



Midland Road, Royston, South Yorkshire

SITE REMEDIATION STATEMENT

FOR PERSIMMON HOMES LTD

Report Ref	Issue	Prepared by	Date	Reviewed by	Date
12040/RS	1	A Cooper	09-09-13	A Coverdale	17-09-13

Client

Persimmon Homes Ltd
3 Hepton Court
York Road
Leeds
West Yorkshire
LS9 6PW

3e Consulting Engineers Ltd
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel : 01924 240420



Midland Road, Royston, South Yorkshire
SITE REMEDIATION STATEMENT

CONTENTS

1	INTRODUCTION	1
2	SUMMARY OF GROUND INVESTIGATION	2
3	CONTAMINATION ASSESSMENT	3
4	REMEDIATION METHOD STATEMENT	5

Figures

- Figure 1RS Site Location Map
- Figure 2RS Exploratory Hole Location Plan

Appendices

- Appendix A Outline Site Plan

1 INTRODUCTION

1.1 It is proposed to develop part of the site of the former Royston High School, Barnsley for a residential development. The development is to comprise 143 housing plots with associated car parking, access roads and areas of soft landscaping as indicated on the latest proposals included as **Appendix A**. The site, centred on National Grid Reference 436290 411840, is located northeast of Royston town centre and immediately southeast of Common Lane as indicated on the enclosed Site Location Plan, **Figure 1RS**.

1.2 Eastwood and Partners (E&P) carried out Phase I Assessment Phase II assessment was completed by 3e Consulting Engineers Limited (3e) in April 2013 assess the ground conditions and levels of contamination, at locations as indicated on the enclosed Exploratory Hole Location Plan, **Figure 2RS**.

1.3 The investigatory work comprised the excavation of trial pits, drilling rotary percussive boreholes, gas monitoring and soil sampling together with associated laboratory testing.

1.4 The following ground investigation reports should be read in conjunction with this remediation statement:

- Eastwood and Partners report, referenced 'Phase 1 Geotechnical and Geo-Environmental Desktop Report, Royston High School, Barnsley, Ref. 33461 Issue 3, January 2011'
- 3e Consulting Phase II Geo-environmental Assessment, Midland Road, Royston, reference 12040, April 2013.

1.5 The ground investigation identified elevated concentrations of arsenic and copper, and to a lesser extent, lead and benzo(a)pyrene associated with ash based made ground, which is present in the north eastern part of the site.

2 SUMMARY OF GROUND INVESTIGATION

Soil profile and visual evidence of contamination

2.1 At the time of the 3e site investigation, the site comprised a mantle of topsoil across the site at thicknesses of between 100mm and 400mm. Made ground, confined to the north eastern part only, comprised ash, cinder, brick and burnt shale to a maximum depth of 1.4 metres in the extreme northern corner. Directly beneath the topsoil, or underlying the made ground, natural stiff clays were proved to between 1.2 and in excess of 3 metres underlain by very weak to weak mudstone, moderately weak siltstone or moderately strong to strong sandstone.

Groundwater

2.2 Perched groundwater ingresses were encountered between 1.2m and 1.4m.

Chemical screening

Reworked Topsoil

2.3 With respect to topsoil, concentrations of arsenic and zinc are in excess of the assessment criteria within two samples. These are samples of reworked topsoil which were recovered from the area that overlies the ash based made ground.

Made Ground

2.4 Samples of shallow ash based made ground located within the north eastern part of the site reported concentrations of arsenic, lead, copper and benzo(a)pyrene above their respective assessment criteria.

Natural Soils

2.5 None of the samples of natural soils record concentrations of contaminants of concern in excess of their respective assessment criteria.

3 CONTAMINATION ASSESSMENT

3.1 Potential contaminated made ground comprised ash based materials in the area of the former landfill as indicated on the enclosed Exploratory Hole Location Plan, **Figure 2RS**. No evidence of potentially significantly contaminated materials was noted, particularly with respect to petroleum hydrocarbons. Laboratory testing has identified widespread elevated concentrations of arsenic and copper within the ash based made ground together with lead and PAHs, benzo(a)pyrene, the latter to a lesser degree.

3.2 In addition, reworked topsoil overlying the ash based materials and the former landfill in the north eastern part of the site recorded elevated concentrations of arsenic and zinc. All these aforementioned contaminants could potentially present a significant risk to human health.

3.3 The natural soils are not regarded as contaminated.

Potential risk to human health and groundwater

3.4 Metals and non-volatile PAHs are present within the made ground have a potential to pose a human health risk. Therefore, a remedial capping layer in gardens and landscaped areas will be sufficient to break the pollutant pathway between the made ground and end users with hardcover providing a pollutant break elsewhere.

Remediation Overview

3.5 In view of the above, the most suitable form of remediation is considered to be a 600mm remedial capping layer in areas of landscaping to break the physical pathway between source and human receptor. The capping layer should comprise at least 150mm of topsoil at the surface. Depending on the final levels, an allowance for the removal of made ground should be made. The location of the ash based made ground is indicated on **Figure 2RS** and therefore the area where remedial capping is required in gardens and areas of landscaping.

3.6 Due to the ash based materials containing burnt shale, which have expansive properties, placement of these materials should be avoided beneath floor slabs or adjacent to subsurface concrete because of their potential to cause heave. Ideally, they should be placed beneath capping in garden areas or beneath areas of soft landscaping.



3.7 If the reworked topsoil overlying the former landfill in the north eastern part of the site is to be re-used during the redevelopment, then it should be placed beneath a minimum of 300mm clean cover to break any pathway to end users.

3.8 The topsoil covering the remainder of the site, where it is directly overlying the natural soils, is regarded as not presenting a potential risk to human health and is considered suitable for re-use as part of the development.

3.9 With respect to underground services, it is considered that no special precautions will be required where service pipes are to be laid within natural soils, however, within the ash based made ground consideration should be given to using specialist protected pipes with further testing in accordance with UKWIR guidelines recommended. The advice of manufacturers should be sought with respect to the use of appropriate materials in accordance with the current guidelines.

Gas protection measures

3.10 No protection measures are required with respect to landfill gas but basic radon protection measures are required.

4 REMEDIATION METHOD STATEMENT

4.1 The following remediation statement details a method of working and validation that will ensure the safe disposal of contaminated soils and leave the site in a condition such that no significant risk is presented to human health.

4.2 Any groundwater encountered during remediation or ground works will need to be assessed prior to disposal.

Remedial Capping

4.3 Within the gardens and landscaped areas of north eastern part of the site underlain by ash based made ground it is proposed to place a 600mm remedial capping layer in gardens and 300mm in landscaped areas, see **Figure 2RS** for location. The depth of capping will be validated by a suitably experienced 3e Consulting Engineers geo-environmental engineer.

4.4 The formation level should be suitably proof rolled prior to the placement of any fill materials. Reference should be made to the specification for topsoil, BS3882:2007.

4.5 Any arisings materials generated for offsite disposal should be stockpiled separate from other materials,

4.6 Where natural soils are encountered within 600mm depth of the final level, the thicknesses of capping materials should be reduced to suite. This may occur at the edges of the area of ash based made ground.

4.7 Where trees are present, made ground should be reduced to the top of the tree roots and isolated by placement of a geotextile cover.

4.8 Topsoil and natural clay arisings from other areas of the site are considered suitable for reuse and it is considered that a sufficient quantity of testing has been carried out on the topsoil and natural soil for the volumes of capping required. Any imported capping materials including topsoil should be screened for potential contaminants prior to importation to site. A summary table of acceptance criteria for capping soils is provided below (Table 1).

Table 1 – Imported Soil Acceptance Criteria

DETERMINAND	COMMERCIAL END USE CRITERIA (mg/kg) IN SOIL
Metals:	
Arsenic	32 ⁽¹⁾
Cadmium	10 ⁽¹⁾
Chromium	3000 ⁽¹⁾
Lead	450 ⁽¹⁾
Mercury	170 ⁽¹⁾
Selenium	350 ⁽¹⁾
Copper	200 ⁽²⁾
Nickel	130 ⁽¹⁾
Vanadium	190 ⁽²⁾
Zinc	450 ⁽²⁾
PAH compounds:	
Acenaphthene	210 ⁽²⁾
Acenaphthylene	170 ⁽²⁾
Anthracene	2300 ⁽²⁾
Benzo(a)anthracene	3.1 ⁽²⁾
Benzo(a)pyrene	0.83 ⁽²⁾
Benzo(b)fluoranthene	5.6 ⁽²⁾
Benzo(g,h,i)perylene	44 ⁽²⁾
Benzo(k)fluoranthene	8.5 ⁽²⁾
Chrysene	6 ⁽²⁾
Dibenz(a,h)anthracene	0.76 ⁽²⁾
Fluoranthene	260 ⁽²⁾
Fluorene	160 ⁽²⁾
Indeno(1,2,3-cd)pyrene	3.2 ⁽²⁾
Naphthalene	1.5 ⁽²⁾
Phenanthrene	92 ⁽²⁾
Pyrene	560 ⁽²⁾
Inorganics:	
Water soluble sulphate	0.5g/l ⁽³⁾
Acidity (pH)	not less than 5

Notes:

- (1) CLEA soil guidance value for commercial end use
- (2) LQM/CIEH GAC for commercial end use
- (3) Upper level for Class 1 concrete (BRE Special Digest:2005)
Assessment criteria based on 1% soil organic matter

4.9 If during the groundwork other areas of contamination are exposed they will be assessed by a geo-environmental engineer from 3e Consulting Engineers and remediation carried out as necessary.

Validation Testing and Reporting Requirements

4.10 Prior to importation to site if necessary, soils used for capping will be tested for the determinands listed in Table 1. The frequency of testing shall be as follows:

- Topsoil – one sample per 250m³, minimum of three samples per greenfield source OR one sample per 100m³, minimum of three samples per brownfield source.



- Subsoil – one sample per 250m³, minimum of three samples per greenfield source OR one sample per 100m³, minimum of three samples per brownfield source.

4.11 The depth of the capping layer will be confirmed by a geo-environmental at a rate of one inspection pit per three gardens of capping placed or one in inspection pit per 50m² in each area of landscaping.

4.12 On completion of the remediation, a validation completion report will be prepared. This will outline the works carried out and include waste transfer notes and the results of any validation testing.

Figures



Ordnance Survey © Crown copyright
 All rights reserved. Licence number 100035887



consulting engineers

4 calder close
 calder park
 wakefield
 WF4 3BA

t 01924 240420
 f 01924 240421

www.3econsult.com

Project		Midland Road, Royston	
		Form Persimmon Homes Ltd.	
Title		Site Location Plan	
Scale	Drawn	Checked	Date
1:25000	AHC	ACV	Sep '13
Job No.	Drawing No.	Rev	
12040	Fig 1RS	0	

Only PDF/DWG Issues of this drawing are controlled. All other formats (eg. DWG AutoCAD FILES) are UN-controlled and are used at your own risk.
 This drawing is copyright ©. It is sent to you in confidence and must not be copied, used or disclosed to any third parties without 3E permission. It remains the property of 3E and must be returned on request.

Contractors should refer to the residual risks contained in the CDM Pre Construction Information before carrying out any site operations and should not issue parts of this drawing without including the CDM notes and references. This information will include details of the SIGNIFICANT risks which 3E have considered beyond that which a competent contractor should be aware.

- KEY**
- TP1 TRIAL PIT EXCAVATED OCTOBER 2012
 - TP301 TRIAL PIT EXCAVATED MARCH/APRIL 2013
 - P1 BOREHOLE DRILLED APRIL 2013



EXPLORATORY HOLE LOCATIONS
 (SCALE 1:1,000)

DO NOT SCALE.

09/09/13	INITIAL ISSUE	AHC	P1
Date	Revisions	Drawn	Rev.

4 calder close
 calder park
 wakefield
 WF4 3BA

t 01924 240420
 f 01924 240421
 www.3econsult.com

Client **Persimmon Homes West Yorkshire**

Project **Midland Road, Royston**

Title **Exploratory Hole Location Plan**

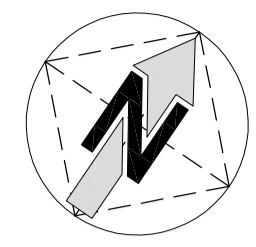
Scale	Drawn	Checked	Date
1:1000	AHC	ACV	SEPT 13

Drawing Status **Information**

Job No.	Drawing No.	Revision
12040	Figure 2RS	P1

Appendix A

Outline Site Plan



- LEGEND**
- KEY AND BOUNDARY TREATMENT**
- DENOTES 1800 HIGH CLOSE BOARDED FENCE
 - - - DENOTES 900 HIGH 2 POST AND RAIL TIMBER FENCE
 - ==== DENOTES 1800 HIGH SCREEN WALL / FENCE
 - ||||| DENOTES 900 HIGH RAILINGS
- SCHEDULE OF RESIDENTIAL ACCOMMODATION**
- * AFFORDABLE HOME ALLOCATION

Housetype	Total
Cherryburn 2 Storey 4 Bed Detached House	3 No.
Crathorne 2 Storey 4 Bed Detached House	9 No.
Roseberry 2 Storey 4 Bed Detached House	18 No.
Souter 2 1/2 Storey 3 Bed Semi Detached/Terraced House	17 No.
Lumley 2 1/2 Storey 4 Bed Detached House	7 No.
Rufford 2 Storey 3 Bed Detached House	12 No.
Rufford Semi 2 Storey 3 Bed Semi Detached	20 No.
Hanbury 2 Storey 3 Bed Semi Detached	36 No.
Swale 2 1/2 Storey 3 Bed Semi/Terrace	11 No.
Skipton 2 Storey 2 Bed Semi/Terrace	10 No.
Total	143 units



Proposed Residential Development
Royston High School

Planning layout	
Scale	1:500
Drawing Number	ROY-2013:01
Drawn By	CAH
May 13	