

TECHNICAL NOTE

Job Name: Bird in Eye Farm, Uckfield
Job No: 332510180/3500
Note No: 332510180/3500/tn001/Rev0
Date: 28th January 2022
Prepared By: Arie Zamler
Subject: Ground Conditions and Infiltration Assessment

1. Introduction

- 1.1. Stantec UK Limited (Stantec) was appointed by Croudace Homes Ltd (the Client) to provide advice with regards to the ground conditions at the site in particular reference to the proposed surface water drainage strategy and the suitability of the near surface soils for the use of shallow infiltration systems for the discharge of surface water into the ground.
- 1.2. A ground investigation was carried out at the site by Geotechnical Investigations Limited (GIL) between the 10th and 13th January 2022 under instruction of the Client. It should be noted that Stantec were not present at the site during the ground investigation works. The factual results of the investigation are presented in a separate letter report prepared by GIL (GIL, 2022)¹.
- 1.3. This technical note presents a summary of the ground investigation and infiltration testing and provides an assessment of the infiltration conditions at the site in relation to the use of shallow infiltration for the disposal of surface water as part of the proposed development of the site.

2. Site Description

- 2.1. The site comprises principally open fields around Bird in Eye Farm used for grazing with semi mature trees and hedges along field boundaries.
- 2.2. The ground level falls from the north-eastern part of the site to the south and west towards a stream along the southern boundary and towards Framfield Stream along the western boundary. According to the topographical survey carried out by Encompass Surveys Ltd dated March 2020, the ground level in the north-eastern corner of the site is about 55 m OD falling to the south towards the stream along the southern boundary where the ground level is about 30 m OD with a maximum gradient of about 1 vertical in 10 horizontal, and towards the north-western corner of the site where the ground level is about 23 m OD with a maximum gradient of about 1 vertical in 5 horizontal.

3. Geology

- 3.1. According to the geological map of the area (BGS, 2006)² the site lies directly on the Lower Tunbridge Wells Sand Formation which is underlain by Wadhurst Clay Formation and Ashdown Formation at depth. Superficial Deposits are not recorded within the site boundaries. Alluvium is recorded along the stream recorded to the west of the site.

4. Ground Investigation

- 4.1. A ground investigation was carried out at the site by GIL between the 10th and 13th January 2022 and comprised the excavation of 13 trial pits referenced TP01 to TP13 to between 1.0 and 2.0 m depth with an infiltration test carried out at each location investigated.

¹ GIL (2022) Bird in Eye Farm, Uckfield – GI1770. Geotechnical Investigations Limited. Fairford, Gloucestershire.

² BGS (2006) Geological Map Sheet 319/334 Lewes and Eastbourne, 1: 50,000 scale Bedrock and Superficial Deposits Edition. British Geological Survey, Keyworth, Notts

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- 4.2. An additional trial pit reference TP05A was excavated to 3.0 m depth adjacent to TP05 to determine the ground conditions at depth and the potential presence of groundwater. The trial pit was excavated at 09:30 am and water ingress was monitored on an hourly basis throughout the day until 14:30 pm when the trial pit was backfilled.
- 4.3. The trial pits were situated across the site where shallow infiltration is proposed. Trial Pit TP05 and TP05A were situated within the proposed infiltration basin in the southern part of the site.

5. Ground Conditions

- 5.1. The ground conditions encountered were in line with the BGS geological map and the known history of the site and comprise the Lower Tunbridge Wells Sand Formation to a maximum investigated depth of 3.0 m below ground level (bgl).
- 5.2. A copy of the exploratory hole records is presented in the factual report by GIL (2022) and the ground conditions are summarised in the table below.

Formation	Base of Stratum, m bgl ⁽¹⁾	Typical Description
Lower Tunbridge Wells Sand Formation	1.0	Variable proportions of brown and orange SILT and SAND with occasional gravel and cobble size fragments of weak siltstone and sandstone.
	1.0 to >3.0 ⁽²⁾	Weak light greyish-brown locally stained dark brown SILTSTONE recovered as angular and subangular gravel and occasional cobbles of weak siltstone.

Note 1) bgl denotes below ground level
2) recorded only in TP05 and TP05A.

- 5.3. All of the trial pit excavations remained stable for the duration of the investigation.

Groundwater

- 5.4. Groundwater was not encountered in any of the locations investigated with the exception of TP13 where a seepage was recorded at about 1.0 m bgl.
- 5.5. Trial pit TP05A was excavated to 3.0 m depth. Water level was recorded just above the base of the excavation during the monitoring period of 5 hours when the trial pit remained open.

6. Infiltration Testing

- 6.1. GIL report that infiltration testing was undertaken in accordance with the guidance presented in BRE DG 365 (2016)³. Most tests were terminated after one fill owing to the very low infiltration rate observed. Higher infiltration rates were observed in TP05 and TP07 and tests were repeated to give a total of 3 tests in TP05 and a total of 2 tests in TP07.
- 6.2. Negligible infiltration was recorded at most of the locations investigated.

³ BRE (2016) Soakaway design. Digest 365. Building Research Establishment, Garston, Watford.

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- 6.3. A summary of the calculated infiltration rates in trial pits TP05 and TP07 is summarised in the table below:

Location	Base of Test Pit (m bgl)	Test No.	Infiltration Rate (m³/m²/s)	Lowest Infiltration Rate (m³/m²/s)
TP05	2.0	1	1.1 x 10 ⁻⁵	1.0 x 10 ⁻⁵
		2	1.2 x 10 ⁻⁵	
		3	1.0 x 10 ⁻⁵	
TP07	1.0	1	1.0 x 10 ⁻⁵	5.1 x 10 ⁻⁶
		2	5.1 x 10 ⁻⁶ (1)	
Note: (1) Infiltration rate extrapolated by Stantec				

7. Conclusion and Recommendations

- 7.1. Surface water drainage using shallow infiltration systems ("soakaways") is unlikely to be suitable across the majority of the site at the near surface soils owing to the very low infiltration rate observed at the weathered near surface soils.
- 7.2. However, shallow infiltration may provide a suitable drainage solution for the proposed drainage basin within the less weathered Turnbridge Wells Sand Formation in the southern part of the site as recorded in Trial Pit TP05. Based on the infiltration test results it is recommended that a soil infiltration rate of 1.0x10⁻⁵ m/s is used for the design of infiltration basin. Soakaway design should be carried out in accordance with BRE DG 365 and CIRIA Report 156⁴.
- 7.3. It is likely that the LLFA will require at least 1 m of unsaturated zone between the base of the infiltration basin and the highest groundwater level at this location. It is recommended that a groundwater monitoring well is installed at this location with groundwater monitoring undertaken during the winter months to confirm the long term groundwater level at this location.
- 7.4. The concentrated ingress of water into Lower Tunbridge Wells Sand Formation could trigger surface instability as this material can be eroded easily which could lead to surface instability. Signs of instability were not noted during the ground investigation works undertaken. Nevertheless, it would be prudent to situate any infiltration basins a minimum of 5.0 m away from any structures or infrastructure to minimise the risk of surface collapse and the potential adverse impact on infrastructure and structures.

DOCUMENT ISSUE RECORD

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⁴ Bettess (1996) Infiltration drainage – manual for good practice. CIRIA Report 156. Construction Industry Research and Information Association, London.