angular to sub rounded fine to medium chalk fragments. <b>(West Melbury Chalk Formation)</b>  | -2.00                                                             |  | (1.00)                    |  |                         |  |
| 2.70- 2.80                                                                                                                                                                                                                                              |     | D    |        | 1,1/0,1,0,1   |                                                                                                                                                            |                                                                   |                                                                                       |                           |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      | SN=2   |               | Soft and firm light brown/grey firm CLAY/SILT with rare sub rounded coarse chalk gravels. <b>(West Melbury Chalk Formation)</b>                            | -3.00                                                             |  | (1.00)                    |  |                         |  |
| 3.60- 3.70                                                                                                                                                                                                                                              |     | D    |        | 1,1/1,1,3,3   |                                                                                                                                                            |                                                                   |                                                                                       |                           |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      | SN=8   |               |                                                                                                                                                            | -4.00                                                             |  | 4.00                      |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                            | <b>End of W/S 4.00 m</b><br>(Thickness of basal layer not proven) |                                                                                       |                           |  |                         |  |
| <b>Remarks:</b><br>Water at 3.5m                                                                                                                                                                                                                        |     |      |        |               |                                                                                                                                                            | <b>Logged By:</b><br>JM                                           |                                                                                       | <b>Checked By:</b><br>CSS |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                            | <b>Scale:</b><br>1:25                                             |                                                                                       | <b>Approved By:</b>       |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                            | <b>FIG No.</b>                                                    |                                                                                       |                           |  |                         |  |
| Notes: For explanation of symbols and abbreviations, see Key Sheet.                                                                                                                                                                                     |     |      |        |               |                                                                                                                                                            |                                                                   |                                                                                       |                           |  |                         |  |

|  <div> <b>Ground and Environmental Services Limited</b><br/> Unit 2 Montpelier Business Park<br/> Dencora Way, Ashford<br/> Kent TN23 4FG<br/> Tel: 01233 646237 </div> |     |      |        |               | <b>Window Sampler Log No. WS9</b><br>Sheet: 1 of 1                                                                                                                                         |                                                                   |                                                                                       |                                                                      |  |                         |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|--------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------|--|-------------------------|--|
| <b>Equipment &amp; Methods.</b><br>Premier 110 Compact<br>Backfill: Arisings                                                                                                                                                                            |     |      |        |               | <b>Project Name:</b> Etchinghill Golf - Golf Course<br><b>Project Location:</b> Canterbury Road, Lyminge, Kent, England<br><b>Client:</b> Pentland Homes                                   |                                                                   |                                                                                       |                                                                      |  | <b>Job No:</b><br>11997 |  |
| <b>Co-ordinates:</b><br>E:<br>N:                                                                                                                                                                                                                        |     |      |        |               | <b>Ground Level (m):</b>                                                                                                                                                                   |                                                                   |                                                                                       | <b>Date Started:</b> 04/06/2018<br><b>Date Completed:</b> 04/06/2018 |  |                         |  |
| Samples and In situ Testing                                                                                                                                                                                                                             |     |      |        | Field Records | DESCRIPTION                                                                                                                                                                                | Reduced Level (m)                                                 | Legend                                                                                | Depth (Thick) (m)                                                    |  |                         |  |
| Depth (m)                                                                                                                                                                                                                                               | No. | Type | Result |               |                                                                                                                                                                                            |                                                                   |                                                                                       |                                                                      |  |                         |  |
| 0.40                                                                                                                                                                                                                                                    |     | TUB  |        | 1,2/1,2,3,4   | TOP SOIL: grey and brown sandy slightly gravelly clay, Sand is subangular fine to medium. Gravel is subangular fine to coarse flint. Roots to 3mm diameter                                 | -0.30                                                             |    | (0.30)                                                               |  |                         |  |
| 0.70- 0.80                                                                                                                                                                                                                                              |     | D    | CN=10  |               | Firm mid brown friable CLAY/SILT frequent sub angular medium to coarse flint gravels many roots down to 1m up to 5mm in diameter. Some oxidation and ironstone fragments.<br><b>(Head)</b> |                                                                   |    | 0.30                                                                 |  |                         |  |
| 1.50- 1.60                                                                                                                                                                                                                                              |     | D    | CN=14  |               | Beige/off white stiff very silty CLAY with frequent fine to coarse sub angular flint and chalk gravels.<br><b>(West Melbury Chalk Formation)</b>                                           | -1.40                                                             |   | 1.40                                                                 |  |                         |  |
| 2.60- 2.70                                                                                                                                                                                                                                              |     | D    | CN=11  | 1,2/3,2,3,3   | Firm light grey stiff to firm very silty CLAY. Chalk Marl<br><b>(West Melbury Chalk Formation)</b>                                                                                         | -2.20                                                             |  | 2.20                                                                 |  |                         |  |
| 3.50- 3.60                                                                                                                                                                                                                                              |     | D    | CN=9   | 2,2/2,2,2,3   | ...from 3.00 to 4.00 Some siltstone layers and wet                                                                                                                                         |                                                                   |  | (1.80)                                                               |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                                            | -4.00                                                             |  | 4.00                                                                 |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                                            | <b>End of W/S 4.00 m</b><br>(Thickness of basal layer not proven) |                                                                                       |                                                                      |  |                         |  |
| <b>Remarks:</b><br>Water at 3m                                                                                                                                                                                                                          |     |      |        |               |                                                                                                                                                                                            | <b>Logged By:</b><br>JM                                           |                                                                                       | <b>Checked By:</b><br>CSS                                            |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                                            | <b>Scale:</b><br>1:25                                             |                                                                                       | <b>Approved By:</b>                                                  |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                                            | <b>FIG No.</b>                                                    |                                                                                       |                                                                      |  |                         |  |
| Notes: For explanation of symbols and abbreviations, see Key Sheet.                                                                                                                                                                                     |     |      |        |               |                                                                                                                                                                                            |                                                                   |                                                                                       |                                                                      |  |                         |  |

|  <div> <b>Ground and Environmental Services Limited</b><br/> Unit 2 Montpelier Business Park<br/> Dencora Way, Ashford<br/> Kent TN23 4FG<br/> Tel: 01233 646237 </div> |     |      |        |               | <b>Window Sampler Log No. WS10</b><br>Sheet: 1 of 1                                                                                                                                                                                                                              |                         |                                                                                       |                                                                                       |        |                         |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|--------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------|-------------------------|--|
| <b>Equipment &amp; Methods.</b><br>Premier 110 Compact<br>_Backfill: Arisings                                                                                                                                                                           |     |      |        |               | <b>Project Name:</b> Etchinghill Golf - Golf Course<br><b>Project Location:</b> Canterbury Road, Lyminge, Kent, England<br><b>Client:</b> Pentland Homes                                                                                                                         |                         |                                                                                       |                                                                                       |        | <b>Job No:</b><br>11997 |  |
| <b>Co-ordinates:</b><br>E:<br>N:                                                                                                                                                                                                                        |     |      |        |               | <b>Ground Level (m):</b>                                                                                                                                                                                                                                                         |                         | <b>Date Started:</b> 04/06/2018<br><b>Date Completed:</b> 04/06/2018                  |                                                                                       |        |                         |  |
| Samples and In situ Testing                                                                                                                                                                                                                             |     |      |        | Field Records | DESCRIPTION                                                                                                                                                                                                                                                                      | Reduced Level (m)       | Legend                                                                                | Depth (Thick) (m)                                                                     |        |                         |  |
| Depth (m)                                                                                                                                                                                                                                               | No. | Type | Result |               |                                                                                                                                                                                                                                                                                  |                         |                                                                                       |                                                                                       |        |                         |  |
| 0.40                                                                                                                                                                                                                                                    |     | TUB  |        | 1,0/1,1,2,3   | TOP SOIL: grey and brown sandy slightly gravelly clay, Sand is subangular fine to medium. Gravel is subangular fine to coarse flint.<br><br>Firm mid brown friable CLAY/SILT rare sub angular coarse flint gravels many roots down to 1m up to 2mm in diameter.<br><b>(Head)</b> | -0.30                   |    | (0.30)<br>0.30                                                                        |        |                         |  |
| 0.70- 0.80                                                                                                                                                                                                                                              |     | D    |        |               |                                                                                                                                                                                                                                                                                  |                         |                                                                                       |    | (1.10) |                         |  |
| 1.50- 1.60                                                                                                                                                                                                                                              |     | D    |        | 1,1/2,2,2,3   | Firm beige/off white CLAY/SILT with frequent fine to coarse sub angular flint and chalk gravels.<br><b>(West Melbury Chalk Formation)</b>                                                                                                                                        | -1.40                   |    | 1.40<br>(0.80)                                                                        |        |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                                                                                                                                  |                         |                                                                                       |   |        |                         |  |
| 2.70- 2.80                                                                                                                                                                                                                                              |     | D    |        | 1,2/2,3,3,4   | Firm light grey very silty CLAY. Chalk Marl. Occasional to frequent sub angular medium to coarse chalk and flint gravels.<br><b>(West Melbury Chalk Formation)</b>                                                                                                               | -2.20                   |  | 2.20<br>(0.80)                                                                        |        |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                                                                                                                                  |                         |                                                                                       |  |        |                         |  |
| 3.50- 3.60                                                                                                                                                                                                                                              |     | D    |        | 2,3/3,3,4,4   | Wet firm light grey CLAY/SILT<br><b>(West Melbury Chalk Formation)</b>                                                                                                                                                                                                           | -3.00                   |  | 3.00<br>(1.00)                                                                        |        |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                                                                                                                                  |                         |                                                                                       |  |        |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                                                                                                                                  | -4.00                   |  | 4.00                                                                                  |        |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               | <b>End of W/S 4.00 m</b><br>(Thickness of basal layer not proven)                                                                                                                                                                                                                |                         |                                                                                       |                                                                                       |        |                         |  |
| <b>Remarks:</b><br>Water at 2.6m                                                                                                                                                                                                                        |     |      |        |               |                                                                                                                                                                                                                                                                                  | <b>Logged By:</b><br>JM |                                                                                       | <b>Checked By:</b><br>CSS                                                             |        |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                                                                                                                                  | <b>Scale:</b><br>1:25   |                                                                                       | <b>Approved By:</b>                                                                   |        |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                                                                                                                                  | <b>FIG No.</b>          |                                                                                       |                                                                                       |        |                         |  |
| Notes: For explanation of symbols and abbreviations, see Key Sheet.                                                                                                                                                                                     |     |      |        |               |                                                                                                                                                                                                                                                                                  |                         |                                                                                       |                                                                                       |        |                         |  |

|  <div> <b>Ground and Environmental Services Limited</b><br/> Unit 2 Montpelier Business Park<br/> Dencora Way, Ashford<br/> Kent TN23 4FG<br/> Tel: 01233 646237 </div> |     |      |        |               | <b>Window Sampler Log No. WS11</b><br>Sheet: 1 of 1                                                                                                            |                         |                                                                                       |                                                                      |  |                         |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|--------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------|--|-------------------------|--|
| <b>Equipment &amp; Methods.</b><br>Premier 110 Compact<br>Backfill: Arisings                                                                                                                                                                            |     |      |        |               | <b>Project Name:</b> Etchinghill Golf - Golf Course<br><b>Project Location:</b> Canterbury Road, Lyminge, Kent, England<br><b>Client:</b> Pentland Homes       |                         |                                                                                       |                                                                      |  | <b>Job No:</b><br>11997 |  |
| <b>Co-ordinates:</b><br>E:<br>N:                                                                                                                                                                                                                        |     |      |        |               | <b>Ground Level (m):</b>                                                                                                                                       |                         |                                                                                       | <b>Date Started:</b> 04/06/2018<br><b>Date Completed:</b> 04/06/2018 |  |                         |  |
| Samples and In situ Testing                                                                                                                                                                                                                             |     |      |        | Field Records | DESCRIPTION                                                                                                                                                    | Reduced Level (m)       | Legend                                                                                | Depth (Thick) (m)                                                    |  |                         |  |
| Depth (m)                                                                                                                                                                                                                                               | No. | Type | Result |               |                                                                                                                                                                |                         |                                                                                       |                                                                      |  |                         |  |
| 0.40                                                                                                                                                                                                                                                    |     | TUB  |        | 1,0/1,1,2,2   | TOP SOIL: grey and brown sandy slightly gravelly clay, Sand is subangular fine to medium. Gravel is subangular fine to coarse flint.                           | -0.30                   |    | (0.30)                                                               |  |                         |  |
| 0.70- 0.80                                                                                                                                                                                                                                              |     | D    |        |               | Firm mid brown friable CLAY/SILT rare sub angular coarse flint gravels many roots down to 1m up to 2mm in diameter.<br><b>(Head)</b>                           |                         |    | 0.30                                                                 |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      | CN=6   |               |                                                                                                                                                                |                         |                                                                                       |                                                                      |  |                         |  |
| 1.60- 1.70                                                                                                                                                                                                                                              |     | D    |        | 1,1/2,1,2,2   | Firm light brown CLAY/SILT with frequent sub angular to sub rounded chalk gravels.<br><b>(West Melbury Chalk Formation)</b>                                    | -1.40                   |    | 1.40                                                                 |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      | SN=7   |               |                                                                                                                                                                |                         |                                                                                       | (0.60)                                                               |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                |                         |                                                                                       |                                                                      |  |                         |  |
| 2.50- 2.60                                                                                                                                                                                                                                              |     | D    |        | 1,2/1,2,3,3   | Firm light grey CLAY/SILT Chalk Marl. Occasional to frequent sub angular to sub rounded fine to coarse chalk gravels.<br><b>(West Melbury Chalk Formation)</b> | -2.00                   |  | 2.00                                                                 |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                |                         |                                                                                       | (1.00)                                                               |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      | CN=9   |               |                                                                                                                                                                |                         |                                                                                       |                                                                      |  |                         |  |
| 3.70- 3.80                                                                                                                                                                                                                                              |     | D    |        | 2,3/3,3,4,4   | Firm pale/light grey CLAY/SILT with occasional siltstone layers. Very small amount of water.<br><b>(West Melbury Chalk Formation)</b>                          | -3.00                   |  | 3.00                                                                 |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                |                         |                                                                                       | (1.00)                                                               |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      | SN=14  |               |                                                                                                                                                                |                         |                                                                                       |                                                                      |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                | -4.00                   |  | 4.00                                                                 |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               | <b>End of W/S 4.00 m</b><br>(Thickness of basal layer not proven)                                                                                              |                         |                                                                                       |                                                                      |  |                         |  |
| <b>Remarks:</b><br>Water at ~4m                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                | <b>Logged By:</b><br>JM |                                                                                       | <b>Checked By:</b><br>CSS                                            |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                | <b>Scale:</b><br>1:25   |                                                                                       | <b>Approved By:</b>                                                  |  |                         |  |
|                                                                                                                                                                                                                                                         |     |      |        |               |                                                                                                                                                                | <b>FIG No.</b>          |                                                                                       |                                                                      |  |                         |  |
| Notes: For explanation of symbols and abbreviations, see Key Sheet.                                                                                                                                                                                     |     |      |        |               |                                                                                                                                                                |                         |                                                                                       |                                                                      |  |                         |  |



# Ground and Environmental Services Limited

Unit 2 Montpelier Business Park  
Dencora Way, Ashford  
Kent TN23 4FG

Tel: 01233 646237

Window

Sampler Log No. WS12

Sheet: 1 of 1

| Equipment & Methods.<br>Premier 110 Compact<br>Backfill: Arisings   |     |      |        | Project Name: Etchinghill Golf - Golf Course<br>Project Location: Canterbury Road, Lyminge, Kent, England<br>Client: Pentland Homes |                                                                                                                                      | Job No:<br>11997                                     |        |                   |
|---------------------------------------------------------------------|-----|------|--------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------|-------------------|
| Co-ordinates:<br>E:<br>N:                                           |     |      |        | Ground Level (m):                                                                                                                   |                                                                                                                                      | Date Started:04/06/2018<br>Date Completed:04/06/2018 |        |                   |
| Samples and In situ Testing                                         |     |      |        | Field Records                                                                                                                       | DESCRIPTION                                                                                                                          | Reduced Level (m)                                    | Legend | Depth (Thick) (m) |
| Depth (m)                                                           | No. | Type | Result |                                                                                                                                     |                                                                                                                                      |                                                      |        |                   |
| 0.40                                                                |     | TUB  |        |                                                                                                                                     | TOP SOIL: grey and brown sandy slightly gravelly clay, Sand is subangular fine to medium. Gravel is subangular fine to coarse flint. | -0.30                                                |        | (0.30)            |
| 0.70- 0.80                                                          |     | D    |        | 1,0/1,1,1,2                                                                                                                         | Firm mid brown friable CLAY/SILT rare sub angular coarse flint gravels many roots down to 1m up to 2mm in diameter.<br>(Head)        |                                                      |        | 0.30              |
| 1.50- 1.60                                                          |     | D    |        | 1,1/1,1,1,2                                                                                                                         |                                                                                                                                      |                                                      |        | (1.70)            |
| 2.60- 2.70                                                          |     | D    |        | 1,1/2,1,2,2                                                                                                                         | Firm mid brown CLAY/SILT Chalk Marl<br>(West Melbury Chalk Formation)                                                                | -2.00                                                |        | 2.00              |
| 3.50- 3.60                                                          |     | D    |        | 2,4/3,2,3,3                                                                                                                         | Firm light grey CLAY/SILT Chalk Marl. Occasional siltstone layers.<br>(West Melbury Chalk Formation)                                 | -3.00                                                |        | 3.00              |
|                                                                     |     |      |        |                                                                                                                                     |                                                                                                                                      | -4.00                                                |        | 4.00              |
| Remarks:<br>DRY                                                     |     |      |        |                                                                                                                                     |                                                                                                                                      | Logged By:                                           |        | Checked By:       |
|                                                                     |     |      |        |                                                                                                                                     |                                                                                                                                      | JM                                                   |        | CSS               |
|                                                                     |     |      |        |                                                                                                                                     |                                                                                                                                      | Scale:<br>1:25                                       |        | Approved By:      |
|                                                                     |     |      |        |                                                                                                                                     |                                                                                                                                      | FIG No.                                              |        |                   |
| Notes: For explanation of symbols and abbreviations, see Key Sheet. |     |      |        |                                                                                                                                     |                                                                                                                                      |                                                      |        |                   |



**APPENDIX 5**  
**TRIAL PIT LOGS**



# Ground and Environmental Services Limited

Unit 2 Montpelier Business Park  
Dencora Way, Ashford  
Kent TN23 4FG

Tel: 01233 646237

Trial Pit No. SP1

Sheet: 1 of 1

|                                                                     |     |      |        |                                                                                                                                     |                                                                                                                                                                                      |                                                                  |        |                    |  |
|---------------------------------------------------------------------|-----|------|--------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|--------|--------------------|--|
| Equipment & Methods.<br>JCB 3CX excavatorBackfill: Arisings         |     |      |        | Project Name: Etchinghill Golf - Golf Course<br>Project Location: Canterbury Road, Lyminge, Kent, England<br>Client: Pentland Homes |                                                                                                                                                                                      | Job No:<br>11997                                                 |        |                    |  |
| Co-ordinates:<br>E:<br>N:                                           |     |      |        | Ground Level (m):                                                                                                                   |                                                                                                                                                                                      | Date Started:02/07/2018<br>Date Completed:02/07/2018             |        |                    |  |
| Samples and In situ Testing                                         |     |      |        | Field Records                                                                                                                       | DESCRIPTION                                                                                                                                                                          | Reduced Level (m)                                                | Legend | Depth (Thick) (m)  |  |
| Depth (m)                                                           | No. | Type | Result |                                                                                                                                     |                                                                                                                                                                                      |                                                                  |        |                    |  |
| <div></div>                                                         |     |      |        |                                                                                                                                     | TOPSOIL: Overgrown vegetation over dark brown slightly clayey slightly gravelly fine to medium sand with occasional roots to 5mm diameter. Gravel is subangular fine to coarse flint | -0.35                                                            |        | (0.35)             |  |
|                                                                     |     |      |        |                                                                                                                                     | Firm brown slightly gravelly fine to medium sandy CLAY. Gravel is subangular fine to coarse flint<br><b>(Head)</b>                                                                   | -0.80                                                            |        | 0.35<br>(0.45)     |  |
|                                                                     |     |      |        |                                                                                                                                     | Firm brown fine to medium sandy very silty CLAY<br><b>(Head)</b>                                                                                                                     | -1.65                                                            |        | 0.80<br>(0.85)     |  |
|                                                                     |     |      |        |                                                                                                                                     | ...from 1.50 to 1.65 slightly gravelly                                                                                                                                               | -2.20                                                            |        | 1.65<br>(0.55)     |  |
|                                                                     |     |      |        |                                                                                                                                     | Soft light brown/beige slightly clayey gravelly sandy SILT. Gravel is subangular fine to coarse of flint and chalk<br><b>(Head)</b>                                                  | -2.70                                                            |        | 2.20<br>(0.50)     |  |
|                                                                     |     |      |        |                                                                                                                                     | Light brown slightly sandy SILT<br><b>(Head)</b>                                                                                                                                     | -3.00                                                            |        | 2.70<br>(0.30)     |  |
|                                                                     |     |      |        |                                                                                                                                     | Soft/firm light brown very silty CLAY, Chalk Marl<br><b>(West Melbury Chalk Formation)</b>                                                                                           |                                                                  |        |                    |  |
|                                                                     |     |      |        | ...from 2.90 Slight water seepage                                                                                                   |                                                                                                                                                                                      |                                                                  |        |                    |  |
| Remarks:                                                            |     |      |        |                                                                                                                                     |                                                                                                                                                                                      | End of Trial Pit 3.00 m<br>(Thickness of basal layer not proven) |        |                    |  |
| Notes: For explanation of symbols and abbreviations, see Key Sheet. |     |      |        |                                                                                                                                     |                                                                                                                                                                                      | Logged By:<br>STP                                                |        | Checked By:<br>CSS |  |
|                                                                     |     |      |        |                                                                                                                                     |                                                                                                                                                                                      | Scale:<br>1:25                                                   |        | Approved By:       |  |
|                                                                     |     |      |        |                                                                                                                                     |                                                                                                                                                                                      | FIG No.                                                          |        |                    |  |



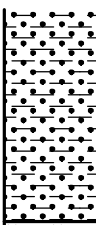
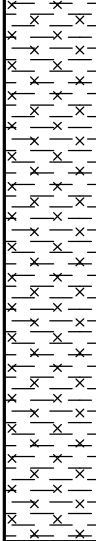
# Ground and Environmental Services Limited

Unit 2 Montpelier Business Park  
Dencora Way, Ashford  
Kent TN23 4FG

Tel: 01233 646237

Trial Pit No. SP2

Sheet: 1 of 1

|                                                                     |     |      |        |                                                                                                                                     |                                                                                                                                                           |                                                      |                                                                                      |                    |
|---------------------------------------------------------------------|-----|------|--------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------|
| Equipment & Methods.<br>JCB 3CX excavatorBackfill: Arisings         |     |      |        | Project Name: Etchinghill Golf - Golf Course<br>Project Location: Canterbury Road, Lyminge, Kent, England<br>Client: Pentland Homes |                                                                                                                                                           | Job No:<br>11997                                     |                                                                                      |                    |
| Co-ordinates:<br>E:<br>N:                                           |     |      |        | Ground Level (m):                                                                                                                   |                                                                                                                                                           | Date Started:02/07/2018<br>Date Completed:02/07/2018 |                                                                                      |                    |
| Samples and In situ Testing                                         |     |      |        | Field Records                                                                                                                       | DESCRIPTION                                                                                                                                               | Reduced Level (m)                                    | Legend                                                                               | Depth (Thick) (m)  |
| Depth (m)                                                           | No. | Type | Result |                                                                                                                                     |                                                                                                                                                           |                                                      |                                                                                      |                    |
|                                                                     |     |      |        |                                                                                                                                     | TOPSOIL: grey and brown sandy slightly gravelly clay, Sand is subangular fine to medium. Gravel is subangular fine to coarse flint. Roots to 3mm diameter | -0.30                                                |   | (0.30)<br>0.30     |
|                                                                     |     |      |        |                                                                                                                                     | Light brown and light grey silty fine sandy CLAY<br>(Head)                                                                                                | -1.10                                                |   | (0.70)<br>1.10     |
|                                                                     |     |      |        |                                                                                                                                     | Firm (medium strength) light grey with light brown clayey SILT, Chalk marl<br>(West Melbury Chalk Formation)                                              | -2.90                                                |  | (1.80)<br>2.90     |
|                                                                     |     |      |        |                                                                                                                                     | End of Trial Pit 2.90 m<br>(Thickness of basal layer not proven)                                                                                          |                                                      |                                                                                      |                    |
| Remarks:                                                            |     |      |        |                                                                                                                                     |                                                                                                                                                           | Logged By:<br>STP                                    |                                                                                      | Checked By:<br>CSS |
|                                                                     |     |      |        |                                                                                                                                     |                                                                                                                                                           | Scale:<br>1:25                                       |                                                                                      | Approved By:       |
|                                                                     |     |      |        |                                                                                                                                     |                                                                                                                                                           | FIG No.                                              |                                                                                      |                    |
| Notes: For explanation of symbols and abbreviations, see Key Sheet. |     |      |        |                                                                                                                                     |                                                                                                                                                           |                                                      |                                                                                      |                    |



**APPENDIX 6**  
**SOAKAGE TEST RESULTS**



## SOAKAWAY TESTING

Test in accordance with BRE 365 Guidelines

Project Reference Number: 11997 Client: Pentland Homes

Site: Etchinghill Golf Course site

Location: Etchinghill

Weather: Sunny and Warm

Date of Test: 02-Jul-18

**SP1 Test**  
**1 / 1**

### TRIAL PIT DIMENSIONS

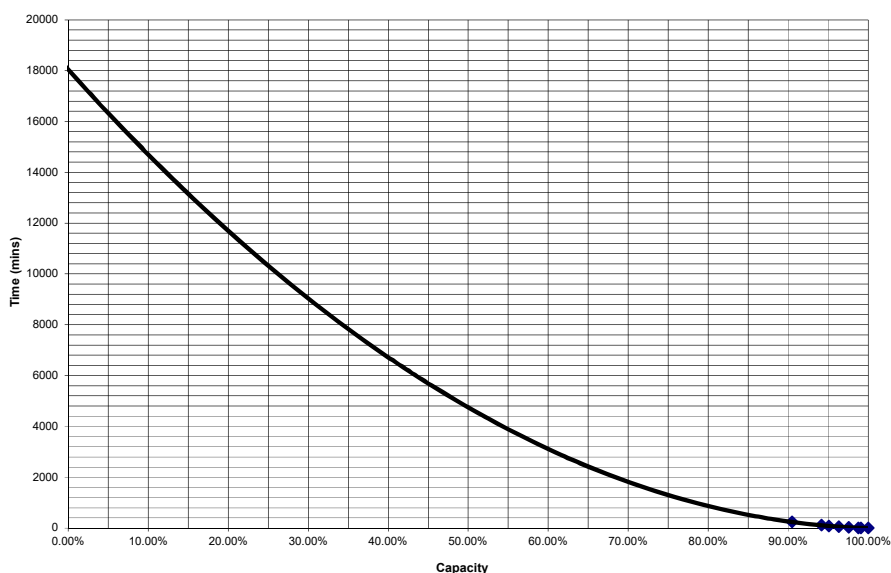
Width (m): 0.45 Length (m): 2.8

Depth (m): 3 Invert Depth (m): 1.37

Drainage time of test (mins): 241 (13% Drained)

### SOAKAGE RESULTS

| Depth | (%)     | Time |
|-------|---------|------|
| 1.37  | 100.00% | 0    |
| 1.385 | 99.08%  | 5    |
| 1.39  | 98.77%  | 10   |
| 1.41  | 97.55%  | 28   |
| 1.43  | 96.32%  | 55   |
| 1.45  | 95.09%  | 82   |
| 1.465 | 94.17%  | 115  |
| 1.525 | 90.49%  | 240  |



### INFILTRATION RATE

| Depth (B.G.L)<br>(m) | Infiltration Rate<br>(m/s) |
|----------------------|----------------------------|
| 1.37 - 3             | 2.84E-07                   |

Departures from the specified test method:

Remarks: Very low soakage - rate calculation based on extrapolation of test data

Authorised Signatory: \_\_\_\_\_

Date: \_\_\_\_\_



## SOAKAWAY TESTING

Test in accordance with BRE 365 Guidelines

Project Reference Number: 11997 Client: Pentland Homes

Site: Etchinghill Golf Course site

Location: Etchinghill

Weather: Sunny and Warm

Date of Test: 02-Jul-18

**SP2 Test**  
**1 / 1**

### TRIAL PIT DIMENSIONS

Width (m): 0.45

Length (m): 2.75

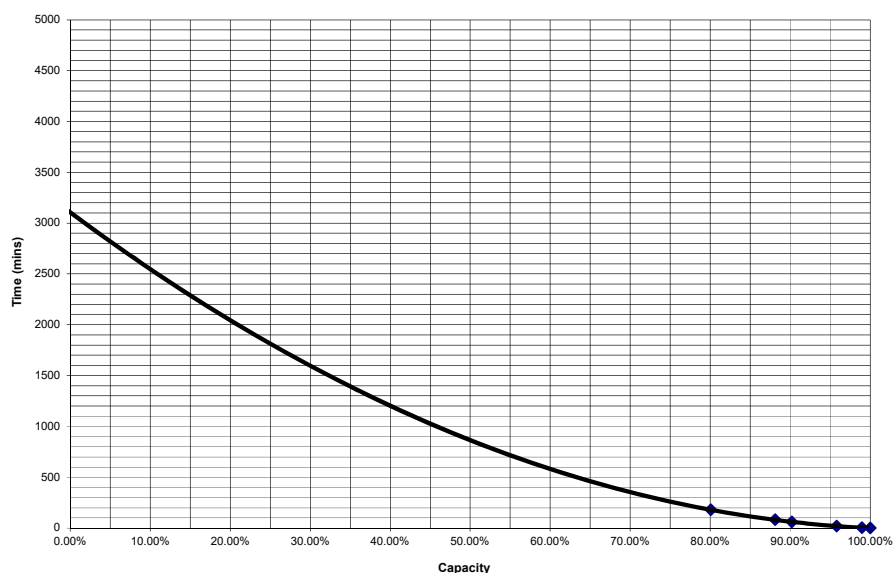
Depth (m): 2.9

Invert Depth (m): 1.47

Drainage time of test (mins): 180 (20% drained)

### SOAKAGE RESULTS

| Depth | (%)     | Time |
|-------|---------|------|
| 1.47  | 100.00% | 0    |
| 1.485 | 98.95%  | 5    |
| 1.53  | 95.80%  | 19   |
| 1.61  | 90.21%  | 61   |
| 1.64  | 88.11%  | 82   |
| 1.755 | 80.07%  | 180  |



### INFILTRATION RATE

| Depth (B.G.L.)<br>(m) | Infiltration Rate<br>(m/s) |
|-----------------------|----------------------------|
| 1.47 - 2.9            | 1.54E-06                   |

Departures from the specified test method:

Remarks:

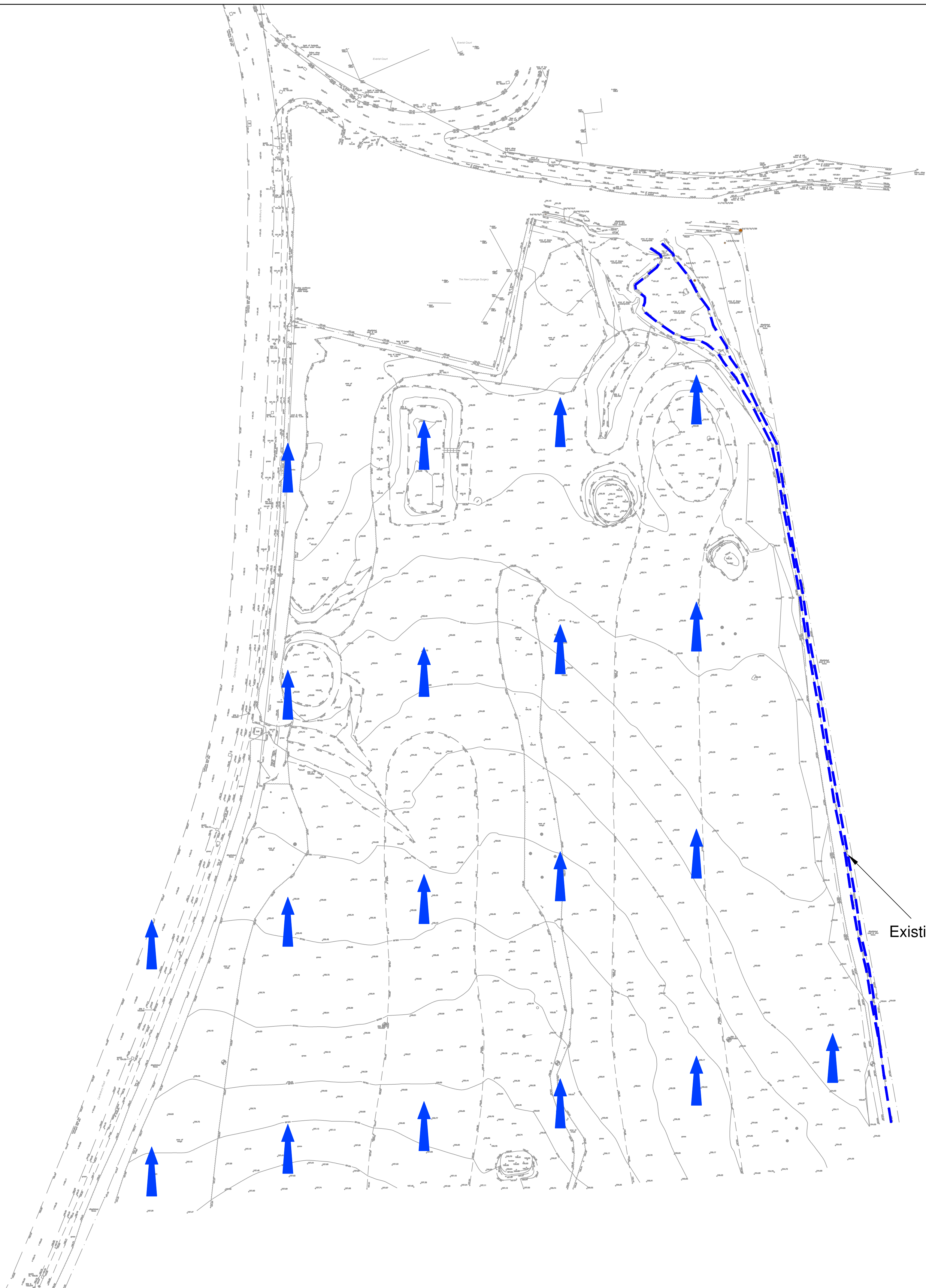
**Moderate to low infiltration rate - rate calculation based on extrapolation of test data**

Authorised Signatory: \_\_\_\_\_

Date: \_\_\_\_\_

## **Appendix (E)**

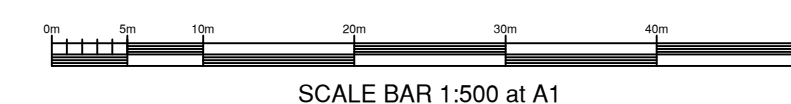
### **Existing Drainage Regime**



1. All dimensions are in metres unless stated otherwise.
2. Adoptable highway works to be constructed in accordance with Wiltshire Council standards & specifications.
3. Topographical Survey as JC White Geomatics LTD, Topographical Survey, drawing number 17/00/130 Revision A, dated November 2020.

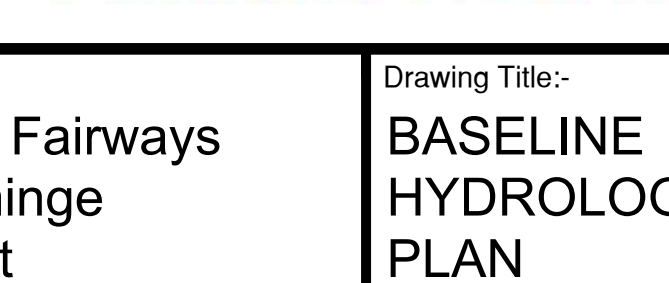
Existing Overland Flow 

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.

[illegible]

| Rev. | Date | Details | By | Chkd | Appd |
|------|------|---------|----|------|------|
|------|------|---------|----|------|------|

\_\_\_\_\_



Drawing Title:-  
**BASELINE  
HYDROLOGY  
PLAN**

|        |            |           |             |
|--------|------------|-----------|-------------|
| Date:  | March 2023 | Scales:   | 1:500 at A1 |
| Drawn: | JAE        | Checked:  | TRS         |
|        |            | Approved: | TRS         |

Drawing No. **PEN/E5069/007**

FOR INFORMATION ONLY



T: 01256 769269 E: [mail@rcpconsultants.co.uk](mailto:mail@rcpconsultants.co.uk) W: [rcpconsultants.co.uk](http://rcpconsultants.co.uk)

## **Appendix (F)**

### **Proposed Drainage Strategy**



1. All dimensions are in metres unless stated otherwise.
2. Do not scale from this drawing. Only written dimensions are to be used.
3. This drawing should be read in conjunction with the Architect's and Structural Engineer's design drawings and specification.
4. Site layout shown in this drawing is based on Sten Architecture's Planning Layout drawing number 2234.01PA5 – Planning Approval, received in .dwg format on 07.03.2023.
5. Layout review is subject to receipt of finalised layout proposal and the final highway layout design will be subject to the outcome of consultation with Kent County Council.
6. **ANY VARIANCE OR DISCREPANCY MUST BE REPORTED BACK TO RCP ENGINEERING BEFORE WORK BEGINS.**

Site Boundary

Adoptable Surface Water Manhole & Sewers

Proposed SuDS basins

Existing topographical levels

Attenuation Tanks

Rising Main

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 |
|------|------|---------|----|------|------|

---



Drawing Title:-  
**DRAINAGE  
STRATEGY**

Drawing No. \_\_\_\_\_

[illegible]

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## **Appendix (G)**

### **MicroDrainage Calculations**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                                                                                     |                       |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|-----------------------|-----|------|-------|-----------|-------|-------|-------|-----------|-----|---------------|----------|------------|-----|------------|-----|------------|------|---------|-----|-----------|------|------------|------|
| Rogers Cory Partnership                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   | Page 1                                                                              |                       |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| The Old School<br>Old School Road<br>Hook Hampshire RG27 9NJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |  |                       |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| Date 06/03/2023 13:34                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Designed by Terry |                                                                                     |                       |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| File                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Checked by        |                                                                                     |                       |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   | Source Control 2017.1.2                                                             |                       |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| <p style="text-align: center;"><u>ICP SUDS Mean Annual Flood</u></p> <p style="text-align: center;">Input</p> <table> <tr> <td>Return Period (years)</td> <td>100</td> <td>Soil</td> <td>0.450</td> </tr> <tr> <td>Area (ha)</td> <td>0.945</td> <td>Urban</td> <td>0.000</td> </tr> <tr> <td>SAAR (mm)</td> <td>800</td> <td>Region Number</td> <td>Region 7</td> </tr> </table> <p style="text-align: center;"><b>Results    1/s</b></p> <table> <tr> <td>QBAR Rural</td> <td>4.9</td> </tr> <tr> <td>QBAR Urban</td> <td>4.9</td> </tr> <tr> <td>Q100 years</td> <td>15.5</td> </tr> <tr> <td>Q1 year</td> <td>4.1</td> </tr> <tr> <td>Q30 years</td> <td>11.0</td> </tr> <tr> <td>Q100 years</td> <td>15.5</td> </tr> </table> |                   |                                                                                     | Return Period (years) | 100 | Soil | 0.450 | Area (ha) | 0.945 | Urban | 0.000 | SAAR (mm) | 800 | Region Number | Region 7 | QBAR Rural | 4.9 | QBAR Urban | 4.9 | Q100 years | 15.5 | Q1 year | 4.1 | Q30 years | 11.0 | Q100 years | 15.5 |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 100               | Soil                                                                                | 0.450                 |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| Area (ha)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.945             | Urban                                                                               | 0.000                 |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| SAAR (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 800               | Region Number                                                                       | Region 7              |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| QBAR Rural                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4.9               |                                                                                     |                       |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| QBAR Urban                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4.9               |                                                                                     |                       |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| Q100 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 15.5              |                                                                                     |                       |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| Q1 year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 4.1               |                                                                                     |                       |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| Q30 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 11.0              |                                                                                     |                       |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| Q100 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 15.5              |                                                                                     |                       |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |
| ©1982-2017 XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |                                                                                     |                       |     |      |       |           |       |       |       |           |     |               |          |            |     |            |     |            |      |         |     |           |      |            |      |

|                                                              |  |                                                                                     |
|--------------------------------------------------------------|--|-------------------------------------------------------------------------------------|
| Rogers Cory Partnership                                      |  | Page 0                                                                              |
| The Old School<br>Old School Road<br>Hook Hampshire RG27 9NJ |  |  |
| Date 06/03/2023 14:08<br>File E5069 - MODEL.MDX              |  |                                                                                     |
| Designed by Terry<br>Checked by                              |  |                                                                                     |
| Innovyze                                                     |  | Network 2017.1.2                                                                    |

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

|                                               |        |
|-----------------------------------------------|--------|
| Return Period (years)                         | 2      |
| FEH Rainfall Version                          | 1999   |
| Site Location GB 616450 140700 TR 16450 40700 |        |
| C (1km)                                       | -0.022 |
| D1 (1km)                                      | 0.350  |
| D2 (1km)                                      | 0.402  |
| D3 (1km)                                      | 0.267  |
| E (1km)                                       | 0.309  |
| F (1km)                                       | 2.505  |
| Maximum Rainfall (mm/hr)                      | 50     |
| Maximum Time of Concentration (mins)          | 30     |
| Foul Sewage (l/s/ha)                          | 0.000  |
| Volumetric Runoff Coeff.                      | 0.750  |
| PIMP (%)                                      | 100    |
| Add Flow / Climate Change (%)                 | 10     |
| Minimum Backdrop Height (m)                   | 0.200  |
| Maximum Backdrop Height (m)                   | 1.500  |
| Min Design Depth for Optimisation (m)         | 1.200  |
| Min Vel for Auto Design only (m/s)            | 1.00   |
| Min Slope for Optimisation (1:X)              | 500    |

Designed with Level Soffits

Network Design Table for Surface Network 1

« - Indicates pipe capacity < flow

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| 1.000 | 20.488        | 0.205       | 99.9           | 0.034          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| 2.000 | 13.823        | 0.418       | 33.1           | 0.034          | 5.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 50.00           | 5.34           | 104.097      | 0.034            | 0.0                  | 0.0           | 0.5               | 1.01         | 17.8         | 5.1           |
| 2.000 | 50.00           | 5.08           | 104.160      | 0.034            | 0.0                  | 0.0           | 0.5               | 2.74         | 193.9        | 5.1           |

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|                                                              |                 |                |                |                  |                      |                                 |                   |              |              |               |                                                                                       |  |
|--------------------------------------------------------------|-----------------|----------------|----------------|------------------|----------------------|---------------------------------|-------------------|--------------|--------------|---------------|---------------------------------------------------------------------------------------|--|
| Rogers Cory Partnership                                      |                 |                |                |                  |                      |                                 |                   |              |              |               | Page 1                                                                                |  |
| The Old School<br>Old School Road<br>Hook Hampshire RG27 9NJ |                 |                |                |                  |                      | Designed by Terry<br>Checked by |                   |              |              |               |    |  |
| Date 06/03/2023 14:08<br>File E5069 - MODEL.MDX              |                 |                |                |                  |                      |                                 |                   |              |              |               |                                                                                       |  |
| Innovyze                                                     |                 |                |                |                  |                      | Network 2017.1.2                |                   |              |              |               |                                                                                       |  |
| Network Design Table for Surface Network 1                   |                 |                |                |                  |                      |                                 |                   |              |              |               |                                                                                       |  |
| PN                                                           | Length<br>(m)   | Fall<br>(m)    | Slope<br>(1:X) | I.Area<br>(ha)   | T.E.<br>(mins)       | Base<br>Flow (l/s)              | k<br>(mm)         | HYD<br>SECT  | DIA<br>(mm)  | Section Type  | Auto<br>Design                                                                        |  |
| 1.001                                                        | 29.619          | 0.895          | 33.1           | 0.034            | 0.00                 | 0.0                             | 0.600             | o            | 300          | Pipe/Conduit  |    |  |
| 1.002                                                        | 22.150          | 0.098          | 226.0          | 0.034            | 0.00                 | 0.0                             | 0.600             | o            | 300          | Pipe/Conduit  |    |  |
| 1.003                                                        | 18.702          | 0.083          | 225.3          | 0.034            | 0.00                 | 0.0                             | 0.600             | o            | 300          | Pipe/Conduit  |    |  |
| 1.004                                                        | 12.266          | 0.055          | 223.0          | 0.034            | 0.00                 | 0.0                             | 0.600             | o            | 300          | Pipe/Conduit  |    |  |
| 3.000                                                        | 31.275          | 1.200          | 26.1           | 0.034            | 5.00                 | 0.0                             | 0.600             | o            | 150          | Pipe/Conduit  |    |  |
| 1.005                                                        | 5.477           | 0.024          | 228.2          | 0.034            | 0.00                 | 0.0                             | 0.600             | o            | 300          | Pipe/Conduit  |    |  |
| 1.006                                                        | 17.744          | 0.079          | 224.6          | 0.034            | 0.00                 | 0.0                             | 0.600             | o            | 300          | Pipe/Conduit  |    |  |
| 4.000                                                        | 12.448          | 1.035          | 12.0           | 0.034            | 5.00                 | 0.0                             | 0.600             | o            | 300          | Pipe/Conduit  |    |  |
| 1.007                                                        | 9.517           | 0.042          | 226.6          | 0.034            | 0.00                 | 0.0                             | 0.600             | o            | 300          | Pipe/Conduit  |    |  |
| 5.000                                                        | 14.826          | 0.219          | 67.7           | 0.034            | 5.00                 | 0.0                             | 0.600             | o            | 150          | Pipe/Conduit  |  |  |
| 5.001                                                        | 8.688           | 0.133          | 65.3           | 0.034            | 0.00                 | 0.0                             | 0.600             | o            | 150          | Pipe/Conduit  |  |  |
| 5.002                                                        | 10.024          | 0.153          | 65.5           | 0.034            | 0.00                 | 0.0                             | 0.600             | o            | 150          | Pipe/Conduit  |  |  |
| 1.008                                                        | 46.981          | 0.209          | 224.8          | 0.034            | 0.00                 | 0.0                             | 0.600             | o            | 300          | Pipe/Conduit  |  |  |
| 1.009                                                        | 7.337           | 0.033          | 222.3          | 0.034            | 0.00                 | 0.0                             | 0.600             | o            | 300          | Pipe/Conduit  |  |  |
| 6.000                                                        | 15.388          | 0.474          | 32.5           | 0.034            | 5.00                 | 0.0                             | 0.600             | o            | 300          | Pipe/Conduit  |  |  |
| Network Results Table                                        |                 |                |                |                  |                      |                                 |                   |              |              |               |                                                                                       |  |
| PN                                                           | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m)   | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s)                   | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |                                                                                       |  |
| 1.001                                                        | 50.00           | 5.52           | 103.742        | 0.102            | 0.0                  | 0.0                             | 1.4               | 2.74         | 193.9        | 15.2          |                                                                                       |  |
| 1.002                                                        | 50.00           | 5.87           | 101.805        | 0.136            | 0.0                  | 0.0                             | 1.8               | 1.04         | 73.6         | 20.3          |                                                                                       |  |
| 1.003                                                        | 50.00           | 6.17           | 101.706        | 0.170            | 0.0                  | 0.0                             | 2.3               | 1.04         | 73.7         | 25.3          |                                                                                       |  |
| 1.004                                                        | 50.00           | 6.37           | 101.623        | 0.204            | 0.0                  | 0.0                             | 2.8               | 1.05         | 74.1         | 30.4          |                                                                                       |  |
| 3.000                                                        | 50.00           | 5.26           | 103.847        | 0.034            | 0.0                  | 0.0                             | 0.5               | 1.98         | 35.0         | 5.1           |                                                                                       |  |
| 1.005                                                        | 50.00           | 6.46           | 101.569        | 0.272            | 0.0                  | 0.0                             | 3.7               | 1.04         | 73.3         | 40.5          |                                                                                       |  |
| 1.006                                                        | 50.00           | 6.74           | 101.544        | 0.306            | 0.0                  | 0.0                             | 4.1               | 1.04         | 73.9         | 45.6          |                                                                                       |  |
| 4.000                                                        | 50.00           | 5.05           | 102.500        | 0.034            | 0.0                  | 0.0                             | 0.5               | 4.56         | 322.2        | 5.1           |                                                                                       |  |
| 1.007                                                        | 50.00           | 6.89           | 101.465        | 0.374            | 0.0                  | 0.0                             | 5.1               | 1.04         | 73.5         | 55.7          |                                                                                       |  |
| 5.000                                                        | 50.00           | 5.20           | 102.993        | 0.034            | 0.0                  | 0.0                             | 0.5               | 1.22         | 21.6         | 5.1           |                                                                                       |  |
| 5.001                                                        | 50.00           | 5.32           | 102.774        | 0.068            | 0.0                  | 0.0                             | 0.9               | 1.25         | 22.0         | 10.1          |                                                                                       |  |
| 5.002                                                        | 50.00           | 5.45           | 102.641        | 0.102            | 0.0                  | 0.0                             | 1.4               | 1.24         | 22.0         | 15.2          |                                                                                       |  |
| 1.008                                                        | 50.00           | 7.64           | 101.423        | 0.510            | 0.0                  | 0.0                             | 6.9               | 1.04         | 73.8«        | 76.0          |                                                                                       |  |
| 1.009                                                        | 50.00           | 7.76           | 101.214        | 0.544            | 0.0                  | 0.0                             | 7.4               | 1.05         | 74.2«        | 81.0          |                                                                                       |  |
| 6.000                                                        | 50.00           | 5.09           | 102.366        | 0.034            | 0.0                  | 0.0                             | 0.5               | 2.77         | 195.7        | 5.1           |                                                                                       |  |
| ©1982-2017 XP Solutions                                      |                 |                |                |                  |                      |                                 |                   |              |              |               |                                                                                       |  |



|                                                              |  |                                                                                     |
|--------------------------------------------------------------|--|-------------------------------------------------------------------------------------|
| Rogers Cory Partnership                                      |  | Page 3                                                                              |
| The Old School<br>Old School Road<br>Hook Hampshire RG27 9NJ |  |  |
| Date 06/03/2023 14:08<br>File E5069 - MODEL.MDX              |  |                                                                                     |
| Designed by Terry<br>Checked by                              |  |                                                                                     |
| Innovyze                                                     |  | Network 2017.1.2                                                                    |

Simulation Criteria for Surface Network 1

|                                 |       |                                     |        |
|---------------------------------|-------|-------------------------------------|--------|
| Volumetric Runoff Coeff         | 0.750 | Additional Flow - % of Total Flow   | 10.000 |
| Areal Reduction Factor          | 1.000 | MADD Factor * 10m³/ha Storage       | 2.000  |
| Hot Start (mins)                | 0     | Inlet Coeffiecient                  | 0.800  |
| Hot Start Level (mm)            | 0     | Flow per Person per Day (l/per/day) | 0.000  |
| Manhole Headloss Coeff (Global) | 0.500 | Run Time (mins)                     | 60     |
| Foul Sewage per hectare (l/s)   | 0.000 | Output Interval (mins)              | 1      |

|                             |   |                              |   |
|-----------------------------|---|------------------------------|---|
| Number of Input Hydrographs | 0 | Number of Storage Structures | 9 |
| Number of Online Controls   | 2 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls  | 0 | Number of Real Time Controls | 0 |

Synthetic Rainfall Details

|                       |                                 |
|-----------------------|---------------------------------|
| Rainfall Model        | FEH                             |
| Return Period (years) | 100                             |
| FEH Rainfall Version  | 1999                            |
| Site Location         | GB 616450 140700 TR 16450 40700 |
| C (1km)               | -0.022                          |
| D1 (1km)              | 0.350                           |
| D2 (1km)              | 0.402                           |
| D3 (1km)              | 0.267                           |
| E (1km)               | 0.309                           |
| F (1km)               | 2.505                           |
| Summer Storms         | Yes                             |
| Winter Storms         | No                              |
| Cv (Summer)           | 0.750                           |
| Cv (Winter)           | 0.840                           |
| Storm Duration (mins) | 30                              |

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|                                                              |                   |                                                                                     |
|--------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|
| Rogers Cory Partnership                                      |                   | Page 4                                                                              |
| The Old School<br>Old School Road<br>Hook Hampshire RG27 9NJ |                   |  |
| Date 06/03/2023 14:08                                        | Designed by Terry |                                                                                     |
| File E5069 - MODEL.MDX                                       | Checked by        |                                                                                     |
| Innovyze                                                     | Network 2017.1.2  |                                                                                     |

### Online Controls for Surface Network 1

#### Hydro-Brake® Optimum Manhole: S6, DS/PN: 1.007, Volume (m³): 4.7

Unit Reference MD-SHE-0098-5000-1500-5000  
Design Head (m) 1.500  
Design Flow (l/s) 5.0  
Flush-Flo™ Calculated  
Objective Minimise upstream storage  
Application Surface  
Sump Available Yes  
Diameter (mm) 98  
Invert Level (m) 101.465  
Minimum Outlet Pipe Diameter (mm) 150  
Suggested Manhole Diameter (mm) 1200

| Control Points            | Head (m) | Flow (l/s) | Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|---------------------------|----------|------------|
| Design Point (Calculated) | 1.500    | 5.0        | Kick-Flo®                 | 0.878    | 3.9        |
| Flush-Flo™                | 0.431    | 4.9        | Mean Flow over Head Range | -        | 4.3        |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100     | 3.2        | 1.200     | 4.5        | 3.000     | 6.9        | 7.000     | 10.3       |
| 0.200     | 4.4        | 1.400     | 4.8        | 3.500     | 7.4        | 7.500     | 10.7       |
| 0.300     | 4.8        | 1.600     | 5.1        | 4.000     | 7.9        | 8.000     | 11.0       |
| 0.400     | 4.9        | 1.800     | 5.4        | 4.500     | 8.4        | 8.500     | 11.3       |
| 0.500     | 4.9        | 2.000     | 5.7        | 5.000     | 8.8        | 9.000     | 11.6       |
| 0.600     | 4.8        | 2.200     | 6.0        | 5.500     | 9.2        | 9.500     | 11.9       |
| 0.800     | 4.3        | 2.400     | 6.2        | 6.000     | 9.6        |           |            |
| 1.000     | 4.1        | 2.600     | 6.5        | 6.500     | 10.0       |           |            |

#### Hydro-Brake® Optimum Manhole: S11, DS/PN: 1.013, Volume (m³): 4.3

Unit Reference MD-SHE-0104-4900-1000-4900  
Design Head (m) 1.000  
Design Flow (l/s) 4.9  
Flush-Flo™ Calculated  
Objective Minimise upstream storage  
Application Surface  
Sump Available Yes  
Diameter (mm) 104  
Invert Level (m) 100.927  
Minimum Outlet Pipe Diameter (mm) 150  
Suggested Manhole Diameter (mm) 1200

| Rogers Cory Partnership                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   | Page 5                                                                              |                           |           |            |                |            |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|---------------------------|-----------|------------|----------------|------------|------------|---------------------------|-------|-----|-----------|-------|-----|------------|-------|-----|---------------------------|---|-----|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|------|-------|------|-------|-----|-------|-----|-------|------|-------|------|-------|-----|-------|-----|-------|------|--|--|-------|-----|-------|-----|-------|------|--|--|
| The Old School<br>Old School Road<br>Hook Hampshire RG27 9NJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |  |                           |           |            |                |            |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| Date 06/03/2023 14:08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Designed by Terry |                                                                                     |                           |           |            |                |            |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| File E5069 - MODEL.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Checked by        |                                                                                     |                           |           |            |                |            |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   | Network 2017.1.2                                                                    |                           |           |            |                |            |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| <p><u>Hydro-Brake® Optimum Manhole: S11, DS/PN: 1.013, Volume (m³): 4.3</u></p> <table border="1"> <thead> <tr> <th>Control Points</th> <th>Head (m)</th> <th>Flow (l/s)</th> <th>Control Points</th> <th>Head (m)</th> <th>Flow (l/s)</th> </tr> </thead> <tbody> <tr> <td>Design Point (Calculated)</td> <td>1.000</td> <td>4.9</td> <td>Kick-Flo®</td> <td>0.637</td> <td>4.0</td> </tr> <tr> <td>Flush-Flo™</td> <td>0.295</td> <td>4.9</td> <td>Mean Flow over Head Range</td> <td>-</td> <td>4.3</td> </tr> </tbody> </table> <p>The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated</p> <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> </tr> </thead> <tbody> <tr><td>0.100</td><td>3.5</td><td>1.200</td><td>5.3</td><td>3.000</td><td>8.2</td><td>7.000</td><td>12.2</td></tr> <tr><td>0.200</td><td>4.8</td><td>1.400</td><td>5.7</td><td>3.500</td><td>8.8</td><td>7.500</td><td>12.7</td></tr> <tr><td>0.300</td><td>4.9</td><td>1.600</td><td>6.1</td><td>4.000</td><td>9.4</td><td>8.000</td><td>13.1</td></tr> <tr><td>0.400</td><td>4.8</td><td>1.800</td><td>6.4</td><td>4.500</td><td>9.9</td><td>8.500</td><td>13.4</td></tr> <tr><td>0.500</td><td>4.6</td><td>2.000</td><td>6.8</td><td>5.000</td><td>10.4</td><td>9.000</td><td>13.8</td></tr> <tr><td>0.600</td><td>4.2</td><td>2.200</td><td>7.1</td><td>5.500</td><td>10.9</td><td>9.500</td><td>14.2</td></tr> <tr><td>0.800</td><td>4.4</td><td>2.400</td><td>7.4</td><td>6.000</td><td>11.4</td><td></td><td></td></tr> <tr><td>1.000</td><td>4.9</td><td>2.600</td><td>7.7</td><td>6.500</td><td>11.8</td><td></td><td></td></tr> </tbody> </table> |                   |                                                                                     | Control Points            | Head (m)  | Flow (l/s) | Control Points | Head (m)   | Flow (l/s) | Design Point (Calculated) | 1.000 | 4.9 | Kick-Flo® | 0.637 | 4.0 | Flush-Flo™ | 0.295 | 4.9 | Mean Flow over Head Range | - | 4.3 | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | 0.100 | 3.5 | 1.200 | 5.3 | 3.000 | 8.2 | 7.000 | 12.2 | 0.200 | 4.8 | 1.400 | 5.7 | 3.500 | 8.8 | 7.500 | 12.7 | 0.300 | 4.9 | 1.600 | 6.1 | 4.000 | 9.4 | 8.000 | 13.1 | 0.400 | 4.8 | 1.800 | 6.4 | 4.500 | 9.9 | 8.500 | 13.4 | 0.500 | 4.6 | 2.000 | 6.8 | 5.000 | 10.4 | 9.000 | 13.8 | 0.600 | 4.2 | 2.200 | 7.1 | 5.500 | 10.9 | 9.500 | 14.2 | 0.800 | 4.4 | 2.400 | 7.4 | 6.000 | 11.4 |  |  | 1.000 | 4.9 | 2.600 | 7.7 | 6.500 | 11.8 |  |  |
| Control Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Head (m)          | Flow (l/s)                                                                          | Control Points            | Head (m)  | Flow (l/s) |                |            |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| Design Point (Calculated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1.000             | 4.9                                                                                 | Kick-Flo®                 | 0.637     | 4.0        |                |            |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.295             | 4.9                                                                                 | Mean Flow over Head Range | -         | 4.3        |                |            |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Flow (l/s)        | Depth (m)                                                                           | Flow (l/s)                | Depth (m) | Flow (l/s) | Depth (m)      | Flow (l/s) |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| 0.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3.5               | 1.200                                                                               | 5.3                       | 3.000     | 8.2        | 7.000          | 12.2       |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| 0.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4.8               | 1.400                                                                               | 5.7                       | 3.500     | 8.8        | 7.500          | 12.7       |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| 0.300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4.9               | 1.600                                                                               | 6.1                       | 4.000     | 9.4        | 8.000          | 13.1       |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| 0.400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4.8               | 1.800                                                                               | 6.4                       | 4.500     | 9.9        | 8.500          | 13.4       |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| 0.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4.6               | 2.000                                                                               | 6.8                       | 5.000     | 10.4       | 9.000          | 13.8       |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| 0.600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4.2               | 2.200                                                                               | 7.1                       | 5.500     | 10.9       | 9.500          | 14.2       |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| 0.800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4.4               | 2.400                                                                               | 7.4                       | 6.000     | 11.4       |                |            |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
| 1.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4.9               | 2.600                                                                               | 7.7                       | 6.500     | 11.8       |                |            |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |       |      |       |     |       |     |       |      |  |  |       |     |       |     |       |      |  |  |
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|--------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|
| Rogers Cory Partnership                                      |                   | Page 6                                                                              |
| The Old School<br>Old School Road<br>Hook Hampshire RG27 9NJ |                   |  |
| Date 06/03/2023 14:08                                        | Designed by Terry |                                                                                     |
| File E5069 - MODEL.MDX                                       | Checked by        |                                                                                     |
| Innovyze                                                     |                   | Network 2017.1.2                                                                    |

Storage Structures for Surface Network 1

Tank or Pond Manhole: S31, DS/PN: 4.000

Invert Level (m) 102.500

| Depth (m) | Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------|------------------------|-----------|------------------------|-----------|------------------------|
| 0.000     | 119.8                  | 0.300     | 157.1                  | 0.600     | 198.3                  | 0.900     | 243.7                  |
| 0.100     | 132.0                  | 0.400     | 170.4                  | 0.700     | 213.0                  | 1.000     | 259.7                  |
| 0.200     | 144.3                  | 0.500     | 184.2                  | 0.800     | 228.1                  |           |                        |

Cellular Storage Manhole: S8, DS/PN: 1.009

Invert Level (m) 101.214 Safety Factor 2.0

Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95

Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 130.0                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 130.0                  | 0.0                         |           |                        |                             |

Tank or Pond Manhole: S14, DS/PN: 6.002

Invert Level (m) 101.504

| Depth (m) | Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------|------------------------|-----------|------------------------|
| 0.000     | 200.0                  | 0.800     | 200.0                  | 0.801     | 0.0                    |

Cellular Storage Manhole: S16, DS/PN: 6.004

Invert Level (m) 101.276 Safety Factor 2.0

Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95

Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 145.0                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 145.0                  | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S17, DS/PN: 1.010

Invert Level (m) 101.182 Safety Factor 2.0

Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95

Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 100.0                  | 0.0                         | 0.800     | 100.0                  | 0.0                         |

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| Rogers Cory Partnership                                      |  | Page 7                                                                              |
| The Old School<br>Old School Road<br>Hook Hampshire RG27 9NJ |  |  |
| Date 06/03/2023 14:08<br>File E5069 - MODEL.MDX              |  |                                                                                     |
| Designed by Terry<br>Checked by                              |  |                                                                                     |
| Innovyze                                                     |  | Network 2017.1.2                                                                    |

Cellular Storage Manhole: S17, DS/PN: 1.010

| Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.801     | 0.0                    | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S10, DS/PN: 1.012

Invert Level (m) 101.014 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 150.0                  | 0.0                         | 0.800     | 150.0                  | 0.0                         |
| 0.400     | 150.0                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |

Cellular Storage Manhole: S26, DS/PN: 7.001

Invert Level (m) 101.186 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 100.0                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 100.0                  | 0.0                         |           |                        |                             |

Cellular Storage Manhole: S27, DS/PN: 7.002

Invert Level (m) 101.091 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 100.0                  | 0.0                         | 0.801     | 0.0                    | 0.0                         |
| 0.800     | 100.0                  | 0.0                         |           |                        |                             |

Tank or Pond Manhole: S11, DS/PN: 1.013

Invert Level (m) 100.927

| Depth (m) | Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------|------------------------|
| 0.000     | 195.0                  | 1.000     | 502.0                  |

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| Hook Hampshire RG27 9NJ |

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Innovyze

Network 2017.1.2

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

| PN    | US/MH<br>Name | Water        | Surcharged   | Flooded        | Pipe           |                   | Status     | Level<br>Exceeded |
|-------|---------------|--------------|--------------|----------------|----------------|-------------------|------------|-------------------|
|       |               | Level<br>(m) | Depth<br>(m) | Volume<br>(m³) | Flow /<br>Cap. | Overflow<br>(l/s) |            |                   |
| 1.000 | S23           | 104.953      | 0.706        | 0.000          | 1.46           | 24.5              | SURCHARGED |                   |
| 2.000 | S1            | 104.545      | 0.085        | 0.000          | 0.16           | 26.4              | SURCHARGED |                   |
| 1.001 | S24           | 104.522      | 0.480        | 0.000          | 0.42           | 74.1              | SURCHARGED |                   |
| 1.002 | S2            | 104.349      | 2.244        | 1.309          | 1.37           | 88.8              | FLOOD      | 2                 |
| 1.003 | S3            | 104.174      | 2.168        | 13.558         | 1.23           | 78.5              | FLOOD      | 3                 |
| 1.004 | S4            | 104.074      | 2.151        | 5.214          | 1.55           | 93.0              | FLOOD      | 3                 |
| 3.000 | S21           | 104.627      | 0.630        | 0.000          | 0.72           | 24.1              | SURCHARGED |                   |
| 1.005 | S22           | 103.997      | 2.128        | 0.523          | 1.73           | 86.3              | FLOOD      | 4                 |
| 1.006 | S5            | 103.965      | 2.121        | 0.277          | 1.54           | 97.8              | FLOOD      | 3                 |
| 4.000 | S31           | 103.784      | 0.984        | 0.000          | 0.06           | 16.4              | SURCHARGED |                   |

|                                                                                                           |  |  |  |  |                                 |  |  |  |  |                                                                                     |  |
|-----------------------------------------------------------------------------------------------------------|--|--|--|--|---------------------------------|--|--|--|--|-------------------------------------------------------------------------------------|--|
| Rogers Cory Partnership                                                                                   |  |  |  |  |                                 |  |  |  |  | Page 10                                                                             |  |
| The Old School<br>Old School Road<br>Hook Hampshire RG27 9NJ                                              |  |  |  |  |                                 |  |  |  |  |  |  |
| Date 06/03/2023 14:08<br>File E5069 - MODEL.MDX                                                           |  |  |  |  | Designed by Terry<br>Checked by |  |  |  |  |                                                                                     |  |
| Innovyze                                                                                                  |  |  |  |  | Network 2017.1.2                |  |  |  |  |                                                                                     |  |
| <u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1</u> |  |  |  |  |                                 |  |  |  |  |                                                                                     |  |
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flood volumes contained within site in area of low risk within road and soft landscaping

flood volumes contained within site in area of low risk within road and soft landscaping

## Appendix (H)

### Exceedance Flow Paths



1. All dimensions are in metres unless stated otherwise.
2. Adoptable highway works to be constructed in accordance with Wiltshire Council standards & specifications.
3. Highway boundary to be delineated throughout the site.
4. Site layout shown in this drawing is based on Sten Architecture's Planning Layout drawing number 2234.01PA5 - Planning Layout, received in .dwg format on 07.03.2023.
5. Topographical Survey as JC White Geomatics LTD, Topographical Survey, drawing number 17/00/130 Revision A, dated November 2020.
6. All works subject to Detailed Design Development and Section 104 Approval.
7. Where cover to pipes is less than 1.2m Type Z Bed & Surround Concrete Protection should be used. This detail should also be used where vertical clearance between pipes is less than 300mm. Where pipes with flexible joints are used the concrete protection shall be interrupted across its full cross-section with a compressible filler.

Existing Road Contours

Existing Overland Flow Route

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.



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[illegible]

Client:-



Site:-  
The Fairways  
Lyminge  
Kent

Drawing Title:-  
**EXCEEDANCE  
FLOW  
LAYOUT**

|        |            |           |             |
|--------|------------|-----------|-------------|
| Date:  | March 2023 | Scales:   | 1:500 at A1 |
| Drawn: | JAE        | Checked:  | TRS         |
|        |            | Approved: | TRS         |

Drawing No. \_\_\_\_\_

PEN/E5069/008

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FOR INFORMATION ONLY



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