Southern Testing
Environmental & Geotechnical

ST Consult
Environmental & Geotechnical

Topsoil Verification Report - Plots 26-32 & Block A Units 33-44

Desk Studies | Risk Assessments | Site Investigations | Geotechnical | Contamination Investigations | Remediation Design and Validation

Site: Former Elvian School, Southcote Lane, Reading

Client: Taylor Wimpey West London

Report Date: February 2017

Project Reference: V0774

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SUMMARY

The site was formerly occupied by a disused school with associated hardstanding/carpark areas and playing fields. The buildings have since been demolished and the site is currently being developed with residential houses and flats.

A desk study carried out by others indicates that the site has a history of residential land use prior to redevelopment as a school.

A series of intrusive investigations have been carried out at the site.

Relevant Pollutant Linkages have been identified in respect of elevated localised lead and B(a)P concentrations in the made ground. The proposed Remediation Strategy comprised:

- Excavation and removal of made ground in private garden areas and placement of a minimum of 400mm clean cover over a deter-to-dig layer as a marker (where made ground remains).

- Placement of a minimum of 200mm thickness of clean topsoil in communal soft landscaping areas.

This current report presents interim verification of the remedial works, which involves placement of topsoil in garden and soft landscaping areas of Plots 26 to 32 & Block A Units 33-44.

The verification testing carried out demonstrates that the remedial works relating to provision of suitable cover system (carried out to date) has been successful. Construction and Remediation work across the remainder of the site is yet to be completed and will be reported under separate cover.

The verification work was conducted and this report has been prepared for the sole internal use and reliance of Taylor Wimpey West London and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorization of Southern Testing Laboratories Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The findings and opinions conveyed via this report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd believes are reliable. Nevertheless, Southern Testing Laboratories Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

S F Pratt MSc CGeol

(Countersigned)

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(Signed)

For and on behalf of Southern Testing Laboratories Limited

STL: V0774
5 February 2018

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A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained in an email from Mr Jason Allan of Taylor Wimpey, dated 26th January 2016.

2 Location

The site is located to the north of Southcote Lane, approximately 2km south of reading town centre. The approximate National Grid Reference of the site is SU 695 722.

3 Construction

The site is being developed with housing.

For the purposes of the contamination risk assessment, the proposed development land use is classified as **Residential with Homegrown Produce Consumption (CLEA model[1]/C4SL report[2]).**

4 Scope

Southern Testing have been employed on a watching brief in respect of verification of remedial measures to deal with the soil contamination identified at the site. This report presents the data collected in the verification process, and our interpretation of that data.

This report should be read with the supporting information appended, and the relevant reports referred to.

The findings and opinions conveyed via this Report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Limited believes are reliable. Nevertheless, Southern Testing Laboratories Limited cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The verification work was conducted and this report has been prepared for the sole internal use and reliance of Taylor Wimpey West London and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorization of Southern Testing Laboratories Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

Waste transfer certificates collated and attached to this report are provided solely as evidence of the volumes of soil exported from site. Southern Testing have not been responsible for verification that the exported soils reached their destination, nor that the receiving tip was licensed to receive the waste. This has been and remains the responsibility of the Client.

The conclusions contained in this report may not be appropriate to alternative development schemes.

[1] Environment Agency Publication SC050021/SR3 'Updated technical background to the CLEA Model' (2009).
[2] SP1010 Development of Category 4 Screening Levels DEFRA (2014)

B BACKGROUND

5 Site History

The site has been the subject of a desk study and a series of intrusive investigation. These are detailed in our Remediation Strategy and Verification Plan report, ref V0774 dated May 2017, to which the reader is referred.

The site has a history of residential land use prior to redevelopment as a school.

6 Relevant Pollutant Linkages

The following Relevant Pollutant Linkages have been identified for the site:

Contaminant/Source	Pathways	Receptors
Lead and BaP in Made Ground	*Soil/dust exposure* *Soil/ dust ingestion* *Plant uptake*	*Site/ Construction workers* *Future residents*
Land Gas (CO_2) – where considered applicable	*Inhalation*	*Future residents*

C REMEDIAL OBJECTIVES AND REMEDIATION STRATEGY

7 Introduction

The remedial objectives, options appraisal and remediation strategy are set out in our report ref V0774, dated May 2017, to which the reader is referred. The remediation strategy was submitted to the Local Authority and NHBC for their approval. A summary of the remedial objectives and strategy adopted is given below.

8 Remedial Objectives

The objective of the remediation is to render the site fit for its intended purpose, in a cost effective manner, whilst minimising waste.

9 Remediation Strategy

The Remediation Strategy comprised the following:

Location	Details
Proposed Private Gardens	Excavation and removal of made ground (depending on proposed finished levels) and placement of a minimum of 400mm of clean cover over deter-to-dig layer as a marker (where made ground remains). The clean cover should include a minimum of 150mm topsoil. (Where made ground is less than 400mm thick further excavation will not be required).

Communal Soft landscaping areas	Placement of a minimum of 200mm of clean topsoil over deter-to-dig layer as a marker (where made ground remains).

D VERIFICATION PLAN

10 Introduction

The verification plan is set out in our report ref V0774, dated May 2017, to which the reader is referred.

11 Data Collection

The data to be collected as part of the verification works are described below.

Location	Data	Responsible party
Private Gardens and soft landscaping areas	*Post placement check of thickness* *Post placement soil samples (one per garden area or one per 100m^3) ** *Consignment Notes*	*Southern Testing* *Southern Testing* *Groundworker*
Houses	*Post-installation inspection and certification of gas membrane (where applicable)***	*Specialist Contractor*

** No topsoil was imported. Site derived topsoil used. No further testing required.*
*** This is outside the scope of this report.*

E VERIFICATION PROGRESS AND DATA

12 Works Completed

At the time of writing, the remediation of the areas covered by this report (Plots 26 to 32 & Block A Units 33 to 44) have been completed.

13 Site Visits

The site was visited on 25th January 2018 by a representative of ST Consult, to check the thickness of the placed topsoil.

The capping thicknesses proved at the various locations are tabulated below. In each case, the thicknesses of the placed material recorded are in accordance with the agreed remediation strategy.

A summary of the soil description is presented in the table below:

Location	Thickness
Plots 26-32 garden	Up to 500mm (topsoil soil- brown clayey slightly gravelly Sand).
Block A Units 33-44 soft landscaping areas	400mm - 500mm (topsoil soil- brown clayey slightly gravelly Sand).

A plan and photographs showing the verification sampling locations are included in Fig 3 of Appendix B and Appendix C respectively.

14 Test Results

Chemical analysis was carried out on a stockpile of site derived topsoil in January 2017 demonstrated that the soil is fit and suitable for reuse on site. The topsoil analysis report is included in Appendix D of this report.

15 Variations from Verification Plan

There is no variation to the verification plan for the areas considered in this report.

16 Discovery Strategy

No previously undiscovered contamination was encountered in the course of the redevelopment works.

17 Exported Soils

Waste Transfer/Consignment Notes relating to material exported from the site have not been provided by client at the time of writing this report. These will be provided in the final report.

18 Imported Soils

No soils have been imported to the areas covered in this report.

F SUMMARY

19 Summary

At the time of writing, all specified remedial works relating Plots 26 to 32 & Block A Units 33-44 have been completed. To the best of our knowledge, the site remediation has been carried out by Taylor Wimpey West London, and their appointed representatives, in accordance with the approved remediation strategy.

We would therefore recommend the discharge of NHBC Condition LQ5 200875 (see Appendix E) relating to these plots.

APPENDIX A

Site Plan

Site: Elvian School, Southcote Lane, Reading	STL: V0774	Fig No: 1
Date: 23 November 2017	Site Plan	
Southern Testing — Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8NN — ST Consult		

APPENDIX B

Remedial Zones and Topsoil Validation Locations Plan

Site: Elvian School, Southcote Lane, Reading	STL: V0774	Fig No: 2
Date: 23 November 2017	Plan showing Remediation Zones	

Southern Testing

Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8NN

ST Consult

NB: Positions of Trial Pits are only indicative unless dimensioned

Site: Elvian School, Southcote Lane, Reading	STL: V0774	Fig No: 3
Date: 02 February 2018	Topsoil Validation Locations _ Plots 26-40	

Southern Testing

Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8NN

ST Consult

APPENDIX C

Photographs

V6 – Plot 26

V7 – Plot 27

Topsoil – Plots 26/27

Rear view of Plots 26/27

V8 – Plot 28

V9 – Plot 29

V10 – Plot 30

Topsoil – Plots 28/29/30

Rear view of Plots 28/29/30

V11 – Plot 31

V12 – Plot 32

Rear view of Plots 31/32

Block A _ V13

Block A - Topsoil

Block A - V14

Block A - View of V14 area

Block A - V15

Block A - V16

Block A - V17/18	Block A - Placement of topsoil in progress

APPENDIX D

Topsoil Analysis Report

Our Ref: RJ/BC/V0774

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4 January 2016

Taylor Wimpey West London
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Hook
Hampshire – RG27 9PQ

For the attention of Mr Jason Allan
(Email: Jason.Allan@taylorwimpey.com)

Dear Sirs,

Re: Excavated Topsoil Analysis at Former Elvian School Reading
National Grid Reference: SU 695 722
Geology: Topsoil/Made Ground/ Lynch Hill Gravels

1 Introduction

Southern Testing have carried out a previous investigation (STL J12432 dated November 2015) which has identified elevated Lead concentrations in topsoil. In January 2016, a scope of additional works was proposed by Southern Testing reference, RJ/MS/Q160120. This proposed scope included delineation of the Lead hotspots in the topsoil and assessment of the material for re-use onsite. It was recommended that the delineation be carried out prior to any demolition work. However, it is understood that during archaeological investigation works the contractor has stripped the topsoil and stockpiled into a single heap along with the underlying gravelly subsoil.

Chemical analysis on the stockpiled material was requested to assess its suitability for re-use on site.

2 Scope

This letter report presents our test results and our interpretation of these data.

Any contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based upon them. (Their validity should be confirmed at the time of site development.)

The findings and opinions conveyed via this Site Investigation Report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Limited believes are reliable. Nevertheless, Southern Testing Laboratories Limited cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The site investigation was conducted and this report has been prepared for the sole internal use and reliance of Taylor Wimpey West London and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorization of Southern Testing Laboratories Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

Recommendations contained in this report may not be appropriate to alternative development schemes.

3 Field work

The site was attended on 23rd November 2016 at which time demolition works was in progress. At the time of our site visit, a large archaeological excavation measuring approximately 50m x 50m x 1.5m was noted in the former playing field of the site. The excavation was down into the underlying sandy gravel material. Excavated material of mixed topsoil and sandy gravelly subsoil was stockpiled in the south-western corner of the site.

Eight composite samples labelled SP1 to SP8 were taken and scheduled for chemical analysis including metals/metalloids, PAHs, TPH and asbestos screening. A single sample was also analysed for British Standard for Topsoil (BS3882 – Specification for Topsoil).

4 Contamination Assessment

The CLEA model[1] provides a methodology for quantitative assessment of the long term risks posed to human health by exposure to contaminated soils and has been used in the assessment of the test results. Toxicological data is used to calculate a Soil Guideline Value (SGV) for an individual contaminant, based on the proposed site use; these represent minimal risk concentrations and may be used as screening values. In this instance the test results have been compared to the Residential with home-grown produce consumption assumed land use.

The screening values and source notes are presented in Table 1 "Tier 1 Screening Values" attached to this letter.

The chemical analysis carried out on the eight samples recorded no significantly elevated concentrations above the screening values. Total petroleum hydrocarbon analysis carried out recorded concentrations generally below the laboratory detection limit. Furthermore, no noticeable pieces of asbestos or free and dispersible fibres were detected in any of the samples analysed. On the basis of the laboratory test results, the soils are considered to be free of any significant contaminant and suitable for reuse on site.

Compliance with BS 3882 (Topsoil specification)

The results of the analysis indicate that the soils fell into the sandy loam texture class and meets and therefore compliant with multipurpose use. The results however, indicate high stone content which is not compliant with multipurpose use. The results also indicate that the soil is deficient in nutrients.
The non-compliance relating to high stone content and nutrient deficiencies can be addressed by screening the soil to remove the stones and also by application of suitable fertilizer.

[1] Environment Agency Publication SC050021/SR3 'Updated technical background to the CLEA Model' (2009).

We hope the above provides sufficient information. If you require any further information, please do not hesitate to contact us.

Yours faithfully,

Robert Jiagge BSc (Hons) MSc MIEnvSc FGS CSci
For and on behalf of
Southern Testing Laboratories Limited
DDI: 01342 333 119
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Table 1 - Tier 1 Screening Values

Contaminant	Units	Proposed Land Use					
		Residential with homegrown produce consumption	Residential without homegrown produce consumption	Open Space* (Residential)	Open Space* (Park)	Allotments	Commercial / Industrial
Arsenic (As) [2]	mg/kg	37	40	79	170	43	640
Cadmium (Cd) [2]	mg/kg	11	85	120	555	1.9	190
Trivalent Chromium (CrIII) [2]	mg/kg	910	910	1,500	33,000	18,000	8600
Hexavalent Chromium (CrVI) [2]	mg/kg	6	6	7.7	220	1.8	33
Lead (Pb) [3]	mg/kg	200	310	630	1300	80	2330
Mercury (Hg) [1,2,7]	mg/kg	7.6-11	9.2-15	40	68-71	6.0	29-320
Selenium (Se) [2]	mg/kg	250	430	1,100	1,800	88	12,000
Nickel (Ni) [2,4]	mg/kg	130	180	230	800	53	980
Copper (Cu) [2,4]	mg/kg	2,400	7,100	12,000	44,000	520	68,000
Zinc (Zn) [2,4]	mg/kg	3,700	40,000	81,000	170,000	620	730,000
Phenol [1,2]	mg/kg	120-380	440-1200	440-1300	440-1300	23-83	440-1300
Benzo[a]pyrene [1,5]	mg/kg	1.7-2.4	2.6	4.9	10	0.67-2.7	36
Naphthalene [1,2]	mg/kg	2.3-13	2.3-13	77-430+	77-430+	4.1-24	77-430+
Total Cyanide (CN) [6]	mg/kg	/	/	/	/	/	/
Free Cyanide [6]	mg/kg	/	/	/	/	/	/
Complex Cyanides [6]	mg/kg	/	/	/	/	/	/
Thiocyanate [6]	mg/kg	/	/	/	/	/	/

Notes:

***** Open Space levels calculated on the basis of the exposure modelling developed in the C4SL research.

+ Screening values constrained to saturation limit. Higher values may be acceptable on a site specific basis.

[1] Where ranges of values are given for organic contaminants the screening value is dependent on the Soil +Organic Matter.

[2] LQM/CIEH S4UL (2014). Copyright Land Quality Management Ltd reproduced with permission; Publication Number S4UL 3116. All rights reserved.

[3] C4SL (DEFRA 2014).

[4] Copper, Zinc and Nickel may have phototoxic effects at the given concentrations. Alternative criteria should be adopted for importation of Topsoil or other soils for cultivation. BS3882:2015 and BS8601:2013 suggest values of 200 to 300mg/kg for Zn, 100 to 200mg/kg for Cu, and 60 to 110mg/kg for Ni, for topsoil and subsoil, depending on pH.

[5] Based on the Surrogate Marker approach and modelled using the modified exposure parameters of C4SL but retaining 'minimal risk' HCV.

[6] Screening criteria derived on a site specific basis if test results indicate.

[7] S4UL for Methyl Mercury, higher concentrations may be tolerable if inorganic mercury is the only species present. Lower concentrations apply for elemental Mercury.

These screening values are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

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Analytical Report Number : 16-34051

Project / Site name:	Former Elvian School (Reading)	**Samples received on:**	28/11/2016
Your job number:	V0774	**Samples instructed on:**	28/11/2016
Your order number:	V0774_1	**Analysis completed by:**	07/12/2016
Report Issue Number:	1	**Report issued on:**	07/12/2016
Samples Analysed:	8 soil samples		

Signed:

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

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soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 16-34051

Project / Site name: Former Elvian School (Reading)
Your Order No: V0774_1

Lab Sample Number				665070	665071	665072	665073	665074
Sample Reference				SP1	SP2	SP3	SP4	SP5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00	0.00	0.00	0.00	0.00
Date Sampled				23/11/2016	23/11/2016	23/11/2016	23/11/2016	23/11/2016
Time Taken				1200	1200	1210	1220	1225
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	11	9.4	12	11
Total mass of sample received	kg	0.001	NONE	1.4	1.6	2.0	1.7	1.6
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.3	7.3	6.7	6.7	6.7
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0035	0.0042	0.0070	0.0044	0.0040
Sulphide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Organic Matter	%	0.1	MCERTS	0.8	1.2	0.7	1.0	1.0
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60	< 1.60	< 1.60	< 1.60
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.3	8.9	9.9	11	9.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	18	16	22	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	16	14	15	18
Lead (aqua regia extractable)	mg/kg	1	MCERTS	30	36	32	34	38
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14	17	18	17	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	37	41	36	45	49
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	-	-	< 10	-	-
TPH2 (C6 - C10)	mg/kg	0.1	NONE	-	-	< 0.1	-	-
TPH C6 - C40	mg/kg	10	NONE	-	-	< 10	-	-

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 16-34051

Project / Site name: Former Elvian School (Reading)
Your Order No: V0774_1

Lab Sample Number				665075	665076	665077		
Sample Reference				SP6	SP7	SP8		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				0.00	0.00	0.00		
Date Sampled				23/11/2016	23/11/2016	23/11/2016		
Time Taken				1230	1235	1250		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	11	11	10		
Total mass of sample received	kg	0.001	NONE	1.5	1.6	1.5		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected		
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	6.1	6.6	7.0		
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0080	0.0062	0.0055		
Sulphide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Organic Matter	%	0.1	MCERTS	2.0	1.5	1.5		
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60	< 1.60		
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.3	7.5	11		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	20	19		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	18	19	19		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	58	42	47		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	21	18		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	50	42	48		
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	-	-	-		
TPH2 (C6 - C10)	mg/kg	0.1	NONE	-	-	-		
TPH C6 - C40	mg/kg	10	NONE	-	-	-		

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 16-34051

Project / Site name: Former Elvian School (Reading)

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
665070	SP1	None Supplied	0.00	Brown loam and clay with vegetation.
665071	SP2	None Supplied	0.00	Brown loam and clay with gravel and vegetation.
665072	SP3	None Supplied	0.00	Brown loam and clay with gravel and vegetation.
665073	SP4	None Supplied	0.00	Brown loam and clay with gravel and vegetation.
665074	SP5	None Supplied	0.00	Brown loam and clay with gravel and vegetation.
665075	SP6	None Supplied	0.00	Brown loam and clay with gravel and vegetation.
665076	SP7	None Supplied	0.00	Brown loam and clay with gravel and vegetation.
665077	SP8	None Supplied	0.00	Brown loam and clay with gravel and vegetation.

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Analytical Report Number : 16-34051

Project / Site name: Former Elvian School (Reading)

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding.	L076-PL	W	MCERTS
TPH C6 - C40 (soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method	L076-PL	W	NONE
TPH2 (Soil)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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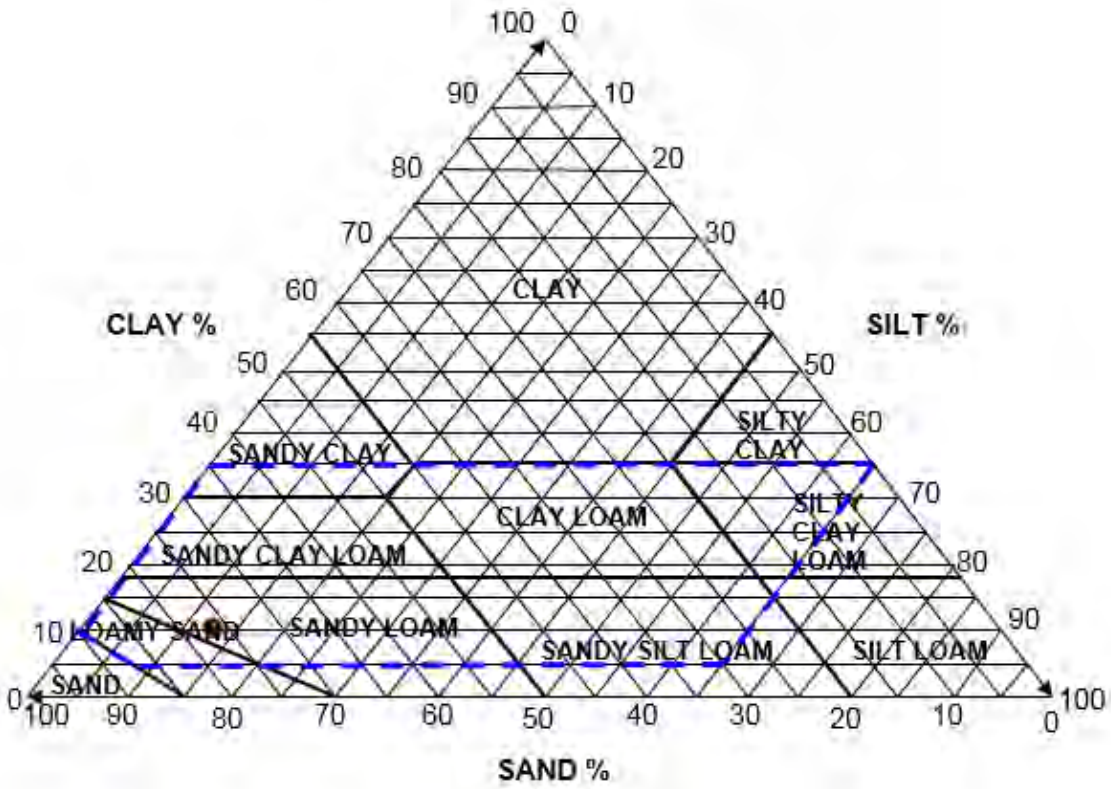
16-34054

Soil Texture Triangle 665090



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Analytical Report Number : 16-34054

Project / Site name:	Former Elvian School (Redding)	**Samples received on:**	28/11/2016
Your job number:	V0774	**Samples instructed on:**	28/11/2016
Your order number:	V0774_1	**Analysis completed by:**	07/12/2016
Report Issue Number:	1	**Report issued on:**	07/12/2016
Samples Analysed:	1 soil sample		

Signed:

Dr Irma Doyle
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

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Certificate of Analysis

BS 3882:2015 Specification For Topsoil

	Fail BS 3882		**client**
Report No:	**16-34054**		**Southern Testing Laboratories Ltd**
Location	Former Elvian School (Redding)		Keeble House Stuart Way East Grinstead West Sussex RH19 4QA
Lab Reference (Sample Number)	665090		
Sampling Date	23/11/2016		
Sample ID	SP3		
Depth (m)	**0.00**		

		unit	Result	Compliant with range (Y/N)					
				Multi-P	**Acid**	**Calc**	**Low-F**	**Low-F(a)**	**Low-F(c)**
Soil texture	<2mm fraction		SANDY LOAM	Y	Y	Y	Y	Y	Y
Maximum coarse fragment content:	>2mm	%w/w	43.00	N	N	N	N	N	N
	>20mm	%w/w	0.00	Y	Y	Y	Y	Y	Y
	>50mm	%w/w	0.00	Y	Y	Y	Y	Y	Y
Mass loss on ignition		%	2.00						
	Clay 5-20%		Y	N	N	N	Y	Y	Y
	Clay 20-35%		-	-	-	-	-	-	-
Soil pH:		pH	6.50	Y	N	N	Y	N	N
Carbonate:		%w/w	3.90	-	-	Y	-	-	Y
Available plant nutrients	Nitrogen	%w/w	0.06	N	N	N	-	-	-
	Extractable Phosphate (as P)	mg/l	34.00	Y	Y	Y	N	N	N
	Extractable Potassium	mg/l	62.80	N	N	N	-	-	-
	Extractable Magnesium	mg/l	27.00	N	N	N	-	-	-
Carbon: Nitrogen Ratio:		:1	11.00	Y	Y	Y	Y	Y	Y
Conductivity		us/cm	1700.00	Y	-	-	-	-	-
Phytotoxic contaminants:	** Total Zinc	mg/kg	45.00	Y	Y	Y	Y	Y	Y
	** Total Copper	mg/kg	14.00	Y	Y	Y	Y	Y	Y
	** Total Nickel	mg/kg	17.00	Y	Y	Y	Y	Y	Y
Visible contaminants:	>2mm	%w/w	0.00	Y	Y	Y	Y	Y	Y
	Plastics	%w/w	0.00	Y	Y	Y	Y	Y	Y
	Sharps	no. in 1 kg	0.00	Y	Y	Y	Y	Y	Y
Compliancy:				Fail	Fail	Fail	Fail	Fail	Fail

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and I2 cannot be held responsible for any discrepencies with current legislation

** = MCERTS accrediited

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Analytical Report Number : 16-34054

Project / Site name: Former Elvian School (Redding)

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Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
665090	SP3	None Supplied	0.00	Brown loam and clay with gravel and vegetation.

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Analytical Report Number : 16-34054

Project / Site name: Former Elvian School (Redding)

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Carbon to Nitrogen Ratio (Topsoil - BS3882:2015)	Carbon to Nitrogen ratio (:1) calculated using Loss on Ignition.	BS3882:2015	L01TS2015	W	NONE
Carbonate (Topsoil - BS3882)	Determination of Carbonate as per BS 3882:2015.	BS3882:2015	L01TS2015	D	NONE
Coarse Fragment and Contaminant Analysis	Determination of >2mm contaminants	BS3882:2007 & BS8601:2013 & PAS 100:2005	L01TS	D	NONE
Conductivity (BS3882/BS8601)	Determination of the conductivity of soil in accordance with BS 3882:2007 methodology	BS3882:2007 & BS8601:2013	L01TS	D	NONE
Extractable/Available Metals (BS3882/BS8601)	Determiation of the extractable metals in soil, in accordance with BS3882:2007 methodology.	BS3882:2007 & BS8601:2013	L01TS	D	NONE
Kjeldahl nitrogen in soil	Determination of total nitrogen using the Kjeldahl-digestion method and colorimetric determination.	In house method based on BS 7755-3.7:1995 &	L087-PL	D	NONE
Mass loss on ignition (Topsoil - BS3882)	Determination of Loss on Ignition as per BS 3882:2015.	BS3882:2015	L01TS2015	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Nitrogen (TKN)	Determination of total nitrogen by Kjeldahl method.	BS3882:2007	L087-PL	D	NONE
pH (BS3882/BS8601)	Determination of the pH of soil in accordance with BS 3882:2007 methodology	BS3882:2007 & BS8601:2013	L01TS	D	NONE
Phosphorus as PO4 (BS3882/BS8601)	Determination of extractable phosphorus	BS3882:2007	L01TS	W	NONE
Sodium (exchangeable %)	Determination of exchangeable sodium (%) by calculation, in accordance with BS3882:2007 methodology.	BS3882:2007	L087-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Textural Classification (BS3882/BS8601)	Determination of the textural classifcation of soil following BS3882:2007 methodology.	BS3882:2007 & BS8601:2013	L01TS	D	NONE
Textural Classification Diagram	Textural classification Diagram	BS3882:2015		D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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APPENDIX E

NHBC Condition Schedule

NHBC Portal

Report Name: Technical Conditions Report
Run By: Jason Allan
Report Date: 06 Oct 2017 11:02

The below report provides details of all outstanding Technical Conditions. A detailed explanation of the report parameters can be found within the 'Help' section of the portal. Should you have any general queries on this report please e-mail onlinesupport@nhbc.co.uk, alternatively if your query relates to a particular condition please contact the individual identified for the site.

Organisation: Taylor Wimpey West London A Division of Taylor Wimpey UK Ltd

Site: Off Bath Road / Southcote Lane READING RG30 2BB
Building Control Surveyor Name: Mr Dave Cummins **Tel No:** 01908 366708
Land Quality Engineer Name: Mr Brian Graham **Tel No:** 01489 588245

Reference	Condition	Stop Finalling	Plot(s) Affected
BC5 02852/2015/HO	Dry risers - I note your comment "Following comments from you and our subsequent consultation with a dry riser expert, we have revised our proposal to show a drain-off chamber, directly adjacent to the dry rise inlet on blocks C, D, G & H, from which the person charged with drain-off has the responsibility of removing/pumping the drained water to a suitable place. This will be in their brief and they should include same in their method statement" Please provide a detail on your floor plan to show this.	Warranty and BC	61-76, 82-118
BC12 02852/2015/HO	It is a requirement of The Regulatory Reform Order that we consult the Fire Authority in relation to the common parts of buildings containing flats 15 days prior to the issue of a Final Certificate, please confirm the programmed date for your first completion so this consultation can take place. First completion noted as Nov 2017 Block A 33-44 Block B 45-60 Block C 61-68 Block D 69-76 Block E 77-78 Block F 79-81 Block G 82-98 Block H 99-118	Warranty and BC	33-76, 82-118
BC13 02852/2015/HO	Dry riser. Please provide a copy of the testing and commissioning certificates for the installation.	Warranty and BC	33-76, 82-118
BC14 02852/2015/HO	Smoke control systems e.g. AOV's - smoke shaft. A copy of the testing and commissioning certificates for the installations should be kept on site for the benefit of the NHBC Inspector and also submitted to the NHBC Surveyor	Warranty and BC	82-118
BC20 02852/2015/HO	Note to inspector - System 3 to Blocks A, B, C, D, F, G & H with system 1 to Block E.	Warranty and BC	33-118
BC21 02852/2015/HO	Extractor fan commissioning Certificates confirming the air flow measurements of the extractor fans to be provided, together with a schedule of the test equipment and the date of the last UKAS calibration.	Warranty and BC	1-118
BC27 02852/2015/HO	The results of the pressure tests should be submitted prior to completion.	Warranty and BC	1-118
BC30 02852/2015/HO	The BS 7671 Electrical Installation certificate should be made available to the NHBC Building Inspector for each plot prior to completion.	Warranty and BC	1-118
BC31 02852/2015/HO	The Energy Performance Certificate (EPC) shall be given to the owner/ displayed in the property and RRN or EPC given to NHBC before the property can be finalled for Building Control Regulations compliance.	BC	1-118
LQ5 200875	Verification report required for contamination remediation works. The report is to accord with NHBC Standards Chapter 4.1 and is to include verification of the following issues: Provide details of remediation carried out to show compliance with the RMS. REVISED 15-03-17 [Report to show 400mm of clean soil placed in garden areas]	Warranty and BC	1-118

NHBC is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority.

	Validation Report to be produced in line with the NHBC Standards noted Chapter 4.1 and amplified in Standards Extra 47 - June 2010 and Technical Extra 8 - November 2012.		

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