

# *Soil Report*

Site Adjacent

60 St Johns Road  
SPALDING  
Lincolnshire

Client J P Builders  
Date November 2009  
Engineer STEVEN KIDD BSc, CEng, FISTructE

## **1.0 Synopsis and Terms of Reference**

*The following soil report relates to the proposed housing development shown on Remway Design Ltd drawings. It is concerned with the ground bearing capacity and tests for possible ground contamination. Related issues such as percolation test, (drainage) and services are not covered here. Specialist advice should be given where appropriate; on these matters.*

*Testing of the ground was confined to Attberberg test, insitu shear vane test and the IRLI suite of programs for ground contamination.*

*For these test three trial hole where dug using a JCB, to a depth of 3m.*

*Whilst every effort is made to accurately predict the actual ground conditions found during excavations it is always possible that old wells and the like are uncovered in this area. These should be reported to the engineer for consideration.*

## 2.0 SURVEY

### 2.1 Introduction

The site is shown on the location plan given in the Appendices. It is situated to the rear of houses on Hawthorne Bank in what was the garden area of these houses; which are generally circa 1970's. Ground conditions here are known to be typical Fenland Silt overlaying soft marine deposits. The proposed development of traditional built dormer bungalows is to be built on a largely green field site surrounded by trees and shrubs.

2.2 Three trial holes equal distant along the length of the site where excavated using a JCB to a depth of three meters. These are shown in the appendices to this report.

2.3 In each hole samples where taken for laboratory testing as described in the synopsis.

2.4 Insitu shear vane testing using a torque vane where taken to establish a ground bearing value for spread foundation design 80kn/sq.m would seem appropriate at 1m deep.

- 2.5 All three holes yielded approximately the same strata though there was a greater presence of ground water in TH3 causing collapse of trench.
- 2.6 The subsoil encountered was typical Fenland Silt characteristic of the area. Normally a ground bearing value of 80kn/sq.m is used found foundation design here.

### 3.0 Conclusions and Recommendations.

- 3.1 From the evidence gathered on site and the results of the laboratory testing (see Appendices) it is proposed to adopt standard trench fill foundations with clay-board where trees are adjacent.
- 3.2 Generally foundations should be taken down to 750mm below existing ground level. However for elevations adjacent trees should be increased to 1.5m and stepped back up to 0.75m where the foundation is outside the zone of influence of the tree.
- 3.3 A designated concrete mix of GEN3 is proposed in foundations with a minimum cement content of 300kg/m<sup>2</sup>.
- 3.4 The contamination report given in the Appendices gives the site a clean bill of health.



STEVEN KIDD BSc, CEng, FStructE

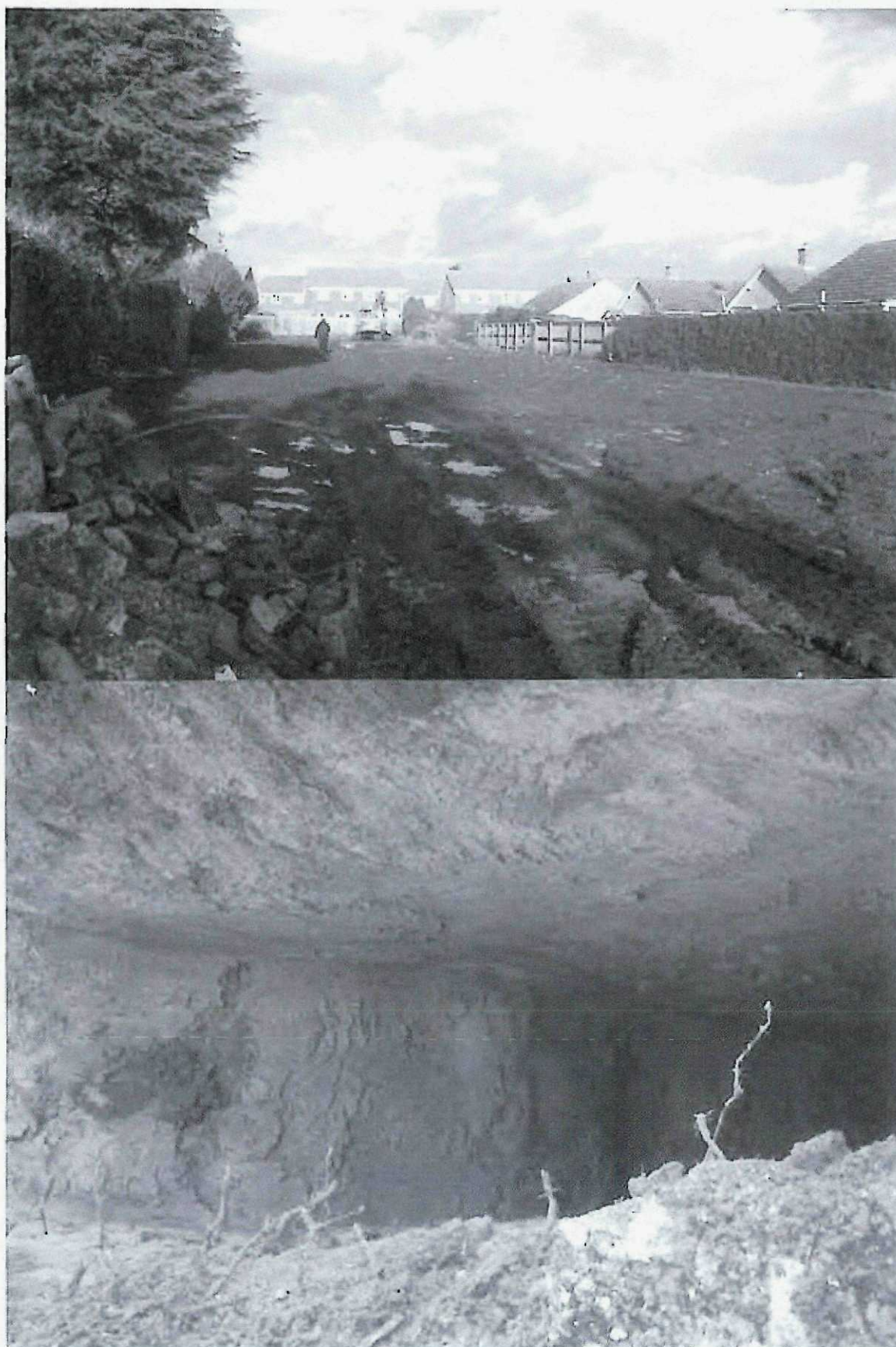
# *Appendices*

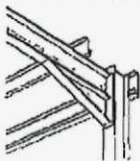
## **1) Photographs**

- a) General view of site
- b) View on typical hole

## **2) Site Logs**

## **3) Laboratory Test results**



**SOUTH Lincs CONSULTING**

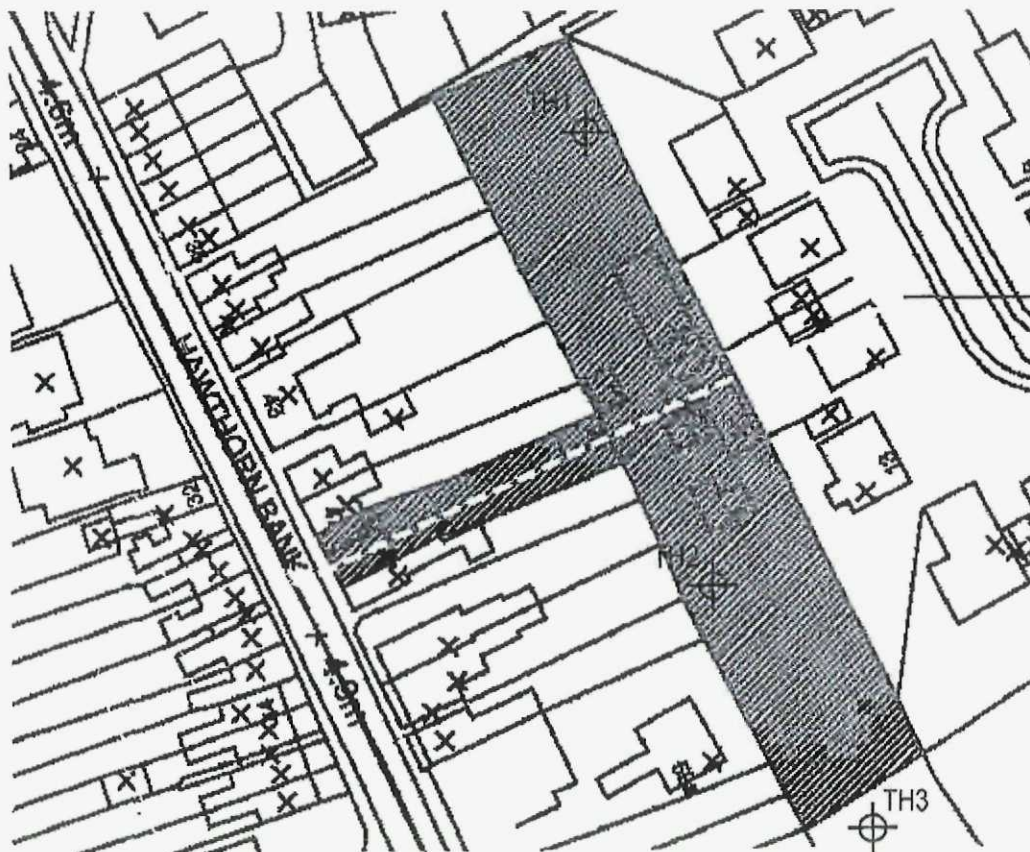
10 East Lane  
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PE11 3XA

T 01775 769 563  
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E enquiries@southlincsconsulting.com  
W www.southlincsconsulting.com

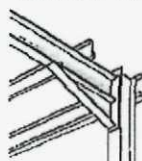
**Paul Brown****Trial Holes****Land Adjacent No. 60****St Johns Road****Spalding**

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| By      | TG      |
| Ckd.    | SK      |
| Date    | NOV 09  |

Location Plan showing Trial Hole Positions - NTS



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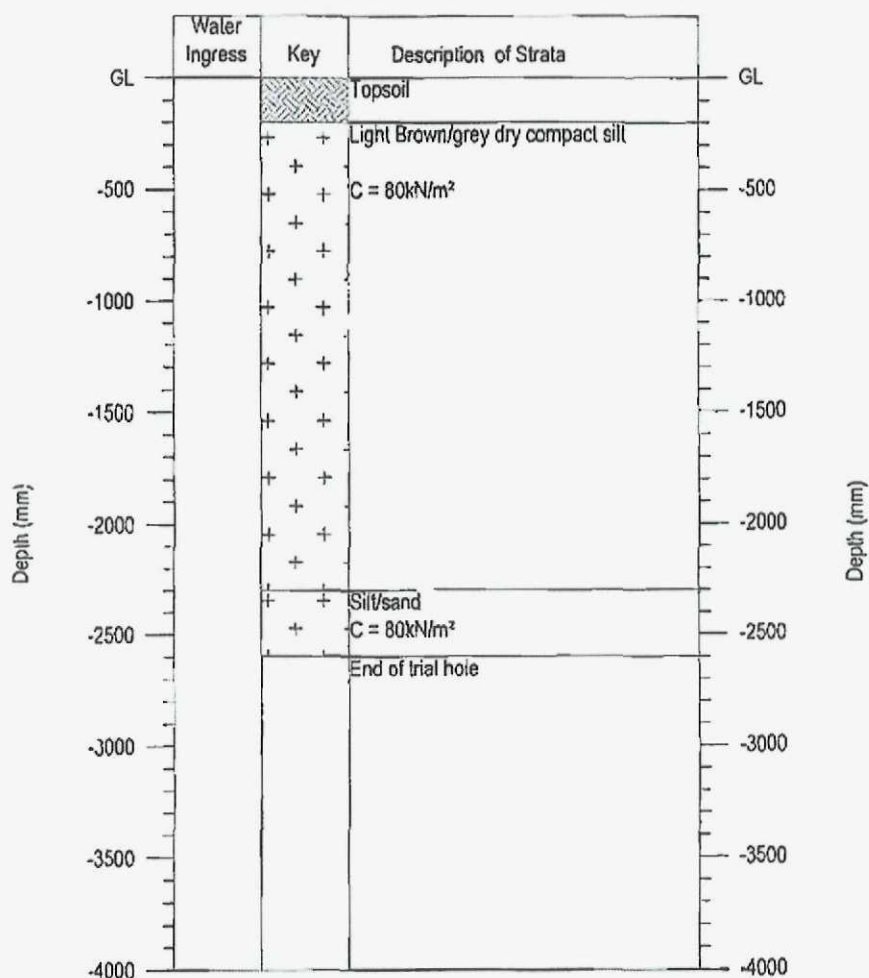
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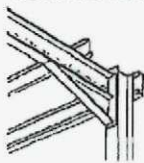
Paul Brown  
Trial Holes  
Land Adjacent No. 60  
St Johns Road  
Spalding

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| Ckd.    | SK      |
| Date    | NOV 09  |

### Trial Borehole Record 1



## SOUTH Lincs CONSULTING



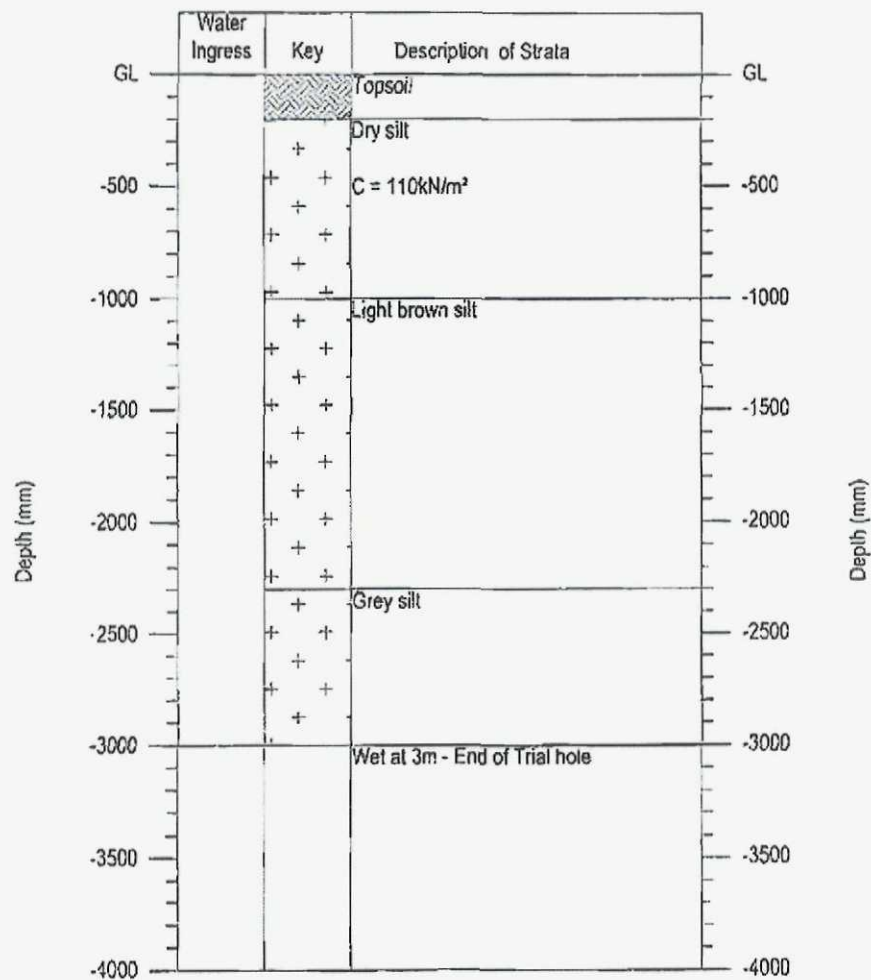
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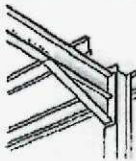
Paul Brown  
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Spalding

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| Sheet   |         |
| By      | TG      |
| Ckd.    | SK      |
| Date    | NOV 09  |

## Trial Borehole Record 2



## SOUTH Lincs CONSULTING



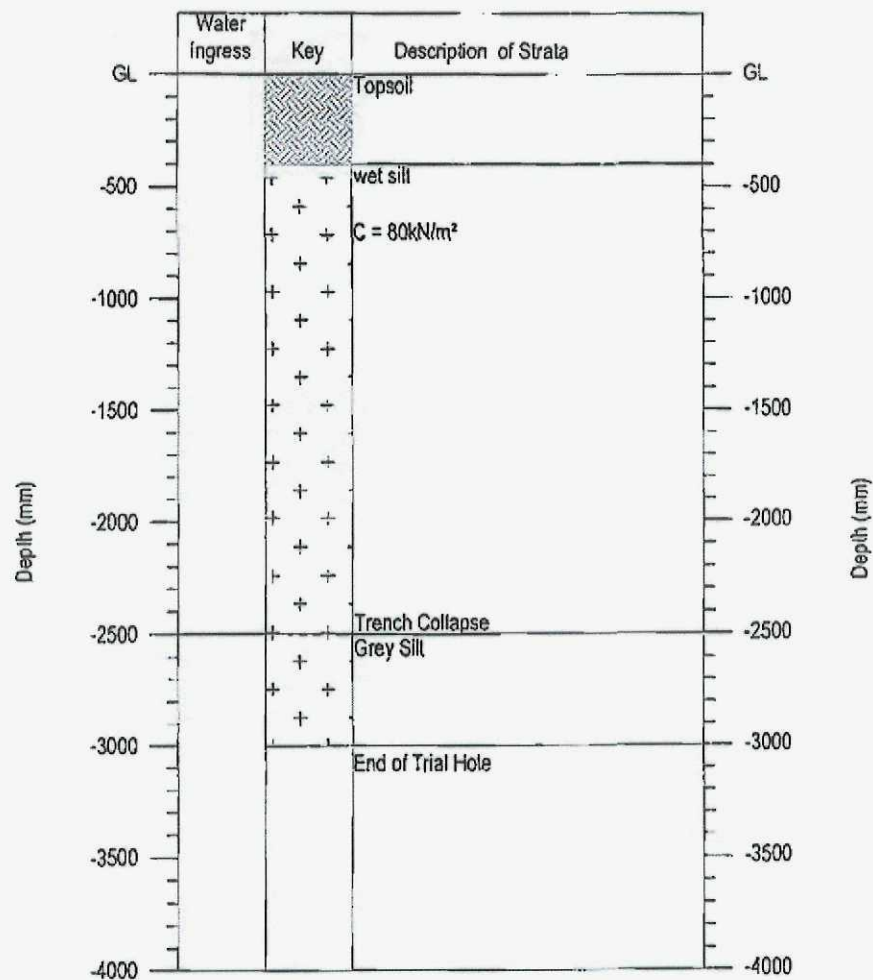
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St Johns Road  
Spalding

|         |         |
|---------|---------|
| Ref No. | 09-0302 |
| Sheet   |         |
| By      | TG      |
| Ckd.    | SK      |
| Date    | NOV 09  |

## Trial Borehole Record 3



## ENGINEERING

Newark Road Peterborough PE1 5UA  
: 01733 566566 f 01733 315280  
e admin@groundengineering.co.uk

South Lines Consulting  
10 Bear Lane  
Pinchbeck  
Spalding  
Lincs  
PE11 2XA

Date 9 December 2009  
Our ref JHG/I.8164

FAO Mr S. Kidd

Dear Sirs,

### 60 St. John's Road, Spalding

Please find attached the results of the geotechnical and chemical testing on three soil samples which was recovered by yourself from the above site and brought to our office on 17 November 2009

The three samples comprised brown, dark brown and orange brown fine sandy silt.

The samples were tested in accordance with the recommendations of British Standard BS1377:1990 'Methods of Tests for Soils for Civil Engineering Purposes'. The results of testing are presented to the rear of this report.

The three soil samples TH1 S1, TH2 S1 and TH3 S1 were tested to determine the moisture content and Atterberg Limits.

The moisture of is reported as the percentage water content with respect to the dry mass of soil.

The liquid and plastic limits and plasticity index are quoted as the percentage water with respect to the dry weight of soil.

Sample TH2 S1 was sub-sampled and tested for a suite of potential contaminants outlined by CIR 8 which is included within the CLEA series of contaminated land reports, by the Department for Environment, Food and Rural Affairs, DEFRA, and the Environment Agency, E.A.

The results of the laboratory chemical testing from the investigation have been compared to CLEA Soil Screening Values (SSV) which have been used as screening tools for use in the assessment of land affected by contamination.



LS164 - 60 St John's Road, Spalding  
Registered Office: Dissing, Wills South Road Newmarket CB8 7SQ

Page 1 of 3

Atkins Limited have derived ATRISK soil SSVs based on the 2009 guidance (SC050021/SR3 (the CLEA Report) and SC050021/SR2 (the TOX report)) for residential with home grown produce, residential without home grown produce and commercial usage. They have based these on the default assumptions provided in the CLEA report which, it is understood, will be used in the development of future Soil Guideline Values by DEFRA and the Environment Agency. Atkins SSVs for 1% soil organic matter (SOM) have been derived using CLEA model v1.04. These are provided under licence to Ground Engineering Limited, and respective toxicology reports and technical details on the derivation of the SSVs can be provided on request.

In summary Table 1 compares the test results with the SSVs in relation to the specified usage.

With the exception of total chromium, none of the determinands exceeded the soil screening values for residential with home grown produce usage.

A measured total chromium concentration was 15mg/kg which exceeded the chromium residential with home grown produce SSV of 14mg/kg. The toxicity of chromium depends upon its oxidation state, which generally comprises trivalent and hexavalent forms. Trivalent compounds are stable and most naturally occurring chromium is in the trivalent (chromic) state. Hexavalent chromium (chromate) rarely occurs naturally and the presence in soil is most likely to be from pollution. Hexavalent chromium is significantly more toxic than the trivalent form, and consequently the SSV assumes that all the chromium is present in the hexavalent form. The hexavalent chromium test results for the analysed sample was less than 0.5mg/kg, a concentration below the SSV of 14mg/kg and therefore the measured chromium concentrations would not be considered to present a significant risk to residential with home grown produce usage.

In conclusion the chemical test results provide no evidence for the submitted soils to be unsuitable for use within a residential development.

Yours faithfully,



J. H. GIBB

B.Sc.(Hons.), M.Sc.(Eng.), C. Geol., F.G.S.  
Senior Geo-Environmental Engineer



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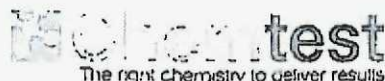
Table 1: Comparison of Chemical Test Results for Near Surface Soils with SSV

| Determinand           | Number of Samples | Min Value (mg/kg) | Max Value (mg/kg) | Number of Samples Exceeding SSV for: |                                        |                       | Measured 95 <sup>th</sup> Percentile (mg/kg) | Soil Screening Criteria SSV (1% SOM)        |                                                |                               | Assessment Method | Soil Screening Criteria SSV (1% SOM)        |                                                |                               | Commercial/Industrial (mg/kg) |
|-----------------------|-------------------|-------------------|-------------------|--------------------------------------|----------------------------------------|-----------------------|----------------------------------------------|---------------------------------------------|------------------------------------------------|-------------------------------|-------------------|---------------------------------------------|------------------------------------------------|-------------------------------|-------------------------------|
|                       |                   |                   |                   | Residential with Home Grown Produce  | Residential without Home Grown Produce | Commercial/Industrial |                                              | Residential with Home Grown Produce (mg/kg) | Residential without Home Grown Produce (mg/kg) | Commercial/Industrial (mg/kg) |                   | Residential with Home Grown Produce (mg/kg) | Residential without Home Grown Produce (mg/kg) | Commercial/Industrial (mg/kg) |                               |
| Arsenic               | 1                 | -                 | 14                | 0                                    | 0                                      | 0                     | 36.23                                        | 32                                          | 35                                             | 640                           | SSV               | 32                                          | 35                                             | 640                           |                               |
| Cadmium               | 1                 | -                 | <0.1              | 0                                    | 0                                      | 0                     | 0.27                                         | 10                                          | 83                                             | 220                           | SSV               | 10                                          | 83                                             | 220                           |                               |
| Chromium (hexavalent) | 1                 | -                 | 15                | 1                                    | 0                                      | 0                     | 33.04                                        | 14                                          | 33                                             | 320                           | SSV               | 14                                          | 33                                             | 320                           |                               |
| Lead                  | 1                 | -                 | <0.5              | 0                                    | 0                                      | 0                     | <5                                           | 14                                          | 38                                             | 330                           | SSV               | 14                                          | 38                                             | 330                           |                               |
| Mercury               | 1                 | -                 | 11                | 0                                    | 0                                      | 0                     | 16.34                                        | 320                                         | 444                                            | 6820                          | SSV               | 320                                         | 444                                            | 6820                          |                               |
| Selenium              | 1                 | -                 | <0.1              | 0                                    | 0                                      | 0                     | 0.10                                         | 6                                           | 7                                              | 66                            | SSV               | 6                                           | 7                                              | 66                            |                               |
| Nickel                | 1                 | -                 | <0.10             | 0                                    | 0                                      | 0                     | 0.23                                         | 350                                         | 595                                            | 13000                         | SSV               | 350                                         | 595                                            | 13000                         |                               |
| Phenols               | 1                 | -                 | 17                | 0                                    | 0                                      | 0                     | 33.24                                        | 130                                         | 130                                            | 1800                          | SSV               | 130                                         | 130                                            | 1800                          |                               |
| Benz[a]pyrene         | 1                 | -                 | <0.3              | 0                                    | 0                                      | 0                     | 0.10                                         | 162                                         | 262                                            | 586                           | SSV               | 162                                         | 262                                            | 586                           |                               |
| Boron                 | 1                 | -                 | <0.1              | 0                                    | 0                                      | 0                     | 0.10                                         | 2.1                                         | 2.2                                            | 22                            | SSV               | 2.1                                         | 2.2                                            | 22                            |                               |
| Copper                | 1                 | -                 | 0.6               | 0                                    | 0                                      | 0                     | 0.16                                         | *                                           | *                                              | *                             | *                 | *                                           | *                                              | *                             | *                             |
| Zinc                  | 1                 | -                 | 6.8               | 0                                    | 0                                      | 0                     | 15.77                                        | 3970                                        | 8370                                           | 109000                        | SSV               | 3970                                        | 8370                                           | 109000                        |                               |
| Free Cyanide          | 1                 | -                 | 35                | 0                                    | 0                                      | 0                     | 83.68                                        | 16,900                                      | 46,800                                         | 917000                        | SSV               | 16,900                                      | 46,800                                         | 917000                        |                               |
| Sulphide              | 1                 | -                 | <0.5              | 0                                    | 0                                      | 0                     | 0.50                                         | 34                                          | 34                                             | 34                            | SSV               | 34                                          | 34                                             | 34                            |                               |
|                       | 1                 | -                 | 2.7               | 0                                    | 0                                      | 0                     | 2.76                                         | *                                           | *                                              | *                             | *                 | *                                           | *                                              | *                             | *                             |

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Depot Road  
Newmarket  
CB8 0AL  
Tel: 01638 606070

Ground Engineering  
Newark Road  
Peterborough

PE1 5UA

FAO John Gibb  
08 December 2009

Dear John Gibb

Test Report Number 98044

Your Project Reference Plot Adjacent to 60 St Johns Road, Spalding - L8164

Please find enclosed the results of analysis for the samples received 2 December 2009.

All soil samples will be retained for a period of one month and all water samples will be retained for 7 days following the date of the test report. Should you require an extended retention period then please detail your requirements in an email to [customerservices@chemiest.co.uk](mailto:customerservices@chemiest.co.uk). Please be aware that charges may be applicable for extended sample storage.

If you require any further assistance, please do not hesitate to contact the Customer Services team.

Yours sincerely

Authorised Signatory

Darrell Hall  
Phil Hellier  
Keith Jones  
John Crawford  
Malcolm Avis

Laboratory Manager  
Operations Director  
Technical Development Manager  
Quality Manager  
Technical Director



Notes to accompany report

- The sign < means 'less than'
- Tests marked 'U' hold UKAS accreditation
- Tests marked 'M' hold MCertS (and UKAS) accreditation
- Tests marked 'N' do not currently hold UKAS accreditation
- Tests marked 'S' were subcontracted to an approved laboratory
- n/a means 'not evaluated'
- ns means 'insufficient sample'
- uns means 'unstable sample'
- Comments or interpretations are beyond the scope of UKAS accreditation
- The results relate only to the items tested

Test Report 98044 Cover Sheet

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**Microtest**  
Incorporating the best of both worlds

Report Date  
08 December 2009

# LABORATORY TEST REPORT

Results of analysis of 1 sample  
received 02 December 2009

Plot Adjacent to 60 St John's Road, Spalding - L815

Ground Engineering  
Newark Road  
Peterborough

PE1 5UA

FAO John Gibb

Length Batch No

Sample ID

Sample No

Depth

Moisture

SOPT1

Cyanide (red)

2300

2325

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Ground Engineering  
Newark Road  
Peterborough

PE1 SUA

FAO John Gibb

**LABORATORY TEST REPORT**

Results of analysis of 1 sample  
received 02 December 2009

Plot Adjacent to 60 St John's Road, Spalding - L316

**Chemtest**  
Report Date  
08 December 2009

38044  
-35221-

1.00

SI

In

SOIL

< 0.1

M

161242

M

mg kg<sup>-1</sup>

mg kg<sup>-1</sup>

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Column page 1  
Report page 2 of 2  
Report sample ID range AES2705 16 AES2705

All tests undertaken between 04-Dec-2009 and 05-Dec-2009

\* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page