john newton & partners
jnpgroup
Consulting Engineers

DOCUMENT CONTROL SHEET

Project Name: Mill Moor Road

Project Number: B21957

Client: Vogue Homes

Report Title: Verification Report

Reference: B21957 Verification

Prepared by…… ……
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Principal Geo-Environmental Engineer

Approved by……
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FOR AND ON BEHALF OF JNP GROUP

Date: January 2020

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-	28.01.2019	First Issue	CDW	HI	HI

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LIST OF APPENDICES

1 INTRODUCTION

1.1.1 jnpgroup was instructed by Vogue Homes to validate the remediation work undertaken at Mill Moor Road, Meltham to demonstrate compliance with the agreed jnpgroup Options Appraisal Remediation Statement (B21957 OARS and Addendum, February 2019). This report covers work undertaken in the rear garden areas of Plot 5 and Plot 6 following the development of residential properties.

1.1.2 The proposed validation work (as recommended by jnpgroup) in this area is detailed as follows:

- Verify the topsoil within the rear garden is 600 mm thick, topsoil has been taken from site-won material previously tested to be proven to be suitable, with the exception of stockpiles 7 & 9 that were not used and are awaiting disposal at the time of writing this report;

1.1.3 This report is subject to the limitations presented in Appendix A.

1.1.4 This report has been compiled in accordance with the on-line Land contamination: risk management (LCRM) guidance produced by the Environment Agency (June 2019). This can be found on the UK government website: https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks.

1.1.5 In addition, this report has been compiled in accordance with the guidance given in the Environment Agency Report – Verification of Remediation of Land Contamination (EA 2010).

1.1.6 This report should be read in conjunction with the following reports:

- jnpgroup Phase II Ground Investigation Report B21957 R002, August 2018;
- jnpgroup Options Appraisal Remediation Statement B21957 R003 Plus addendum, February 2019.

1.2 Parties Involved

- jnpgroup provided advice and attended site to undertake the inspection of the soil including with soil sampling and verification of the thickness;
- Chemical testing was undertaken by i2 Analytical Ltd in Watford, which is a UKAS and MCerts qualified laboratory.

2 VALIDATION WORKS UNDERTAKEN

2.1 Introduction

2.1.1 jnpgroup attended site on 11 December 2019 to validate the work undertaken.

2.1.2 Photographs were taken during the visits, a selection of which is included in Appendix B.

2.2 Validation Works

2.2.1 A representative from jnpgroup visited the site and oversaw the excavation of hand dug pits (two in each rear garden) to verify that the thickness of topsoil within the gardens of Plot 5 and 6 was at least 600 mm thick.

2.2.2 The site-won topsoil has been proven to be suitable via additional testing (described within the OARS Addendum). The results (included within Appendix C) identify exceedances of 37 mg/kg of arsenic that is considered unsuitable for residential use in two sampled stockpiles (7 & 9) and these are awaiting removal off-site.

3 FINAL SITE CONDITIONS

3.1.1 Based on the validation work undertaken at the site by jnpgroup during the site visits, jnpgroup consider that:

- The topsoil placed in the rear garden areas are free from contamination;
- The topsoil layers in the rear garden areas are at least 600 mm thick.

3.1.2 The remediation work undertaken at Plots 5 and 6 has been validated by jnpgroup and meets with the requirements of Options Appraisal and Remediation Strategy Report (B21957 RE003), and hence, is considered suitable for use.

3.1.3 It is recommended that a copy of this report is to be submitted to the relevant Regulatory Authorities for their approval.

4 REFERENCES

1. DEFRA. 2014. SP1010 - Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document. DEFRA. London.

2. – Reporting checklists. GPLC3. Bristol.

3. Land Quality Management & Chartered Institute of Environmental Health (2015) The LQM/CIEH S4UL for Human Health Risk Assessment - LQM CIEH. Land Quality Press, Nottingham.

4. Environment Agency. 2010. Verification of Remediation of Land Contamination. Report SC030114/R1. Bristol.

5. Environment Agency. 2019. Land Contamination: Risk Management. UK Government Website - https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks.

6.

Appendix A

Limitations

1 INTRODUCTION

1.1.1 This report is confidential and has been prepared solely for the benefit of the client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from jnpgroup; a charge may be levied against such approval. jnpgroup accepts no responsibility or liability for the consequences of this document being used for any purpose or project other than for which it was commissioned, and: this document to any third party with whom and agreement has not been executed.

1.1.2 Any comments given within this report are based on the understanding that the proposed works to be undertaken will be as described in the introduction and the information referred to and provided by others and will be assumed to be correct and will not have been checked by jnpgroup and jnpgroup will not accept any liability or responsibility for any inaccuracy in such information.

1.1.3 Any deviation from the recommendations or conclusions contained in this report should be referred to jnpgroup in writing for comment and jnpgroup reserve the right to reconsider their recommendations and conclusions contained within. jnpgroup will not accept any liability or responsibility for any changes or deviations from the recommendations noted in this report without prior consultation and our full approval.

1.1.4 The details contained within this report reflect the site conditions prevailing at the time of investigation. jnpgroup warrants the accuracy of this report up to and including that date. Additional information, improved practice or changes in legislation may necessitate this report having to be reviewed in whole or in part after that date. If necessary, this report should be referred back to jnpgroup for re-assessment and, if necessary, re-appraisal.

1.1.5 This report is only valid when used in its entirety. Any information or advice included in the report should not be relied upon until considered in the context of the whole report. Whilst this report and the opinion made herein are correct to the best of jnpgroups' belief, jnpgroup cannot guarantee the accuracy or completeness of any information provided by third parties.

1.1.6 The report represents the finding and opinions of experience geotechnical and geoenvironmental engineers. jnpgroup does not provide legal advice and the advice of lawyers may also be required.

1.1.7 It should be noted that the following were not included as part of the agreed scope of works with the client: detailed ecological surveys and assessment; groundwater monitoring and sampling; geotechnical requirements etc.

1.1.8 jnpgroup has provided advice and made recommendations based on the findings of the work undertaken, however this is subject to the approval / acceptance by the relevant regulatory authorities.

1.2 Objectives

1.2.1 The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the site. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, jnpgroup reserves the right to review such information and, if warranted, to modify the opinions accordingly. It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

1.3 Phase II Intrusive Investigations

1.3.1 The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made.

1.3.2 Where intrusive investigations have been undertaken they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature sampling, no investigation technique is capable of identifying all conditions present in all areas. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered. The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

1.3.3 The objectives of the investigation have been linked to establishing the risks associated with potential human targets, building materials, the environment (including adjacent land), and to surface and ground water. The amount of exploratory work and chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to areas unoccupied by the building(s) on the site and by buried services.

1.3.4 Gas and groundwater levels may vary from those reported due to seasonal, or other effects.

1.4 Gas Membranes

1.4.1 Where jnpgroup are commissioned to undertake the inspection and validation of a gas membrane, we, at the time of inspection, will ensure that the membrane is laid in accordance with the relevant arrangements and sections. At that time, we will ensure that the venting media is laid correctly in preparation of the membrane and we will ensure that any tears in the membrane or bad workmanship is reported and instructions given to be rectified. Thereafter it is the duty of the Principal Contractor to ensure that tears and defects are rectified.

1.5 Remediation and Verification Reports Limitations

1.5.1 The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

1.5.2 Where intrusive investigations have been undertaken they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature sampling, no investigation technique is capable of identifying all conditions present in all areas. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered.

1.5.3 If costs have been included in relation to the site remediation these must be confirmed by a qualified quantity surveyor. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed from Third Party should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, jnpgroup reserves the right to review such information and, if warranted, to modify the opinions accordingly.

1.5.4 Whilst this report and the opinion made herein are correct to the best of jnpgroups' belief, jnpgroup cannot guarantee the accuracy or completeness of any information provided by third parties.

1.5.5 Gas and groundwater levels may vary from those reported due to seasonal, or other effects.

Appendix B

Site Photographs

Plot 05 Pit 1

Plot 05 Pit 2

Appendix C

Stockpile Testing Results

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Woodvale House
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HD6 4AB

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7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
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e: reception@i2analytical.com

Analytical Report Number : 19-36899

Project / Site name:	Mill Moor Road, Meltham	**Samples received on:**	08/04/2019
Your job number:	B21957	**Samples instructed on:**	10/04/2019
Your order number:		**Analysis completed by:**	17/04/2019
Report Issue Number:	1	**Report issued on:**	17/04/2019
Samples Analysed:	18 soil samples		

Signed:

Dr Claire Stone
Quality 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

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Analytical Report Number: 19-36899

Project / Site name: Mill Moor Road, Meltham

Lab Sample Number				1197942	1197943	1197944	1197945	1197946
Sample Reference				1	2	3	4	5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
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	20	12	27	11	14
Total mass of sample received	kg	0.001	NONE	0.15	0.15	0.17	0.17	0.15
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	31	23	31	26	30

Analytical Report Number: 19-36899

Project / Site name: Mill Moor Road, Meltham

Lab Sample Number				1197947	1197948	1197949	1197950	1197951
Sample Reference				6	7	8	9	10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
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	23	19	12	17	25
Total mass of sample received	kg	0.001	NONE	0.16	0.16	0.15	0.16	0.17
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	29	41	28	43	23

Analytical Report Number: 19-36899

Project / Site name: Mill Moor Road, Meltham

Lab Sample Number				1197952	1197953	1197954	1197955	1197956
Sample Reference				11	12	13	14	15
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
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	27	26	11	22	27
Total mass of sample received	kg	0.001	NONE	0.17	0.18	0.15	0.17	0.17
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	22	25	27	27	21

Analytical Report Number: 19-36899

Project / Site name: Mill Moor Road, Meltham

Lab Sample Number				1197957	1197958	1197959		
Sample Reference				16	A	B		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				05/04/2019	05/04/2019	05/04/2019		
Time Taken				None Supplied	None Supplied	None Supplied		
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	17	24	25		
Total mass of sample received	kg	0.001	NONE	0.16	0.17	0.17		
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	22	27	29		

Analytical Report Number : 19-36899

Project / Site name: Mill Moor Road, Meltham

* 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 *
1197942	1	None Supplied	None Supplied	Brown loam with vegetation.
1197943	2	None Supplied	None Supplied	Brown loam with vegetation.
1197944	3	None Supplied	None Supplied	Brown loam and clay with vegetation.
1197945	4	None Supplied	None Supplied	Brown loam with vegetation.
1197946	5	None Supplied	None Supplied	Brown loam with vegetation.
1197947	6	None Supplied	None Supplied	Brown loam with vegetation.
1197948	7	None Supplied	None Supplied	Brown loam with vegetation.
1197949	8	None Supplied	None Supplied	Brown loam and sand with vegetation and gravel.
1197950	9	None Supplied	None Supplied	Brown loam and sand with vegetation and gravel.
1197951	10	None Supplied	None Supplied	Brown loam and clay with vegetation and gravel
1197952	11	None Supplied	None Supplied	Brown loam and clay with vegetation and gravel
1197953	12	None Supplied	None Supplied	Brown loam and clay with vegetation and gravel
1197954	13	None Supplied	None Supplied	Brown sandy loam with vegetation and gravel
1197955	14	None Supplied	None Supplied	Brown loam and sand with vegetation and gravel.
1197956	15	None Supplied	None Supplied	Brown loam and clay with vegetation and gravel
1197957	16	None Supplied	None Supplied	Brown loam and sand with vegetation and gravel.
1197958	A	None Supplied	None Supplied	Brown sandy clay with vegetation.
1197959	B	None Supplied	None Supplied	Brown loam and sand with vegetation and gravel.

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

Analytical Report Number : 19-36899

Project / Site name: Mill Moor Road, Meltham

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	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

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.