

13th February 2014

Our Ref: 13.7841

Hastoe Housing Association – Marina House,
17 Marina Place,
Hampton Wick,
Kingston upon Thames,
Surrey,
KT1 4BH

RE: Soil Infiltration Testing- Arun District Council

For the attention of Jane Gallifent

Email: 

Dear Jane,

I write following the completion of further ground investigation works undertaken on the 11th and 12th February 2014 at four locations within the residential area of Wick, Littlehampton. The works have been carried out to assist with assessment of the soil soakage potential for each location in respect to the proposed planning applications for the area.

The letter report follows on from the previous investigation works carried in December 2013 (ref lett/13.7841/Dec 13) that included the completion of windowless sample boreholes with groundwater monitoring installation standpipes as well as the subsequent weekly monitoring records.

Site Status

As described in the previous letter (referenced above) the five proposed redevelopments are located within the residential area of Wick in Littlehampton. These areas are currently occupied by a mixture of hardstanding and grass verges and largely utilised for car parking areas by the local residents. Four of the five sites are located along the northern border of the housing area and parallel to the A259 to the north. These sites are referred to as Joyce Close, Land west of Joyce Close, Greenfields and Land West of Greenfields. The fifth site is located to the south within White Acre road and referenced as Clun Road

however Constructive Evaluation has subsequently been instructed that no further assessment was required at this location.

Investigation Works

The soil infiltration testing was carried out within machine excavated trial pits to depths between 2.60m and 2.70mbgl (metres below ground level). It was requested that the trial holes were located away from hardstanding areas where possible and sited on grass verge locations. With minimal grassed areas at the four locations tested these were generally positioned adjacent to the window sample installations. Only one location, TP4, was positioned at a location away from the associated window sample borehole (WS4) as shown on the enclosed plan. This latter position was agreed with Hastoe Housing Association since little space was available to complete two test pits within the available grassed areas for this location (SK06).

Prior to any excavations taking place a CAT (Cable Avoidance Tool) was used to check for any underlying electrical services. In addition the service plans provided to CE were consulted prior to commencing works. The excavations were completed using a 3tonne tracked excavator with a 0.30m width bucket size. Length of excavations ranged between 1.80m and 2.50m.

Following consultation with the ADC Engineering team testing was to be completed within the soils above the highest groundwater level recorded within the standpipes. From review of the subsequent monitoring works to date the highest level to date was immediately prior to the infiltration testing of 3.22m in WS1. At all other installations (excluding Clun Road WS5) the groundwater has in general been recorded below the base of the installation depths of 3.82mbgl (i.e. levels have generally been recorded as dry).

Testing was completed in accordance with the methods described in BRE Digest 365 and after trimming and shaping the trial pit sides the pit were rapidly filled with clean water from a road tanker.

The result sheets are enclosed showing the fall in water level with time for locations TP1 to TP4.

Geology and Ground Conditions

The relevant 1:50,000 British Geological Survey (BGS) Map 317/337 (Chichester and Bognor) indicates the site to be underlain by Brickearth overlying the Upper Chalk deposits of the Cretaceous.

- Brickearth – The composition of this unit is commonly determined by the formation on which it rests and the formation of the unit is controlled either by solifluction, flood deposits or as wind-blown loess. As a result the unit is comprised largely as an unstratified mixture of fine-grained sand or flint with clay.
- Upper Chalk - The upper Chalk of the Cretaceous Period consists mainly of soft, smooth, white massively bedded Chalk with flint nodules generally lying within distinct beds; thin beds of tabular flint and marl also occur.

Ground Conditions

Within TP1 to TP3, which were completed adjacent to WS1 to WS3 locations respectively, the ground conditions encountered were generally consistent with those previously described. In summary a thick deposit of upper cohesive clay deposits were encountered with a change in soils towards the base of the trial pits. These latter changes were described as a cream/light brown gravely clayey Silt in TP1 at approximately 2.20mbgl, a silty fine to medium Sand at 2.10mbgl in TP2 and a fine to medium silty Sand at 2.20mbgl in TP3.

Within TP4 location soil deposits were consistent to the maximum excavation depth of 2.65mbgl and described as light brown silty Clay.

No groundwater was encountered within any of the trial pits. Please find enclosed full log details along with the hole location plan.

Results

As you can see from the enclosed results sheets due to slow rate of soakage following the infilling of the trial holes only a single test was attempted at each location.

Following monitoring periods that ranged from 192minutes up to 349minutes it was evident that the rate of infiltration rate was decreasing over time to such that water levels were unlikely to reach 25% fill depth. TP1 dropped most significantly to a level of 41% fill depth which calculates to infiltration rates from 75-50% fill depth of the order of 5×10^{-6} m/s reducing to 2.5×10^{-6} m/s from 50% - 41% fill depth. In all other tests fill depths between 71% to 88% only were reached describing even slower rates obtainable.

13.7841 – Wick, Littlehampton

Since the infiltration tests were not repeated and with 25% fill depths not reached within any of the trial pit locations the requirement to BRE guidance was not obtained. Subsequently the results suggest that these upper deposits, immediately above the groundwater level, show poor soil infiltration characteristics.

Kind Regards,

Constructive Evaluation Limited

.....
Dave Crellin MSc BSc, FGS
Engineering Geologist

Enclosed:

- Exploratory Hole Plan
- Soil Logs
- Investigation Images



CONSTRUCTIVE EVALUATION LTD. 0203 1460 003

 The Constructive Group

NOTES

1. Do not scale from this drawing except for planning purposes. Use figured dimensions only.
2. All dimensions must be checked on site prior to commencement of work.
3. Where applicable this drawing is to be read in conjunction with other consultants drawings.
4. This drawing is the copyright of Constructive Evaluation Ltd.



rev	date	amendment	check

constructiveevaluation
 Building & Material Test Consultants
 TEL: 01243-533499 FAX: 01243-531070
 email: info@theconstructivegroup.com

Client.
 ARUN DISTRICT COUNCIL

Project.
 WICK ESTATE, LITTLEHAMPTON

Drawing.
 TEST LOCATION PLAN
 scale
 NT5

date FEB 13	drawn D.Y	checked
drawing number 13.784	revision	

constructive evaluation
making sense of what we do

Test 1

Permeability Graph TP1



construction
adding & deleting the elements

Trial Hole: TP2 Test 1

WARNING DOES NOT FALL TO 25% OF START DEPTH-Refer to graph sheet for calculation

<u>Infiltration Rate</u>	<u>from 75%-25%</u>	not valid
---------------------------------	---------------------	------------------

The graph displays a single data series representing depth over time. The y-axis, labeled 'Depth in metres', ranges from 0.0% to 100.0% in 10.0% increments. The x-axis, labeled 'Time in minutes', ranges from 0.00 to 400.00 in 50.00 increments. The curve starts at (0, 100.0%) and shows a decreasing trend, reaching approximately 71.0% at 235.00 minutes.

Time in minutes	Depth in metres
0.00	100.0%
50.00	88.0%
100.00	81.0%
150.00	76.0%
200.00	73.0%
235.00	71.0%

Construction
Building a better way to work

Trial Hole: TP3 Test 1

Test 1

WARNING DOES NOT FALL TO 25% OF START DEPTH-Refer to graph sheet for calculation

Infiltration Rate	<u>from 75%-25%</u>	not valid
--------------------------	---------------------	------------------

A line graph showing the percentage of depth reached over time for a 100m depth. The y-axis is labeled 'Depth in metres' and ranges from 0.0% to 100.0% in 10.0% increments. The x-axis is labeled 'Time in minutes' and ranges from 0.00 to 400.00 in 50.00 increments. The curve starts at 100.0% at 0.00 minutes and decreases exponentially, reaching approximately 74.0% at 240.00 minutes.

Time in minutes	Depth in metres (%)
0.00	100.0
10.00	98.0
20.00	95.0
30.00	91.0
40.00	88.0
50.00	85.0
60.00	82.0
70.00	80.0
80.00	78.0
90.00	76.0
100.00	74.0
110.00	72.0
120.00	70.0
130.00	68.0
140.00	66.0
150.00	64.0
160.00	62.0
170.00	60.0
180.00	58.0
190.00	56.0
200.00	54.0
210.00	52.0
220.00	50.0
230.00	48.0
240.00	46.0

construction evaluation
nothing is more or less

Trial Hole: TP4 Test 1

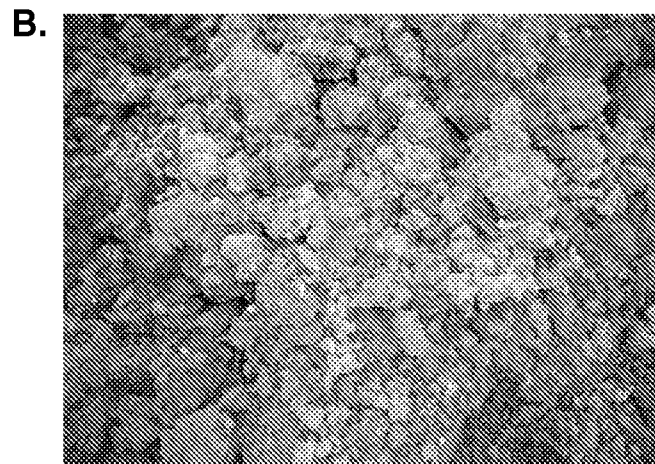
WARNING DOES NOT FALL TO 25% OF START DEPTH-Refer to graph sheet for calculation

<u>Infiltration Rate</u>	<u>from 75%-25%</u>	not valid
---------------------------------	---------------------	------------------

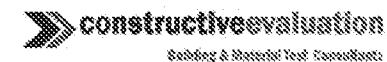
A line graph showing the percentage of depth remaining over time for a 100m depth. The y-axis is labeled 'Depth in metres' and ranges from 0.0% to 100.0% in 10.0% increments. The x-axis is labeled 'Time in minutes' and ranges from 0.00 to 400.00 in 50.00 increments. The graph shows a single data series that starts at 100.0% at 0.00 minutes and decreases steadily to approximately 88.0% at 190.00 minutes. The data points are connected by a solid black line.

Time in minutes	Depth in metres (%)
0.00	100.0%
10.00	98.0%
20.00	96.0%
30.00	94.0%
40.00	93.0%
50.00	92.0%
60.00	91.0%
70.00	90.0%
80.00	89.0%
90.00	88.0%
100.00	87.0%
110.00	86.0%
120.00	85.0%
130.00	84.0%
140.00	83.0%
150.00	82.0%
160.00	81.0%
170.00	80.0%
180.00	79.0%
190.00	78.0%

Site Investigation Photographs Wick Estate, Littlehampton



- A. TP1 GL – 2.60mbgl
- B. TP1 Basal material from pit
- C. TP2 GL – 2.70mbgl
- D. TP2 Basal material from pit



Date of Site Works:

11/12-2.14

Wick Estate, Littlehampton

Client:

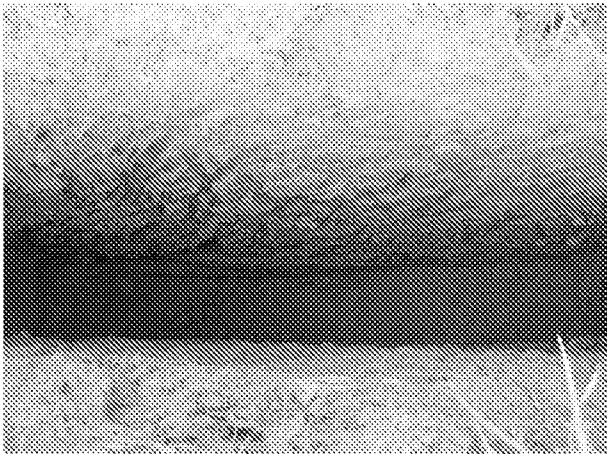
Arun District Council

Job/ref no.

13.7841/DC

Site Investigation Photographs Wick Estate, Littlehampton

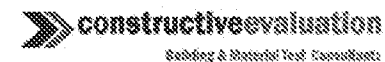
E.



F.



- E. TP3 GL – 2.70mbgl
F. TP3 Material from excavation



Date of Site Works:

11-12/2.14

Site Address:

Wick Estate, Littlehampton

Client:

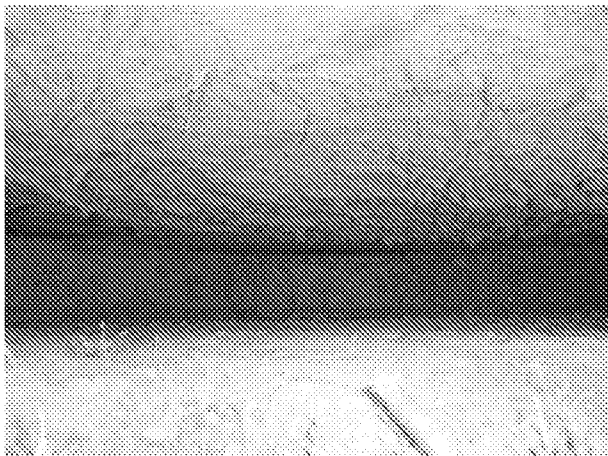
Arun District Council

Job/ref no.

13.7841/DC

Site Investigation Photographs Wick Estate, Littlehampton

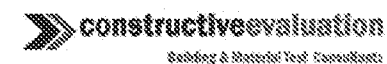
I.



J.



- I. TP4 GL – 2.65mbgl
J. TP4 Material from pit



Date of Site Works:

11-12/2.14

Site Address:

Wick Estate, Littlehampton

Client:

Arun District Council

Job/ref no.

13.7841/DC

Site Investigation Photographs Wick Estate, Littlehampton

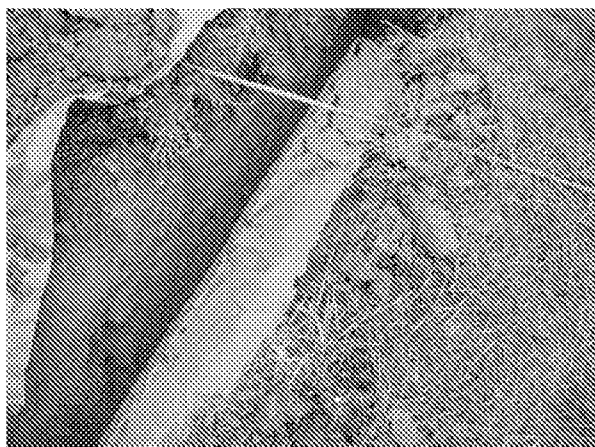
M.



N.



O.



- M. Example site set up TP4
- N. Rapid infiltration of clean water from road tanker
- O. Infiltration monitoring

constructiveevaluation
Soil & Material Test Consultants

Date of Site Works:

11-12/2-14

Site Address:

Wick Estate, Littlehampton

Client:

Arun District Council

Job/ref no.

13.7841