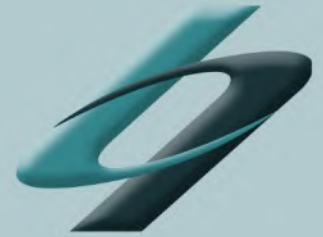
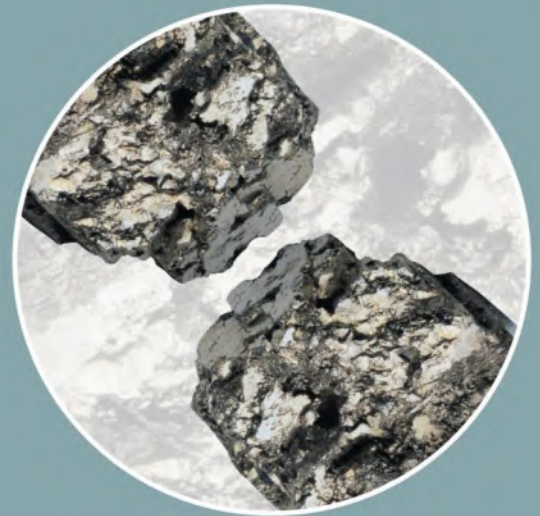


Document: Remediation Verification Report
Project: Needham Market Quarry
Reference No.: GN17820_RV41
Date: February 2024
Prepared for: Hopkins Homes Limited



harrisongeotechnical
ENGINEERING



HARRISON GROUP ENVIRONMENTAL LIMITED

Document: Remediation Verification Report

Project: Needham Market Quarry

Reference No.: GN17820_RV41

Date: February 2024

Prepared For: Hopkins Homes Limited

REPORT STATUS:

Revision	Comments	Prepared By	Approved By	Issued By	Audited By
0	First issue	INIT CD SIGN COMMENTS DATE 13/02/24	INIT JA SIGN COMMENTS DATE 20/02/24	INIT CD SIGN COMMENTS DATE 22/02/24	INIT JA SIGN COMMENTS DATE 21/02/24
		INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE
		INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE
		INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE	INIT SIGN COMMENTS DATE

CONTENTS

FOREWORD

1	TERMS OF REFERENCE & INTRODUCTION	1
2	BACKGROUND INFORMATION	1
2.1	Verification Report Structure	1
2.2	Site Setting, History and Investigation	2
3	SOIL REMEDIATION	2
3.1	Cover System Material	3
3.1.1	Site Won Subsoil	3
3.1.2	Site Won Topsoil	3
3.1.3	Soil Cover Thickness	3
4	CONCLUSIONS	3
APPENDICES – Supporting Documentation		
	Remediation Plans and Drawings	
	Trial Pit Logs	
	Soil Chemical Analysis Reports	
	Photo sheet	

FOREWORD

General Conditions Relating to a Verification Report

This investigation has been devised to generally comply with the relevant principles and requirements of B.S.10175:2011+A2:2017 'Investigation of potentially contaminated sites - Code of practice', science report SC050021/SR3 'Updated Technical Background to the CLEA Model' (Environment Agency, 2008), and DEFRA/Environment Agency (EA), 2023 'land contamination: risk management'. The recommendations made and opinions expressed in this report are based on the information obtained from the sources described using a methodology intended to provide reasonable consistency and robustness.

The opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site and of laboratory test results. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between exploratory positions, these are only for guidance and no liability can be accepted for their accuracy.

Boring and sampling procedures are undertaken in accordance with B.S.5930:2015+A1:2020 'Code of Practice for Ground Investigations'. Likewise, in-situ and laboratory testing complies with B.S.1377:1990 'Methods of Tests for Soils for Civil Engineering Purposes' and B.S.22475:2011, unless stated otherwise in the text. Chemical testing has been undertaken by a UKAS accredited laboratory.

Some items of the investigation have been provided by third parties and whilst Harrison Group have no reason to doubt the accuracy, the items relied on have not been verified. No responsibility can be accepted for errors within third party items presented in this report.

This report is produced in accordance with the scope of Harrison Group's appointment and is subject to the terms of appointment. Harrison Group accepts no liability for any use of this document other than by its client and only for the purposes, for which it was designed and produced. No responsibility can be accepted for any consequences of this information being passed to a third party who may act upon its contents/recommendations.

Any advice, opinions, or recommendations within this document should be read and relied upon only in the context of the document as a whole. The contents of this document are not to be construed as providing legal, business or tax advice or opinion.

REMEDATION VERIFICATION REPORT
FOR REMEDIAL ACTIVITY
AT
NEEDHAM MARKET QUARRY (Plots 109-111)

1 TERMS OF REFERENCE & INTRODUCTION

The work covered by this document was undertaken on behalf of Hopkins Homes Ltd, in accordance with an emailed instruction to proceed from Hopkins Homes Ltd dated 3rd October 2018.

The work described in this report represents validation and verification of remediation comprising a suitable soil cover (600mm of combined subsoil and topsoil, with a minimum thickness of topsoil to be 150mm) to the areas of soft landscaping around plots 109-111 of the Needham Market development. A remediation method statement (RMS) for the site was compiled and provided for the client to submit to the regulatory authorities in December 2017. The RMS (reference GN17820_RMS1) detailed the method of remediation to be undertaken, based on the ground investigations and assessment previously completed, and provided the planned principles for verification. We believe that the RMS was issued to Mid Suffolk District Council and the NHBC for their review and comment on the planned remediation verification.

The plots which require validation of the suitability of the soils in gardens and soft landscaping can be identified in drawing GN17820_DR402 (appended to this report), which highlights the development phasing plan (phases 1A, 1B, 2 and 3). Specifically, plots which require confirmation of the suitability of the near-surface soils, and the need for a soil cover, includes plot numbers 1-136, 161-170, 184-193, 197-211, 218-266 and soft landscaping areas in these development phases.

To date, potentially unsuitable material (as outlined in the RMS) has only been encountered in two plots in the western portion of phase 2 of the development (see verification reports GN17820_RV14 and GN17820_RV15) and in both instances further chemical testing of the material determined this was chemically suitable to remain. Following discussions between the client, the regulator and the NHBC it was agreed that a reduction in the number of plots that are to be tested as part of the remaining validation was sensible. The agreed strategy involved a reduction in the testing frequency to 1 in every 2 plots across the remainder of phase 2, as this was within an area formally used as part of the landfill, then reducing to 1 in 4 plots for phase 3 where it is understood the landfill did not extend into. This proposal was caveated that should potentially unsuitable material be encountered then the frequency of plots tested would be locally increased until confidence can be gained that no further plots are impacted, before returning to the agreed upon frequency.

Subsequent remediation verification reports are in production for additional affected plots/areas, as each area is remediated.

2 BACKGROUND INFORMATION

2.1 Verification Report Structure

This document has been set out as follows:

- A brief background of the site, the findings of previous investigations and nature of the remediation planned.
- A description of the activities undertaken.
- Details of soil sampling undertaken to date.
- Concluding with an assessment of the suitability for use.

Appended to this document is supporting evidence as follows:

- Photographs taken during the verification of the suitability of the cover system material.
- Chemical analysis of the material used within the cover system (topsoil).

2.2 Site Setting, History and Investigation

Harrison Group Environmental Limited (HGE) provided ground investigation for Hopkins Homes (HH) under the direction of Coffey Geotechnics Limited (CG) as part of their interpretative report on contamination and geotechnical aspects of the former chalk quarry, which was completed to provide HH with information for their development prior to acquiring the site. Reference should be made to CG report (reference 02095AA_R_003A-InterpReport v6, dated 23rd May 2014). Part of CG recommendations were for ground improvement in parts of the site, where deep fill material was placed as part of quarrying activity, and for two zones to require ground gas protection measures.

HGE were contacted by HH in 2017 to assess the ground gas regime during and after earthworks, and to assess the exposure of made ground soils by their earthworks contractor (Breheny Civil Engineering) when they removed approximately 2m thickness of surcharge toward the conclusion of ground improvement. We were also asked to consider the suitability of topsoil and subsoil stockpiled by Breheny Civil Engineering (BCE) as part of earthworks for reuse within the development.

The HGE report on the ground gas regime (reference GN17820_SI_GGrev1, dated November 2017) should be referred to for the details. In summary, the concentrations of ground gases were not found to significantly differ during or after earthworks. The two zones requiring protection measures to CS2 in accordance with BS8485 were refined to specifically include plots 109-111, 116 and 121-126 in zone 1 and plots 1, 230, 234-239, 240-249, 251-256, 265 and 266 in zone 2. Drawing GN17820_DR104 (appended to the RMS document) identifies the two zones referred to and the plots affected.

HGE report on the suitability of identified soil for use within the residential development (GN17820_SI_Soilrev1, also dated November 2017) should be referred to for details. Based on the available ground investigation information the quarry backfill material was generally found to comprise reworked glacial drift and structureless chalk but was also noted to include some organic soils with low levels of PAH compounds in some soil samples analysed. It was considered likely that where the darker organic/ashy material was encountered it may potentially be unsuitable to remain where exposed in the near surface of domestic gardens. These areas approximately correspond to development phases 1B and 2, but may extend to areas within phase 3. It was recommended that where unsuitable material is exposed or is present within the near surface of domestic gardens and soft landscaping areas, that a suitable soil cover system is implemented. In order to determine the affected gardens and soft landscaping areas, it was proposed that HGE undertake shallow trial pit excavations.

A stockpile of topsoil (S02) was imported from Hopkins Homes' Bramford site during the summer of 2018. The topsoil was considered physically suitable for reuse in gardens with chemical analysis of this material confirming its chemical suitability. There was a minimal amount of anthropogenic content to the stockpiled topsoil, which was inert and does not present a significant risk to end users, but may be physically undesirable. It was recommended that this undesirable content is removed from topsoil planned for use in gardens and areas of public open space, where observed during moving and placing the topsoil.

A remediation method statement (RMS) for the site was compiled following completion of the site investigation works and submitted to the regulatory authorities in December 2017 (reference GN17820_RMS1). The method for ensuring soil suitability is detailed in sections 4, 5 and 6 of the RMS. Section 3 within the RMS document details the need for gas protection measures. HH have confirmed that gas protection measures are being installed where required and verification of these works is being undertaken by others.

The plots which require validation of the suitability of the soils in gardens and soft landscaping can be identified in drawing GN17820_DR402 (appended to this report), which highlights the development phasing plan (phases 1A, 1B, 2 and 3). Specifically, plots which require investigation before the suitability of the near-surface soils (and the need for a soil cover) can be confirmed includes plot numbers 1-136, 161-170, 184-193, 197-211, 218-266 and soft landscaping areas in these development phases.

3 SOIL REMEDIATION

As described above, the verification process was planned to comprise confirmation that there is sufficient thickness of suitable cover soil within the garden areas of plots 1-136, 161-170, 184-193, 197-211, 218-266 and soft landscaping areas in these development phases, as indicated on drawing GN17820_DR402 within the appendix. The work described in this report represents validation and verification of remediation comprising a suitable soil cover system (subsoil and topsoil) within areas of soft landscaping surrounding plots 109-111.

Engineers from HGE visited site on 07/02/24 to undertake hand dug trial pits within the soft landscaped areas surrounding plots 109-111 to confirm that suitable topsoil and subsoil was present in the gardens (HDTP110-01 to HDTP110-03). Specifically, plot 110 was targeted for investigation, however, the findings are considered representative of plots 109-111 inclusive.

During the visit, the following observations were made:

- Concrete edging was observed adjacent to footpaths and curb sides at approximately 45° angle.

The following sections of this report outline the remediation completed for plots 109-111.

3.1 Cover System Material

The material used for the cover system includes site won subsoil and topsoil.

The fieldwork locations are shown on drawings GN17820-DR502aq included within the appendix. Hand excavated trial pits were undertaken to record the thickness and physical descriptions of the materials present and to confirm material suitability.

3.1.1 Site Won Subsoil

The material was generally described as made ground consisting of the following.

- MADE GROUND. Light brown slightly sandy gravelly silt. Gravel is sub-angular to rounded fine to coarse chalk, flint and brick.

The materials encountered within plot 110 were considered suitable for use as subsoil from visual inspection. The dark material identified elsewhere on site that contained low levels of contaminants was not encountered in the soft landscaping surrounding plot 110 and is therefore not considered likely to be encountered within plots 109-111.

3.1.2 Site Won Topsoil

HGE were made aware that topsoil stockpile S02 had been used and that a new topsoil stockpile (TS1) had been created during onsite earthworks undertaken at the beginning of 2023. Testing was therefore required to confirm the suitability for site use. The stockpile of site won topsoil had been placed within the development area of plots 104-108. An HGE engineer visited site on 19th May 2023 to visually assess the stockpile and to collect representative soil samples for chemical analysis at an appropriately accredited laboratory (to confirm material suitability). On visual inspection the material was deemed physically suitable for use as a topsoil, as the soil appeared to be an appropriate consistency for use in garden areas. The material within TS1 was described as dark brown slightly gravelly silty fine to medium SAND. Gravel is sub-angular to sub-rounded fine to coarse flint with occasional chalk and rare brick. A total of five samples were submitted to a laboratory in May 2023 for testing of a general suite of contaminants and an asbestos screen. No asbestos was detected, and the levels of all other contaminants were below the site criteria. The results of the chemical analysis are appended to this report (test report ref.: 23-16989-1, dated 09th June 2023).

During the verification works, the material was generally described as dark brown silty fine to coarse SAND with occasional gravel of subangular to subrounded fine to coarse flint. This recent description is generally consistent with the previous description, allowing for some variability, and therefore has been confirmed as the same material. This material was used for the topsoil (ground level up to 300mm depth) within the soft landscaping areas surrounding plots 109-111. The minimum thickness of 150mm of topsoil was encountered in all of the trial pits during the verification exercise.

3.1.3 Soil Cover Thickness

A thickness of suitable soil was stated in the RMS to need to be at least 600mm. The dark material identified elsewhere on site that contained low levels of contaminants was not encountered within the upper 600mm in the soft landscaping surrounding plot 110 and is therefore not considered likely to be encountered within plots 87-89.

The thickness of suitable soil was recorded to be at least 600mm within the trial pits completed.

4 CONCLUSIONS

Harrison Group Environmental Limited considers that a suitable cover system of suitable thickness, comprising chemically and physically suitable material, has been implemented. We are satisfied that there

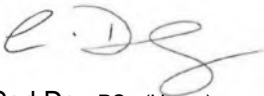
will be no significant risk to human health from residual contamination in the soft landscaping that surrounds plots 109-111 at the development known as Needham Market Quarry.

This report should be submitted to the regulators in order to conclude the remediation process.

Plots 3-89, 90-103, 112-119, 121-126, 161-170, 197-203 and 218-266 have previously been validated and are shown as green on appended drawing GN17820-DR502 which shows a summary of the validation completed to date. The requirement for remediation in other plots is currently being assessed and the remediation undertaken as appropriate. Further remediation verification reports are in production for additional affected plots/areas on the whole development, as each area is built and remediated. These include plots 1, 2, 104-108, 120, 127-136, 184-193 and 204-211.

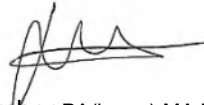
Public open space and soft landscaping areas within the development phases are yet to be verified.

Report by:



Carl Day BSc (Hons.)
Senior Geoenvironmental Engineer

Checked and approved by:

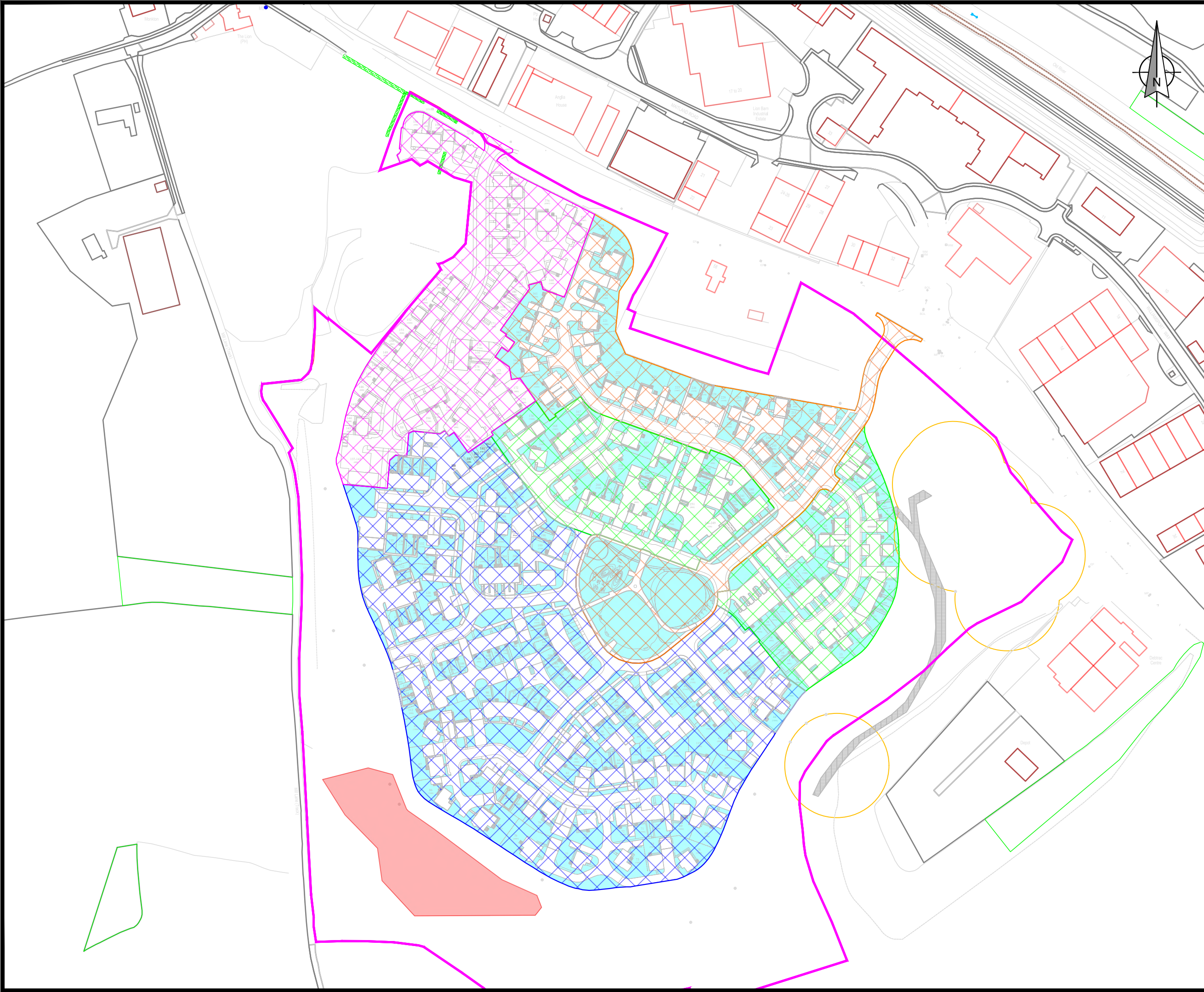









Jon Archer BA(hons.) MA FGS FRGS
Associate Director

APPENDICES – Supporting Documentation

Drawings:	GN17820-DR402 GN17820-DR502aq GN17820-DR502
Hand Dug Trial Pit Logs	HDTP110-01- HDTP110-03
Chemical Analysis Reports:	23-16989-1 (Eurofins Chemtest Report 2023)
Photo Sheet:	GN17820_RV41 Photo Sheet 1

PL-HI-D-101 Rev B N:\work\p\projects\jobs 17000s\jobs 17800\GN17820 Needham Market Quarry\Renovation\Drawings\CAD files\GN17820 - DR402.dwg



- Key :
-  Site Boundary
 -  Area of Phase 1A
 -  Area of Phase 1B
 -  Area of Phase 2
 -  Area of Phase 3
 -  Areas of Soft Landscaping
 -  Area of Potential Backfill

Notes :

HOPKINS HOMES

Client : Hopkins Homes Limited
 Project : Needham Market Quarry
 Job No : GN17820 Date : December 2017
 Drawing Title : Development Layout with Phases and Plots Requiring Suitable Soil Verifying
 Drawing No : GN17820 - DR402
 Scale : 1:2000 @ A3
 Drawn by : RW Checked by : JA
 Eastings : 009411 Northings : 254247

Revision history

Rev	Date	Revision Data

harrisongroup ENVIRONMENTAL

Norwich: 01603 613111 London: 020 7537 9233
 Cambridge: 01223 781585 Laboratory: 01603 416333
 Email: info@harrisongroupuk.com
 Website: www.harrisongroupuk.com


 ISOQAR
 REGISTERED


 UKAS
 MANAGEMENT SYSTEMS
 0026


 UKAS
 TESTING
 4031

Certificate Number 5933
 ISO 9001, ISO 14001

Reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office © Crown Copyright Harrison Group Environmental Ltd., Kimberley Street, Norwich, NR2 3RU; AL100021199

THIS DRAWING IS THE PROPERTY OF HARRISON GROUP LIMITED AND NO REPRODUCTION MAY BE MADE IN WHOLE OR IN PART WITHOUT PERMISSION

PL-11-0-101 Rev B N:\work\Projects\Jobs 17000\Jobs 17820\GN17820 Needham Market Quarry Remediation Drawings\CAD files\GN17820 - DR502.dwg



Key :

- HDTP90-01 Hand Dug Trial Pit
- Acceptable Cover System

Notes :

harrisongroup ENVIRONMENTAL

Client : Hopkins Homes Ltd
 Project : Needham Market Quarry
 Job No : GN17820 Date : February 2024
 Drawing Title : Fieldwork Location Plan - Plot 109-111
 Drawing No : GN17820 - DR502aq
 Scale : 1:400 @ A3
 Drawn by : RW Checked by : CD
 Eastings : 609375 Northings : 254040

Revision history

Rev	Date	Revision Data

harrisongroup ENVIRONMENTAL

Norwich: 01603 613111 London: 020 7537 9233
 Cambridge: 01223 781585 Laboratory: 01603 416333
 Email: info@harrisongroupuk.com
 Website: www.harrisongroupuk.com

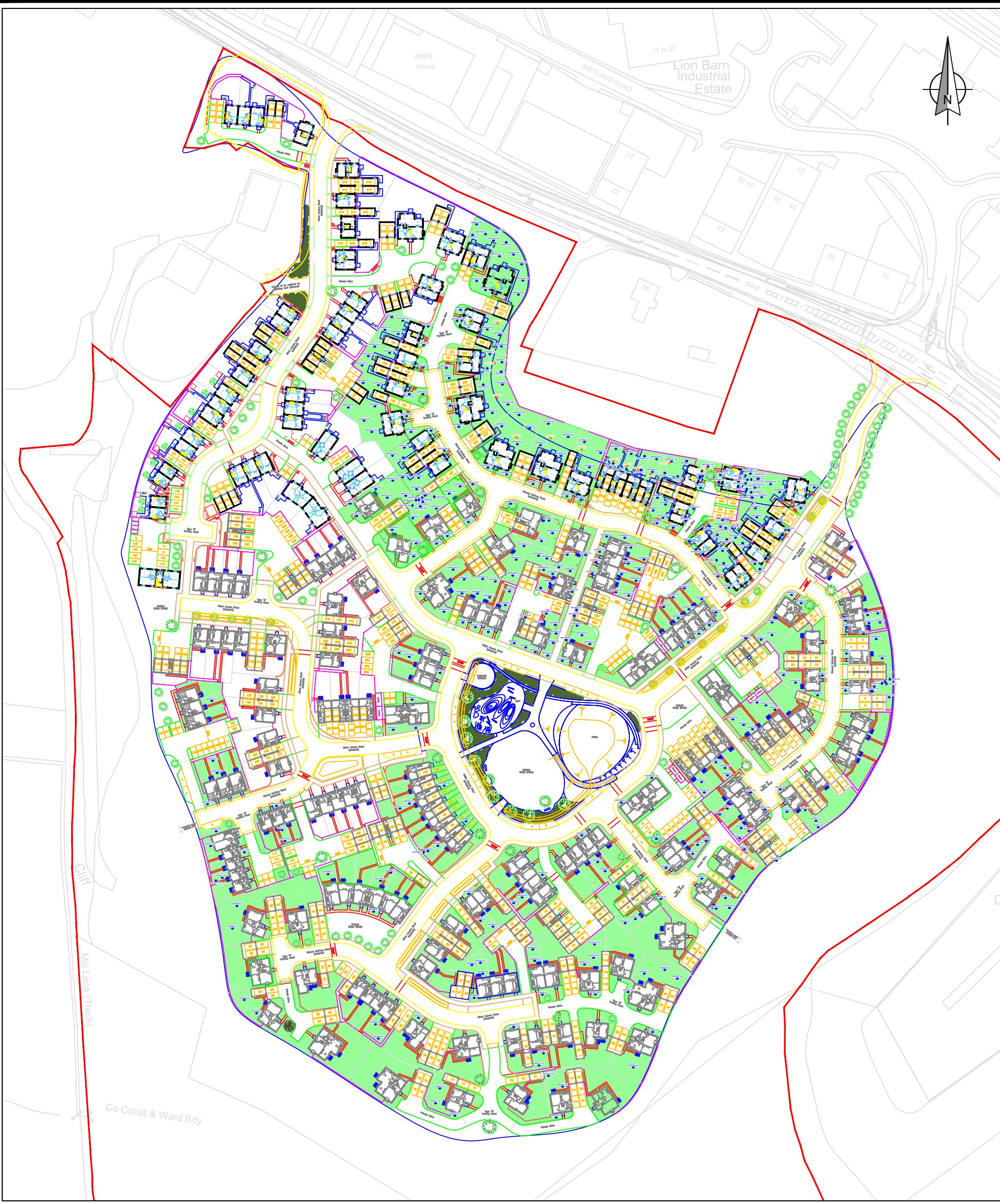
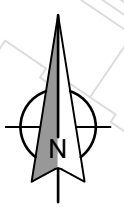
ISOQAR REGISTERED
UKAS MANAGEMENT SYSTEMS 0026
UKAS TESTING 4031

Certificate Number 5933
 ISO 9001, ISO 14001

Reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office © Crown Copyright Harrison Group Environmental Ltd., Kimberley Street, Norwich, NR2 2RU. All 0021199

THIS DRAWING IS THE PROPERTY OF HARRISON GROUP LIMITED AND NO REPRODUCTION MAY BE MADE IN WHOLE OR IN PART WITHOUT PERMISSION

PA-hh-D-103 Rev B N:\NewProjects\Jobs 17000\Jobs 17800\GN17820 Needham Market Quarry Remediation\Drawings\CAD Files\GN17820 - DR502.dwg



Client : Hopkins Homes Ltd		
Project : Needham Market Quarry		
Job No : GN17820	Date : January 2023	
Drawing Title : Fieldwork Location Plan		
Drawing No : GN17820 - DR502		
Scale : 1:1500 @ A3		
Drawn by : RW	Checked by : MR	
Eastings : 609480	Northings : 254090	
Revision history		
Rev	Date	Revision Data
R40	07/02/2024	Fieldwork locations for Plots 109-111 added

Key :

- Site Boundary
- HDTP220-01 Hand Dug Trial Pit
- TP220-01 Machine Excavated Trial Pit
- Acceptable Cover System

Notes :

Norwich: 01603 613111 London: 020 7537 9233
 Cambridge: 01223 781585 Laboratory: 01603 416333

Email: info@harrisingroupuk.com
 Website: www.harrisingroupuk.com

ISOQAR
REGISTERED

UKAS
MANAGEMENT
SYSTEMS
0026

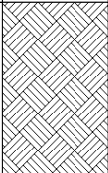

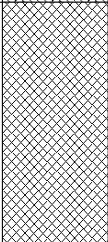


UKAS
TESTING
4031

Certificate Number 5933
ISO 9001, ISO 14001


Reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office © Crown Copyright Harrison Group Environmental Ltd., Kimberley Street, Norwich, NR2 2R. All00021399

THIS DRAWING IS THE PROPERTY OF HARRISON GROUP LIMITED AND NO REPRODUCTION MAY BE MADE IN WHOLE OR IN PART WITHOUT PERMISSION

Project ID: GN17820	Client: Hopkins Homes Limited	E: 609377.59	N: 254038.51
Location: Needham Market Quarry	Consultant:		
	Plant used: Hand Excavated	Date: 07/02/2024	

Geology Description	Legend	Depth	Elevation (maOD)	Sample / In-Situ Test Information			Installation & Backfill
				Type	Depth	Results / Remarks	
TOPSOIL. Dark brown silty fine to coarse SAND with occasional gravel of sub-angular to sub-rounded medium to coarse flint.							
MADE GROUND. Light brown slightly sandy gravelly SILT. Gravel is sub-angular to rounded fine to coarse chalk and flint with occasional brick.		0.25					
Trial pit terminated at 0.60m.		0.60					


Weather: Cloudy and dry	Water Strike				
Pit Stability: Stable	Date	Water Strike (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
Shoring Used:	07-02-2024	0.50			Slight seepage

Pit Dimensions: L: 0.30m x W: 0.30m	Remarks				
Norwich Office: 01603 613111 London Office: 020 7537 9233 Cambridge Office: 01223 781585 Colchester Office: 01206 986675 Testing Services: 01603 416333 E-mail: info@harrisingroupuk.com Website: www.harrisingroupuk.com	 1. Backfill: GL to 0.60m arisings. 2. Approximate coordinates.				
	Logged by: JB	Checked by: CD	Fm-Hn-R-3069-Rev E		

Project ID: GN17820	Client: Hopkins Homes Limited	E: 609378.78	N: 254033.85
Location: Needham Market Quarry	Consultant:		
	Plant used: Hand Excavated	Date: 07/02/2024	

Geology Description	Legend	Depth	Elevation (maOD)	Sample / In-Situ Test Information			Installation & Backfill
				Type	Depth	Results / Remarks	
TOPSOIL. Dark brown silty fine to coarse SAND with occasional gravel of sub-angular to sub-rounded medium to coarse flint.							
MADE GROUND. Light brown slightly sandy gravelly SILT. Gravel is sub-angular to rounded fine to coarse chalk and flint, brick and tarmac.		0.25					
Trial pit terminated at 0.60m.		0.60					


Weather: Cloudy and dry	Water Strike				
Pit Stability: Stable	Date	Water Strike (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
Shoring Used:					No groundwater encountered

Pit Dimensions: L: 0.30m x W: 0.30m Norwich Office: 01603 613111 London Office: 020 7537 9233 Cambridge Office: 01223 781585 Colchester Office: 01206 986675 Testing Services: 01603 416333 E-mail: info@harrisingroupuk.com Website: www.harrisingroupuk.com		Remarks 1. Backfill: GL to 0.60m arisings. 2. Approximate coordinates.
Logged by: JB		Checked by: CD
		Fm-Hn-R-3069-Rev E

Project ID: GN17820	Client: Hopkins Homes Limited	E: 609375.20 N: 254048.74
Location: Needham Market Quarry	Consultant:	
	Plant used: Hand Excavated	Date: 07/02/2024

Geology Description	Legend	Depth	Elevation (maOD)	Sample / In-Situ Test Information			Installation & Backfill
				Type	Depth	Results / Remarks	
TOPSOIL. Dark brown silty fine to coarse SAND with occasional gravel of sub-angular to sub-rounded medium to coarse flint and chalk.		0.30					
MADE GROUND. Light brown slightly sandy gravelly SILT. Gravel is sub-angular to rounded fine to coarse chalk and flint and brick.		0.60					
Trial pit terminated at 0.60m.							

Weather: Cloudy and dry	Water Strike				
Pit Stability: Stable	Date	Water Strike (m)	Time Elapsed (mins)	Standing Level (m)	Remarks
Shoring Used:					No groundwater encountered

Pit Dimensions: L: 0.30m x W: 0.30m		Remarks 1. Backfill: GL to 0.60m arisings. 2. Approximate coordinates.
Norwich Office: 01603 613111 London Office: 020 7537 9233 Cambridge Office: 01223 781585 Colchester Office: 01206 986675 Testing Services: 01603 416333 E-mail: info@harrisingroupuk.com Website: www.harrisingroupuk.com		Logged by: JB Checked by: CD Fm-Hn-R-3069-Rev E



Final Report

Report No.: 23-16989-1

Initial Date of Issue: 09-Jun-2023

Re-Issue Details:

Client Harrison Group Environmental Ltd

Client Address: Kimberley Street
Norwich
Norfolk
NR2 2RJ

Contact(s): Carl Day

Project GN17820 Needham Market Quarry

Quotation No.: Q22-29662

Date Received: 23-May-2023

Order No.: GN17820/40965/CD

Date Instructed: 23-May-2023

No. of Samples: 7

Turnaround (Wkdays): 7

Results Due: 01-Jun-2023

Date Approved: 09-Jun-2023

Subcon Results Due: 14-Jun-2023

Approved By:

Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: GN17820 Needham Market Quarry

Client: Harrison Group Environmental Ltd		Chemtest Job No.:		23-16989	23-16989	23-16989	23-16989	23-16989	23-16989	23-16989	23-16989
Quotation No.: Q22-29662		Chemtest Sample ID.:		1643562	1643563	1643564	1643565	1643566	1643567	1643568	
Order No.: GN17820/40965/CD		Client Sample Ref.:		1	2	3	4	5	1	1	
		Sample Location:		TS1	TS1	TS1	TS1	TS1	80-01	TS1	
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
		Top Depth (m):		0.00	0.00	0.00	0.00	0.00	0.15	0.00	
		Bottom Depth (m):		0.50	0.50	0.50	0.50	0.50	0.50	0.50	
		Date Sampled:		19-May-2023	19-May-2023	19-May-2023	19-May-2023	19-May-2023	19-May-2023	19-May-2023	
		Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY			
Determinand	Accred.	SOP	Units	LOD							
ACM Type	U	2192		N/A	-	-	-	-	-		
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		
Moisture	N	2030	%	0.020	9.1	9.9	11	8.8	11	12	11
pH	U	2010		4.0	8.9	8.7	8.7	11.7	9.0		
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.87	0.87	0.81	26	0.88		
Arsenic	U	2455	mg/kg	0.5	10	10	10	4.7	7.9		
Beryllium	U	2455	mg/kg	0.5	0.5	0.5	0.6	< 0.5	< 0.5		
Cadmium	U	2455	mg/kg	0.10	0.16	0.16	0.16	< 0.10	0.13		
Chromium	U	2455	mg/kg	0.5	10	11	11	12	8.1		
Copper	U	2455	mg/kg	0.50	9.7	10	11	5.2	8.2		
Mercury	U	2455	mg/kg	0.05	< 0.05	< 0.05	0.05	< 0.05	< 0.05		
Nickel	U	2455	mg/kg	0.50	10	11	11	8.2	9.1		
Lead	U	2455	mg/kg	0.50	19	20	20	5.2	15		
Selenium	U	2455	mg/kg	0.25	0.36	0.34	0.39	< 0.25	0.28		
Vanadium	U	2455	mg/kg	0.5	20	21	23	17	16		
Zinc	U	2455	mg/kg	0.50	42	44	47	16	33		
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25		
Aliphatic EPH >C10-C12	U	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	3.6	< 2.0		
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Aliphatic EPH >C12-C16	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
Aliphatic EPH >C16-C21	U	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0		
Aliphatic EPH >C21-C35	U	2690	mg/kg	3.00	4.4	< 3.0	4.2	8.5	3.9		
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00	< 10	< 10	< 10	14	< 10		
Total Aliphatic EPH >C10-C35	U	2690	mg/kg	5.00	< 5.0	< 5.0	< 5.0	13	< 5.0		
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25		
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00	11	11	11	18	12		

Results - Soil

Project: GN17820 Needham Market Quarry

Client: Harrison Group Environmental Ltd		Chemtest Job No.:		23-16989	23-16989	23-16989	23-16989	23-16989	23-16989	23-16989
Quotation No.: Q22-29662		Chemtest Sample ID.:		1643562	1643563	1643564	1643565	1643566	1643567	1643568
Order No.: GN17820/40965/CD		Client Sample Ref.:		1	2	3	4	5	1	1
		Sample Location:		TS1	TS1	TS1	TS1	TS1	80-01	TS1
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.00	0.00	0.00	0.00	0.00	0.15	0.00
		Bottom Depth (m):		0.50	0.50	0.50	0.50	0.50	0.50	0.50
		Date Sampled:		19-May-2023	19-May-2023	19-May-2023	19-May-2023	19-May-2023	19-May-2023	19-May-2023
		Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY		
Determinand	Accred.	SOP	Units	LOD						
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00	2.1	< 2.0	< 2.0	< 2.0	< 2.0	
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00	< 1.0	< 1.0	1.3	2.0	< 1.0	
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00	13	12	13	18	14	
Total VPH >C5-C10	U	2780	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Total EPH >C10-C35	U	2690	mg/kg	10.00	17	17	17	30	19	
Total Organic Carbon	U	2625	%	0.20	0.41	0.71	0.58	0.49	0.74	
Naphthalene	U	2700	mg/kg	0.10					< 0.10	
Acenaphthylene	U	2700	mg/kg	0.10					< 0.10	
Acenaphthene	U	2700	mg/kg	0.10					< 0.10	
Fluorene	U	2700	mg/kg	0.10					< 0.10	
Phenanthrene	U	2700	mg/kg	0.10					0.56	
Anthracene	U	2700	mg/kg	0.10					0.13	
Fluoranthene	U	2700	mg/kg	0.10					1.2	
Pyrene	U	2700	mg/kg	0.10					1.2	
Benzo[a]anthracene	U	2700	mg/kg	0.10					0.59	
Chrysene	U	2700	mg/kg	0.10					0.55	
Benzo[b]fluoranthene	U	2700	mg/kg	0.10					< 0.10	
Benzo[k]fluoranthene	U	2700	mg/kg	0.10					< 0.10	
Benzo[a]pyrene	U	2700	mg/kg	0.10					< 0.10	
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10					< 0.10	
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10					< 0.10	
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10					< 0.10	
Total Of 16 PAH's	U	2700	mg/kg	2.0					4.2	
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Naphthalene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	

Results - Soil

Project: GN17820 Needham Market Quarry

Client: Harrison Group Environmental Ltd		Chemtest Job No.:		23-16989	23-16989	23-16989	23-16989	23-16989	23-16989	23-16989
Quotation No.: Q22-29662		Chemtest Sample ID.:		1643562	1643563	1643564	1643565	1643566	1643567	1643568
Order No.: GN17820/40965/CD		Client Sample Ref.:		1	2	3	4	5	1	1
		Sample Location:		TS1	TS1	TS1	TS1	TS1	80-01	TS1
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.00	0.00	0.00	0.00	0.00	0.15	0.00
		Bottom Depth (m):		0.50	0.50	0.50	0.50	0.50	0.50	0.50
		Date Sampled:		19-May-2023	19-May-2023	19-May-2023	19-May-2023	19-May-2023	19-May-2023	19-May-2023
		Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY		
Determinand	Accred.	SOP	Units	LOD						
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Chrysene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	

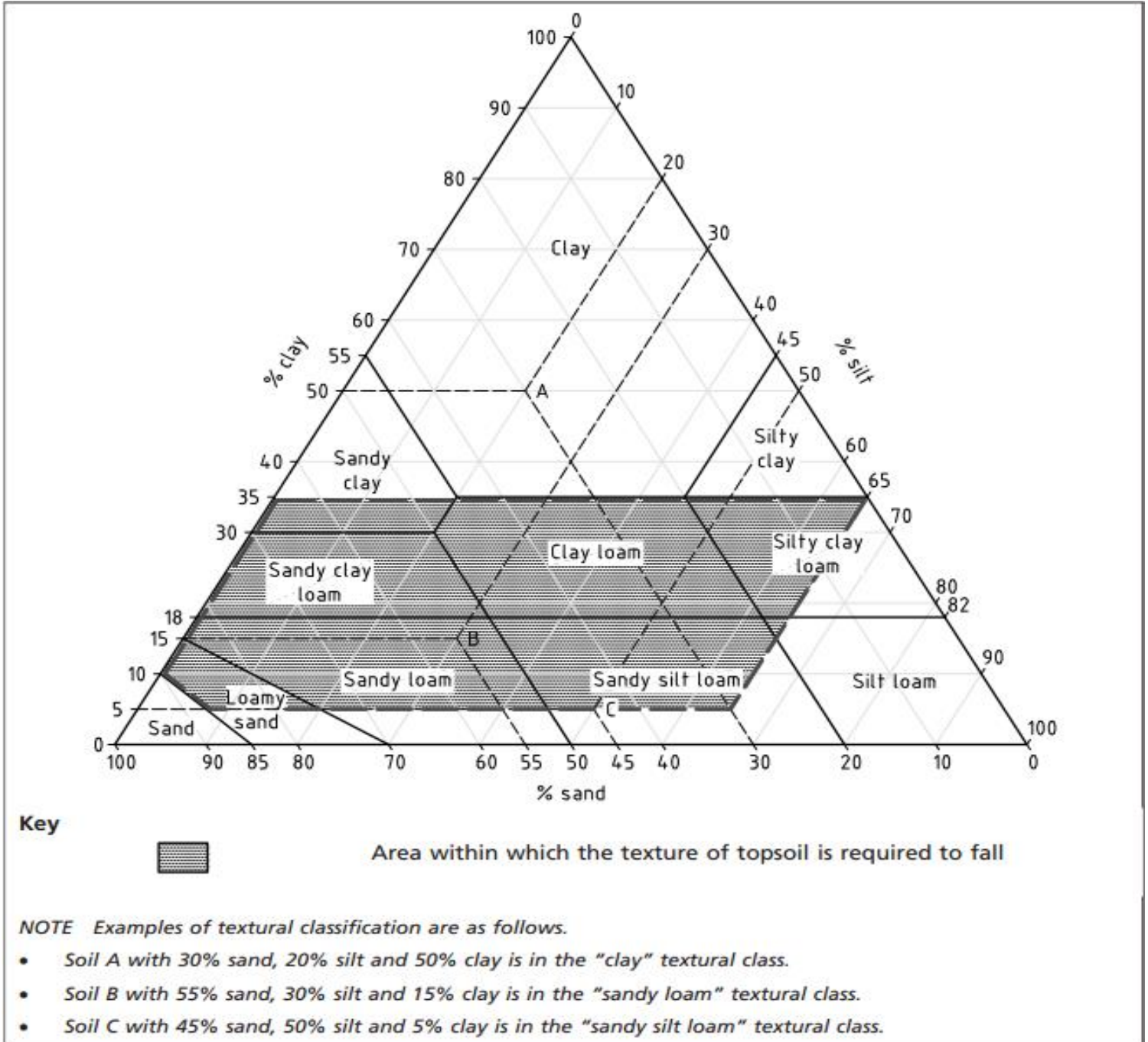
Results - Topsoil Report

BS3882:2015

Chemtest Job No.: 23-16989
Chemtest Sample ID.: 1643568
 Client Sample Ref.: 1
 Sample Location: TS1
Client Sample ID.:
 Top Depth (m): 0.00
 Bottom Depth (m): 0.50
 Date Sampled: 19-May-2023
 Time Sampled:

Parameter	Units	Multipurpose Range	Result	Compliant with Multipurpose Range? (Y/N)	Compliant with Specific Purpose Range? (Y/N)		
					Acid	Low F	Calc.
Texture							
Clay content (Sub Contracted)	%		4.0				
Silt content (Sub Contracted)	%		13				
Sand content (Sub Contracted)	%		83				
Soil texture class		See Attached Chart	Loamy Sand	NO			
Mass Loss on Ignition							
Clay 5-20%		3.0-20	0.95	NO	NO	NO	NO
Clay 20-35%		5.0-20					
Stone Content	% m/m						
>2mm (Sub Contracted)		0-30	8.9	YES			
>20mm (Sub Contracted)		0-10	3.7	YES			
>50mm (Sub Contracted)		0	< 0.10	YES			
Soil pH value		5.5-8.5	8.9	NO	NO	YES	YES
Carbonate (Calcareous only)	%		< 0.10				NO
Electrical Conductivity	µS/cm	If >3300 do ESP	1800	YES			
Available Nutrient Content							
Nitrogen %		>0.15	0.030	NO	NO		NO
Extractable phosphorus	mg/l	16-140	4.7	NO	NO	YES	NO
Extractable potassium	mg/l	121-1500	170	YES	YES		YES
Extractable magnesium	mg/l	51-600	93	YES	YES		YES
Carbon : Nitrogen Ratio		<20:1	18.7/1	YES	YES	YES	YES
Exchangeable sodium	%	<15	4.0				
Available Calcium	mg/l		520				
Available Sodium	mg/l		130				
Phytotoxic Contaminants (by soil pH)		< 6.0	6.0-7.0	> 7.0			
Zinc (Nitric Acid extract)	mg/kg	<200	<200	<300	90	YES	
Copper (Nitric Acid extract)	mg/kg	<100	<135	<200	23	YES	
Nickel (Nitric Acid extract)	mg/kg	<60	<75	<110	23	YES	
Visible Contaminants	% mm						
>2mm		<0.5	0.000	YES			
..... of which plastics		<0.25	0.000	YES			
..... man-made sharps		zero in 1kg	0.000	YES			

Texture Classification Chart



Permission to reproduce extracts from BS 3882:2015 is granted by BSI.

British Standards can be obtained in PDF or hard copy formats from the BSI online shop: www.bsigroup.com/Shop or by contacting BSI Customer Services for hardcopies only: Tel: +44 (0)20 8996 9001, Email: cservices@bsigroup.com.

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2020	Electrical Conductivity	Electrical conductivity (EC) of aqueous extract or calcium sulphate solution for topsoil	Measurement of the electrical resistance of a 2:1 water/soil extract.
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2115	Total Nitrogen in Soils	Nitrogen	Determination by elemental analyser
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2260	Carbonate	Carbonate	Titration
2400	Cations	Cations	ICP-MS
2420	Phosphate	Phosphate	Spectrophotometry - Discrete analyser
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'AquaKem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2620	LOI 440	LOI 440 Trommel Fines	Determination of the proportion by mass that is lost from a soil by ignition at 440°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2690	EPH A/A Split	Aliphatics: >C10-C12, >C12-C16, >C16-C21, >C21- C35, >C35- C40 Aromatics: >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C40	Acetone/Heptane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2780	VPH A/A Split	Aliphatics: >C5-C6, >C6-C7,>C7-C8,>C8-C10 Aromatics: >C5-C7,>C7-C8,>C8-C10	Water extraction / Headspace GCxGC FID detection

Test Methods

SOP	Title	Parameters included	Method summary
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

GN17820 – Needham Market Quarry
Verification Report 41 - Photo Sheet 1



Photograph 1, taken on the 19th May 2023 showing stockpile TS1 within the future plots of 104-108. Photograph taken looking towards the East.



Photographs 2-4, taken on the 07th February 2024 showing verification hand dug trial pits in rear garden of plot 110. Photographs taken looking towards the South.



Photographs 5-7, taken on the 07th February 2024 showing verification hand dug trial pit in front garden of plot 110 (HDTP110-03). Photographs taken looking towards the South.



Norwich (Registered Office)

Kimberley Street
Norwich
Norfolk
NR2 2RJ

Tel: 01603 613111

London

12 Waterways Business Centre
Navigation Drive
South Ordnance Road
Enfield, EN3 6JJ

Tel: 020 7537 9233

Cambridge

Future Business Centre
Kings Hedges Road
Cambridge
CB4 2HY

Tel: 01223 781585

Colchester

Colchester Business Centre
1 George Williams Way
Colchester
CO1 2JS

Tel: 01206 986675