Percolation Test Report

Postwick Interchange,
Norwich

Client:
Monte Blackburn Ltd &
Pigeon Investments Ltd

Project Number:
16325

16/03/2017
Percolation testing was carried out on site on 15th March 2017 to establish if infiltration methods were going to be a suitable solution for draining the site.

Two trial holes were formed with the dimensions;

<table>
<thead>
<tr>
<th>Test Pit</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Pit 1</td>
<td>1200mm x 500mm x 1100mm deep</td>
</tr>
<tr>
<td>Test Pit 2</td>
<td>1200mm x 500mm x 1100mm deep</td>
</tr>
</tbody>
</table>

Test Pit 1 was filled with water to a depth of 840mm
Test Pit 2 was filled with water to a depth of 570mm

The water level drop was monitored in each of the test pits and recorded (see test sheets in Appendix A).

For Test 1 the water level drop was 840mm over a period of 321 minutes.
For Test 2 the water level drop was 570mm over a period of 131 minutes.

During the testing period the water levels dropped until empty which satisfies the requirements of BRE 365.

Based on the formula:

Soil infiltration rate = \( \frac{v}{t \times a \times 60} \)

Where:
- \( v \) = effective storage volume between 75 – 25% depth
- \( a \) = surface water area of pit @ 50% depth
- \( t \) = time for water level to fall from 75 – 25%

The Infiltration rate for Test pit 1 is calculated as = \( 1.387 \times 10^{-5} m/s \)
The Infiltration rate for Test pit 2 is calculated as = \( 1.700 \times 10^{-5} m/s \)
Upon visual inspection of the ground conditions while forming the trial holes, the ground conditions appeared to be a sandy soil in Test pit 1, whereas Test pit 2 appeared to be more of a yellow sand.

Based on these infiltration rates it is viable to drain the site using infiltration methods when dealing with the surface water run-off from the site.
Appendix A

Test Results & Test Pit Locations
PERCOLATION TEST SHEET

METHOD from BRE DIGEST 365

- Excavate a soakage trial pit to the required depth (typically 1.0-2.0 m deep) using minimum width (0.3m) and length (1m). Carefully trim sides and bottom.
- Carefully measure size of pit and note sizes below.
- Fill soakage hole briskly with water (from bowser) to at least three quarters full. Being careful not to wash away sides. Note: a 300mm wide, 1 metre long, 1.5 metre deep trench needs at least 350 litres (80 gallons) of water.
- Place straight edge over top of soakage pit and measure (dip) to top of water.
- Record time versus dips in table below. Dip every 5 minutes for first hour then every hour until pit is one quarter full.
- Repeat test 3 times in total on the same or consecutive days.

DETAILS

SITE LOCATION Postwick Interchange, Norwich

DATE OF TEST 15/03/17

WEATHER CONDITIONS Sunny

SIZE OF PIT

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>WIDTH</th>
<th>DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200</td>
<td>500</td>
<td>1100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TIME</th>
<th>DIP</th>
<th>TIME</th>
<th>DIP</th>
<th>TIME</th>
<th>DIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.52</td>
<td>840</td>
<td>12.14</td>
<td>220</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.57</td>
<td>770</td>
<td>12.52</td>
<td>160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.59</td>
<td>750</td>
<td>1.22</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.03</td>
<td>685</td>
<td>1.52</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.08</td>
<td>650</td>
<td>3.13</td>
<td>EMPTY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.13</td>
<td>610</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.18</td>
<td>520</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.23</td>
<td>555</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.31</td>
<td>515</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.36</td>
<td>695</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.45</td>
<td>460</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.52</td>
<td>440</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.08</td>
<td>385</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.31</td>
<td>315</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.52</td>
<td>275</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Test Pit 1

Soil Infiltration rate $(ms^{-1})$: \[ \frac{V_{(P75-25)}}{t_{(P75-25)} \times a_{(P50)}} \]

- $V = \text{Effective storage volume between 75} - 25\%$
- $a_{(P50)} = \text{Surface area of the pit (50\% effective depth) + box area}$
- $t_{(P75-25)} = \text{Time for water to fall from 75} - 25\%$

\[ V = 1.2 \times 0.5 \times 0.55 = 0.33m^3 \]
\[ a_{(P50)} = 1.2 \times 0.5 + (2 \times 0.55 \times 1.2) + (2 \times 0.55 \times 0.5) = 2.47m^2 \]
\[ t_{(P75-25)} = 9630s \]

Soil Infiltration rate $(ms^{-1})$: \[ \frac{0.33}{9630 \times 2.47} = 1.387 \times 10^{-5} ms^{-1} \]

Soil Infiltration rate $(m/hr^{-1})$: \[ 1.387 \times 10^{-5} \times 3600 = 0.050 m/hr^{-1} \]
PERCOLATION TEST SHEET

METHOD from BRE DIGEST 365

- Excavate a soakage trial pit to the required depth (typically 1.0-2.0 m deep) using minimum width (0.3m) and length (1m). Carefully trim sides and bottom.
- Carefully measure size of pit and note sizes below.
- Fill soakage hole briskly with water (from bowser) to at least three quarters full. Being careful not to wash away sides. Note: a 300mm wide, 1 metre long, 1.5 metre deep trench needs at least 350 litres (80 gallons) of water.
- Place straight edge over top of soakage pit and measure (dip) to top of water.
- Record time versus dips in table below. Dip every 5 minutes for first hour then every hour until pit is one quarter full.
- Repeat test 3 times in total on the same or consecutive days.

DETAILS

SITE LOCATION Postwick Interchange, Norwich

DATE OF TEST 15/03/17

WEATHER CONDITIONS Sunny

SIZE OF PIT

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>WIDTH</th>
<th>DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200</td>
<td>500</td>
<td>1100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TIME</th>
<th>DIP</th>
<th>TIME</th>
<th>DIP</th>
<th>TIME</th>
<th>DIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:02</td>
<td>570</td>
<td>10:06</td>
<td>520</td>
<td>10:11</td>
<td>420</td>
</tr>
<tr>
<td>10:37</td>
<td>280</td>
<td>10:47</td>
<td>250</td>
<td>11:10</td>
<td>180</td>
</tr>
<tr>
<td>11:30</td>
<td>115</td>
<td>11:53</td>
<td>50</td>
<td>12:13</td>
<td>EMPTY</td>
</tr>
</tbody>
</table>
Test Pit 2

Soil Infiltration rate\((ms^{-1})\): \[
\frac{V_{(P75-25)}}{t_{(P75-25)} \times a_{(P50)}}
\]

\(V\) = Effective storage volume between 75 – 25%

\(a_{(P50)}\) = Surface area of the pit (50% effective depth) + box area

\(t_{(P75-25)}\) = Time for water to fall from 75 – 25%

\(V = 1.2 \times 0.5 \times 0.55 = 0.33m^3\)

\(a_{(P50)} = 1.2 \times 0.5 + (2 \times 0.55 \times 1.2) + (2 \times 0.55 \times 0.5) = 2.47m^2\)

\(t_{(P75-25)} = 7860\) s

Soil Infiltration rate \((m s^{-1})\): \[
\frac{0.33}{7860 \times 2.47} = 1.700 \times 10^{-5} m s^{-1}
\]

Soil Infiltration rate \((m hr^{-1})\): \[
1.700 \times 10^{-6} \times 3600 = 0.061 m hr^{-1}
\]