

**AN ADDENDUM REPORT TO ADDRESS CONDITION 4 OF OUTLINE PLANNING PERMISSION,
REFERENCED H17-0798-15, FOR A RESIDENTIAL DEVELOPMENT AT:**

LAND ADJACENT TO 72 STATION ROAD, SURFLEET



CLIENT:	Mr J W & Mrs G M Needham
AGENT:	Cooper Architectural Design Limited
REFERENCE:	DJM/17.041/Phasell/Add
DATE:	17 July 2017

A F Howland Associates Limited
The Old Exchange
Newmarket Road
Cringleford
Norwich
NR4 6UF

Tel: 01603 250754
Email: admin@howland.co.uk
Website: www.howland.co.uk



A F Howland Associates

CONTENTS

1.	INTRODUCTION	1
2.	TERMS OF REFERENCE	2
3.	REVIEW OF PERTINENT BACKGROUND INFORMATION	3
3.1	HISTORICAL INFORMATION	3
3.2	SITE GEOLOGY AND GROUNDWATER	3
4.	QUANTITATIVE RISK ASSESSMENT	5
4.1	GENERAL	5
4.2	REVIEW OF LABORATORY TESTING	5
4.3	HUMAN HEALTH RISK ASSESSMENT	6
4.4	CONCEPTUAL MODEL	8
5.	RISK MANAGEMENT AND MITIGATION MEASURES	10
5.1	INTRODUCTION	10
5.2	CHEMICAL CONTAMINATION – HUMAN END-USERS	10
5.3	CHEMICAL CONTAMINATION – CONSTRUCTION WORKERS	10
5.4	CHEMICAL CONTAMINATION – WATER SUPPLY PIPES	11
6.	SUMMARY	12

APPENDICES

APPENDIX A: REFERENCES

APPENDIX B: EXPLORATORY HOLE RECORDS

APPENDIX C: LABORATORY TESTING

APPENDIX D: DRAWINGS

APPENDIX E: RISK ASSESSMENT CLASSIFICATION



1. INTRODUCTION

A F Howland Associates Limited (AFHA) was instructed by Mr J W & Mrs G M Needham to carry out an addendum report at land adjacent to No. 72 Station Road, Surfleet, Lincolnshire (Fig. 17.041/PhaseII/Add/1). This was required to address condition 4 of outline planning permission, referenced H17-0798-15, with respect to the risks to sensitive receptors from potential contamination. The development proposals are for five dwellings with private gardens.

This report was prepared for the use of the Client and their advisors. Other parties using the contained information do so at their own risk and any duty of care to those parties is specifically excluded. The report has been carried out in general accordance with accepted best practice and methodologies (BSI, 2013) (DEFRA and EA, 2004) (DCLG, 2010).



2. TERMS OF REFERENCE

This report has been prepared to support the proposed development, and follows on from a Phase I Desk Study report (AFHA, 2017a) and a Phase II Contamination Survey (AFHA, 2017b), both written for larger site area, which should be referred to for the background data pertinent to the scheme. This report includes a review of the findings of the previous reports, including a re-assessment of the contamination laboratory testing results pertinent to the site area.

The proposed development includes the construction of 5 No. residential dwellings and associated private gardens, with individual access directly from Station Road as defined on a drawing named 'Sketch Layout – 5 No. Plots', which is appended.

The Phase II report concluded that further investigation or remedial action was warranted due to elevated levels of contaminants associated with the previous use. However, this was over a larger site area and an assessment has therefore been carried out that is pertinent to the area covered by the outline planning permission referenced above.

This addendum report was therefore intended to:

- review the pertinent background information,
- undertake a quantitative risk assessment of pertinent laboratory results,
- assess the risks to human end-users, construction workers, water supply pipes and controlled waters,
- comment on appropriate mitigation and/or remediation strategies if required.

The comments and recommendations contained within this report are based on data acquired from relevant exploratory holes and associated laboratory testing. Extrapolation between and to other parts of the site is considered within the light of the geo-environmental setting as interpreted, but no responsibility can be accepted for conditions varying from those on which the report is based.



3. REVIEW OF PERTINENT BACKGROUND INFORMATION

3.1 HISTORICAL INFORMATION

The previous reports outlined the historical setting of the site, which indicated the area adjacent to Station Road was historically, and is currently, arable land. There has been no recorded development in this area. During the walkover element of the Phase I Desk Study report (AFHA, 2017a) and the intrusive investigation of the Phase II Contamination Survey (AFHA, 2017b) the area comprised two small arable plots bisected by an unmade access track. No potential sources of contamination were identified on site.

The immediate surrounding land use to the north was historically fields until a nursery was established in the early 1900s. There-in, this area has remained in use as a nursery, with small plots of arable land. There is a residential property, No. 72 Station Road, to the east which was established by the early 1970s. Station Road is immediately to the south, with the River Glen beyond. The centre of the village of Surfleet is to the west, which has slowly developed to incorporate the site into the village. The wider surrounding area is low-lying agricultural land.

Sources of contamination were identified off site including the nursery site to the north, as per the details in the Phase II report (AFHA, 2017). No other sources of contamination were identified in the wider surrounding area.

3.2 SITE GEOLOGY AND GROUNDWATER

Exploratory holes TP04, TP05, TP16 and WS01 were undertaken in the site area. These indicated a similar ground profile across the site, comprising topsoil or made ground overlying natural silt and occasionally clay and sand. The findings were consistent with the general sequence mapped for the area by the BGS (2017), with the natural soil sequence interpreted as superficial Tidal Flat Deposits.

The soil sequence initially comprised topsoil comprising dark brown clayey silt/silty clay, although in TP05 and WS01 rare brick and coal gravel were recorded suggesting the presence of made ground to approximately 0.5 m depth. These were underlain by natural soils generally described as light brown silt with variable clay and sand content.



Groundwater was not encountered during the investigation in the exploratory holes undertaken on this site. Perched groundwater was encountered in made ground found in TP08, located off site, to the north of the glasshouse. However, observations will have been affected by the permeability of the ground, the rate of progress of the hole and the techniques in operation. The general procedures used do not allow precise measurements of the groundwater conditions, but give only a general guide to the overall situation. Fluctuations in any groundwater table will also occur as a result of seasonal or climatic effects, as well as other outside influences.



4. QUANTITATIVE RISK ASSESSMENT

4.1 GENERAL

This quantitative risk assessment is undertaken using the laboratory results from the environmental samples taken from exploratory positions TP04, TP05, TP16 and WS01 from the previous intrusive investigation (AFHA, 2017b) only. A copy of the pertinent laboratory results is appended as analytical report 'Supplement 1 to Report No. 643464-3'.

4.2 REVIEW OF LABORATORY TESTING

The testing programme undertaken on the environmental samples included analysis for a general suite of contaminants. In summary, the following determinants were analysed for:

- Heavy metals/metalloids (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium and zinc)
- Cyanide, phenol
- Total and speciated PAHs (USEPA-16)
- BTEX¹, MTBE² and petroleum hydrocarbons (Criteria Working Group banding in soil)
- Organic matter content

Targeted samples were also tested for:

- Asbestos³.
- Organo-tin compounds, organochlorine insecticides, organophosphorus insecticides, triazines and phenoxy acid herbicides

¹ Benzene, Toluene, Ethylbenzene, p and m-xylene and o-xylene

² Methyl Tertiary Butyl Ether

³ The soil samples are screened for the presence of asbestos fibres and asbestos containing material



4.3 HUMAN HEALTH RISK ASSESSMENT

4.3.1 Assessment Methodology

The results for the two samples of topsoil and two samples of made ground, pertinent to this site area, subject to testing for the suite of contaminants listed above, are presented in the Appendix. This also provides the stone and moisture content where applicable.

The results have been assessed against human health guideline values produced by Land Quality Management Limited in association with the Chartered Institute of Environmental Health (LQM, 2015) and which are referred to as Suitable for Use Levels (S4ULs). The S4ULs provide generic assessment criteria (GAC) values from a risk based approach to human exposure through the pathways of inhalation, ingestion and dermal contact which have been derived using the CLEA software version 1.06 and Environment Agency guidance (Environment Agency, 2009). In this case, the results are assessed against S4ULs for a 'residential with plant uptake' setting and a soil organic matter of 2.5 %. For metals, the guideline values relate to a soil organic matter of 6.0%.

When relevant S4ULs were unavailable, such as in the case of antimony, cyanide, lead and MTBE, the results were compared to alternative Soil Screening Values (SSVs). For antimony and cyanide the SSV was derived by WS Atkins Consultants Limited (W S Atkins, 2011), using the ATRISKsoil programme. In this case the 'residential with consumption of home grown produce' scenario has been used with a soil organic matter of 1%. For lead, Category 4 Screening Levels (C4SLs) were used which have been developed by Contaminated Land: Applications in Real Environments (CL:AIRE, 2014) using a modified version of the CLEA model. The derivation of C4SLs uses the concept of a low level of toxicological concern (LLTC), which represents the estimated concentration of a contaminant that would pose an 'acceptably low' risk to human health. These allow a higher (though still 'acceptably low') level of risk than SGVs or SSVs while maintaining the precautionary approach. SSVs and C4SLs are also GAC values.

In the case of MTBE, the results have been assessed against GAC values produced by The Sirius Group (2015), which have been derived using the CLEA software, version 1.06, and Environment Agency guidance (Environment Agency, 2009), and have been updated in line with the relevant S4ULs (LQM, 2015) and C4SLs (CL:AIRE, 2014) where appropriate. These GAC values therefore follow the same principles as those from which they are derived. In this case, the MTBE results have been assessed for a 'residential with homegrown produce' setting and a soil organic matter of 2.5%.



4.3.2 Results

The results can be summarised as follows:

- Concentrations of heavy metals/metalloids were all below screening levels.
- Concentrations of phenol and cyanide were below the limit of detection.
- Concentrations of BTEX were below the limit of detection
- Low concentrations of MTBE were found in two samples (TP04 and TP05) but these are below the GAC value of 55 mg/kg, produced by The Sirius Group (2015).
- Concentrations of petroleum hydrocarbon (TPH) and polyaromatic hydrocarbons (PAHs [USEPA-16]) were below screening levels.
- Asbestos fibres or asbestos containing material were not detected.
- Concentrations of organo-tin compounds, organophosphorus insecticides, triazines and phenoxy acetic acid herbicides were below the limit of detection.
- Concentrations of organochlorine insecticides were mostly below the limit of detection. A single low concentration of DDT was noted in TP05, but is below Dutch Intervention Levels (Ministry of Housing, Spatial Planning and Environment, 2000)⁴, in the absence of UK Guidance.

⁴ The Dutch soil remediation intervention values indicate when the functional properties of the soil for humans, plants and animals is seriously impaired or threatened. They are representative of the level of contamination above which a serious case of soil contamination is deemed to exist.



4.4 CONCEPTUAL MODEL

A conceptual model, based on the findings that have been presented, is shown below. The risks to groundwater and surface water, as well as the risks from radon and ground gas were considered low or very low in the desk study and Phase II report and therefore have not been considered here. Risk management and remediation measures are discussed in Section 5, where appropriate, and risk assessment classification is appended.

It should be noted that an assessment of risk to construction workers is carried out on a site specific basis, which suggests that only contamination of acute toxicity might represent an unacceptable risk to the health of construction workers but which should be managed through health and safety procedures.



Source of Contamination	Pathway	Receptor	Probability and Reasoning	Consequence and Reasoning	Risk Classification
Soil (potentially contaminated)	Direct contact, inhalation, ingestion	Human end-users	Unlikely – No contaminants observed above selected GAC values. Off-site sources of contamination identified in a previous report (AFHA, 2017b) are not considered to have adversely affected the site	Medium – Residential development proposed with private gardens, leading to exposure to contamination causing chronic damage to human health	Low Risk
		Construction Workers		Mild – Potential short term exposure can be managed with PPE and adoption of good hygiene practices	Very Low Risk
	Direct Contact	Water Supply	Unlikely – Low concentrations of contaminants, including petroleum hydrocarbons, in soil that can permeate plastic water supply pipes. Off-site sources of contamination identified in a previous report are not considered to have adversely affected the site.	Medium – Chronic exposure to human end-users with proposed residential water supply for human consumption assumed	Low Risk

Table 1: Revised Conceptual Model

5. RISK MANAGEMENT AND MITIGATION MEASURES

5.1 INTRODUCTION

The review of risk and assessment of appropriate remediation is based on the presence of a “source-pathway-receptor”. In the absence of the linkage, the risk is eliminated. If any suspected contamination is encountered during the construction phase then this should be evaluated and appropriate action taken.

5.2 CHEMICAL CONTAMINATION – HUMAN END-USERS

Analysis of potential contaminants reveals that all results are below levels of concern for a ‘residential with plant uptake’ setting. Given no significant contamination has been identified on site, the sources of contamination identified in the previous Phase II Contamination Survey (AFHA, 2017b), which are off site, are not considered to have adversely affected the site. Therefore, a low risk to human end-users is identified and no further investigation is required.

5.3 CHEMICAL CONTAMINATION – CONSTRUCTION WORKERS

Soil contamination is considered to represent a very low risk to construction workers during construction phase because of the low concentrations found. However, it should be noted that the GAC values are formulated from research into long-term chronic exposure pathways, and are not directly applicable to short-term contact such as that experienced by construction workers. Nevertheless, without any current UK guidelines that allow an assessment of the potential risk to workers from contaminated soils the approaches used provide an applicable assessment criterion.

Regardless, it is necessary to make construction and other workers on site aware of the possible hazard of contact with ‘potentially contaminated’ ground. It is important to ensure that precautions are implemented through ‘toolbox talks’ and site inductions. The primary provisions are to minimise ‘dusty’ working conditions, utilise appropriate personal protective equipment (PPE) and the requirement for suitable hygiene facilities on-site.



5.4 CHEMICAL CONTAMINATION – WATER SUPPLY PIPES

Generally low levels of contaminants were identified on site, such that a low risk from permeation of contaminants through water supply pipes is concluded. No further investigation is therefore required.



6. SUMMARY

1. This addendum report was required to support a planning application, referenced H17-0798-15, with respect to the risks to end-users from potential contamination for plots No. 1 to 5 at land adjacent to No. 72 Station Road, Surfleet
2. This report follows on from a Phase I Desk study (AFHA, 2017a) and a Phase II Contamination Report (AFHA, 2017b), which both covered a wider area. This report reviews pertinent information from these reports to assess the risks to sensitive receptors.
3. Historically, the site has been arable land and remains this way to the present-day. The nursery immediately to the north has developed from the early 1900s. No sources of contamination were identified on site, although contamination sources have been off site to the north.
4. The intrusive investigation found a similar profile in each of the exploratory holes, which typically comprised topsoil, although rare brick and coal gravel were noted in two positions, underlain by natural silt and occasionally sand and clay.
5. Groundwater was not encountered within any of the exploratory holes on site.
6. A review of the contamination results pertinent to this area indicates contaminants were found to be below GAC values for a 'residential with plant uptake' end-use. Therefore, there is not considered to be a significant risk to sensitive receptors and end-users.
7. A low risk was concluded to human end-users, whilst a very low risk was concluded to construction workers.
8. A low risk to water supply pipes was concluded.
9. The Phase II report (AFHA, 2017b) concluded groundwater and surface water were at very low and low risk respectively, whilst there were no significant sources of ground gas identified or expected. This is replicated here.
10. No further investigation is required to enable the development of the site, and as such it is considered suitable for residential end-use.



Mr D J Myhill
MSc FGS



Dr A F Howland
MSc PhD DIC CEng FIMMM CGeol FGS

A F HOWLAND ASSOCIATES
17 July 2017



A F Howland Associates
Geotechnical Engineers

www.howland.co.uk

APPENDIX A: REFERENCES

A F HOWLAND ASSOCIATES LIMITED (AFHA). 2017a. A Phase I Desk Study to Address Condition 4 of Planning Permission Reference H17-0798-15 for a Residential Redevelopment at: Land Adjacent to 72 Station Road, Surfleet. Dated 28 February 2017. Norwich, Norfolk.

A F HOWLAND ASSOCIATES LIMITED (AFHA). 2017b. A Phase II Contamination Report to Support a Planning Application for a Residential Development at: Land Adjacent to 72 Station Road, Surfleet. Dated 12 May 2017. Norwich, Norfolk.

BRITISH GEOLOGICAL SURVEY. 2017. OpenGeoscience web site. Geology of Britain Viewer. www.bgs.ac.uk/opengeoscience

BRITISH STANDARDS INSTITUTION. 2015. BS 5930:2015 Code of practice for ground investigations. British Standards Institution. London.

BRITISH STANDARDS INSTITUTION. 2013. BS 10175:2011+A1:2013. Code of practice for investigation of potentially contaminated sites. British Standards Institution. London.

CONTAMINATED LAND: APPLICATIONS IN REAL ENVIRONMENTS (CL:AIRE). 2014. SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination.

DEPARTMENT FOR COMMUNITIES AND LOCAL GOVERNMENT (DCLG). 2004. The Building Regulations 2010 (England). Approved Document C: Site preparation and resistance to contaminants and moisture, 2004 and incorporating 2010 and 2013 amendments.

DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS AND THE ENVIRONMENT AGENCY. 2002. Assessment of Risks to Human Health from Land Contamination: An Overview of the Development of the Soil Guideline Values and Related Research. Environment Agency, Bristol.

DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS AND THE ENVIRONMENT AGENCY. 2004. Model Procedures for the Management of Land Contamination. Contaminated Land Report 11. Environment Agency, Bristol.

ENVIRONMENT AGENCY. 2009a. Soil Guideline Values in soil. Arsenic SGV / Nickel SGV / Mercury SGV / Selenium SGV / Benzene SGV / Toluene SGV / Ethylbenzene SGV / Xylenes SGV / Cadmium SGV / Phenol SGV. Science Report SC050021

ENVIRONMENT AGENCY. 2009b. Human health toxicological assessment of contaminants in soil. Science Report – Final SC050021/SR2.

LAND QUALITY MANAGEMENT. 2015. S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham

ROSSI LONG CONSULTING LIMITED. 2015. Geoenvironmental Report: George Lambton Avenue, Newmarket. Dated 16 December 2015. Norwich, Norfolk

THE SIRIUS GROUP. 2015. Sirius Generic Assessment Criteria. Rev.: February 2015. <http://myplanning.warrington.gov.uk/Planning/StreamDocPage/obj.pdf?DocNo=8146921&PageNo=1&content=obj.pdf> Accessed 13 July 2017

W S ATKINS CONSULTANTS LIMITED. 2011. ATRISKsoil Soil Screening Values (SSVs). 31 March 2011. www.atrisksoil.co.uk



APPENDIX B: EXPLORATORY HOLE RECORDS

Trial pit records pertinent to this report only (see AFHA, 2017b, for other pertinent records)

- Trial pits records – TP04, TP05 and TP16
- Window sample record – WS01

Key

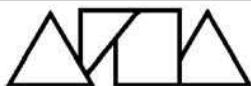
D	Small disturbed sample
ES	Environmental sample
L	Plastic liner
U	Nominal 70 mm diameter undisturbed open tube sample
SPT	Standard penetration test using a split spoon sampler. N Value is uncorrected, but the hammer energy ratio is given where known (in remarks).
IP xx	Initial penetration during the SPT recorded in millimetres. If initial penetration equals or exceeds 450 mm the test is aborted.
S x,x	SPT seating drive blow count given by the summation of the blows 'X' required to drive the seating length
T x,x,x,x	SPT test drive blow count 'N' given by the summation of the blows 'X' required to drive the seating length (300 mm)
X*Y	Incomplete standard penetration test where the seating/test drive could not be completed. The blows 'X' represent the total blows for the given length of seating drive 'Y' (mm)
dd/mm/yy: 1.0	Date, water level at the window sample hole depth at the end of shift and the start of the following shift
dd/mm/yy: dry	



 A F Howland Associates Geotechnical Engineers				Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP04		
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 3.90		Client Mr & Mrs Needham		Job Number 17.041
		Location 525642 E 328531 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.52	D1					TOPSOIL (Dark brown clayey silt)		
0.10-0.20	ES1				(0.52)			
				3.38	0.52	Yellow brown sandy SILT		
0.52-1.00	D2				(0.48)			
				2.90	1.00	Complete at 1.00m		
No image available						Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion		
						Scale (approx) 1:25		Logged By JDR

 A F Howland Associates Geotechnical Engineers				Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP05		
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 4.24		Client Mr & Mrs Needham		Job Number 17.041
		Location 525663 E 328515 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.39	D1					MADE GROUND? (Dark brown clayey silt with rare subangular fine to medium brick gravel)		
0.10-0.20	ES1				(0.39)			
0.39-1.00	D2			3.85	0.39	Brown clayey slightly sandy SILT		
					(0.61)			
0.90	ES2			3.24	1.00	Complete at 1.00m		
No image available						Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion		
Scale (approx) 1:25						Logged By JDR		Figure No. 17.041.TP05

 A F Howland Associates Geotechnical Engineers					Site Land adjacent to 72 Station Road, Surfleet		Trial Pit Number TP16				
Excavation Method Hand dug trial pit		Dimensions L 0.3 m x W 0.3 m x D 1.0 m		Ground Level (mOD) 4.21		Client Mr & Mrs Needham		Job Number 17.041			
		Location 525733 E 328522 N		Dates 23/03/2017		Agent Cooper Architectural Design Limited		Sheet 1/1			
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water		
0.00-0.82	D1					TOPSOIL (Dark brown clayey silt)					
0.10-0.20	ES1				(0.82)						
0.82-1.00	D2			3.39	0.82 (0.18)	Brown clayey slightly sandy SILT					
				3.21	1.00	Complete at 1.00m					
No image available						Remarks 1. Location CAT scanned prior to excavation. 2. No groundwater encountered 3. Pit remained open and sidewalls stable during excavation 4. Backfilled with arisings upon completion					
						Scale (approx) 1:25		Logged By JDR		Figure No. 17.041.TP16	



A F Howland Associates Geotechnical Engineers

Site

Land adjacent to 72 Station Road, Surfleet

Number
WS01

Excavation Method

Tracked Window Sampling
Rig, Dando Terrier 2002.

102 mm to 2.00 m
87 mm to 3.00 m
75 mm to 4.00 m
65 mm to 5.00 m

Dimensions

Location

525695 E 328533 N

Ground Level (mOD)

4.09

Client

Mr & Mrs Needham

Job
Number
17.041

Dates

23/03/2017

Agent

Cooper Architectural Design Limited

Sheet

1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10 0.10	D1 ES1				(0.48)	MADE GROUND (Brown silty fine sand with rare subangular to subrounded fine to medium brick and coal gravel)		
				3.61	0.48	Light brown slightly clayey sand SILT		
0.70	D2							
1.20-2.00	L1					...becoming clayey and slightly sandy		
1.50	D3							
2.00-3.00	L2					...becoming damp		
2.50	D4					...becoming brown, slightly clayey and sandy		
					(4.72)			
3.00-4.00	L3							
3.60	D5							
4.00-5.00	L4							
4.50	D6					...becoming very sandy		

Remarks

1. Location CAT scanned prior to excavation.
2. Hand dug inspection pit to 1.20 m.
3. No groundwater encountered
4. Recovered soil samples damp from 2.0 m
5. Upon completion the hole collapsed/swelled to 2.0 m
6. Position backfilled with arisings

Scale
(approx)

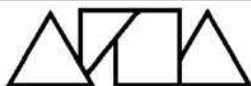
1:25

Logged
By

DJM

Figure No.

17.041.WS01



A F Howland Associates Geotechnical Engineers

Site

Land adjacent to 72 Station Road, Surfleet

Number
WS01

Excavation Method

Tracked Window Sampling
Rig, Dando Terrier 2002.

102 mm to 2.00 m
87 mm to 3.00 m
75 mm to 4.00 m
65 mm to 5.00 m

Dimensions

Location

525695 E 328533 N

Ground Level (mOD)

4.09

Client

Mr & Mrs Needham

Job
Number
17.041

Dates

23/03/2017

Agent

Cooper Architectural Design Limited

Sheet

2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
5.00-6.00	L5			-1.11	5.20	Brown slightly clayey silty fine SAND ...becoming a slightly clayey silty fine SAND		
5.50	D7				(0.80)			
			23/03/2017:DRY	-1.91	6.00	Complete at 6.00m		

Remarks

Scale
(approx)

1:25

Logged
By

DJM

Figure No.

17.041.WS01

APPENDIX C: LABORATORY TESTING

Laboratory Analysis Report 'Supplement 1 to Report No. 643464-3'



Concept Life Sciences

Certificate of Analysis

3 Crittall Drive
Springwood Industrial
Estate
Braintree
Essex
CM7 2RT
Tel : 01376 560120
Fax : 01376 552923

Report Number: Supplement 1 to Report Number 643464-3

Date of Report: 10-Jul-2017

Customer: A F Howland Associates
The Old Exchange
Newmarket Road
Cringleford
Norwich
NR4 6UF

Customer Contact: Mr Daniel Myhill

Customer Job Reference: DJM/17.041/00/01

Customer Purchase Order: DJM/17.041/00/01

Customer Site Reference: Land adjacent to 72 Station Road, Surfleet

Date Job Received at Concept: 29-Mar-2017

Date Analysis Started: 31-Mar-2017

Date Analysis Completed: 06-Apr-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept SOPs

All results have been reviewed in accordance with Section 25 of the Concept, Analytical Quality Quality Manual



Report checked
and authorised by :
Chelsea Entwistle
Senior Project Manager

Issued by :
Aislinn Arthey
Trainee Project Manager

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01					
Soil Asbestos Screen					
Concept Reference				643464 023	
Customer Sample Reference				WS01 ES1 @ 0.10m	
Date Sampled				23-MAR-2017	
Matrix Class				Topsoil	
Determinand	Method	Test Sample	LOD	Units	
Asbestos ID	T27	A40			Asbestos not detected

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01									
Soil AFHA Soil Contamination 3									
Concept Reference		643464 003		643464 004		643464 017		643464 023	
Customer Sample Reference		TP04 ES1 @ 0.10m		TP05 ES1 @ 0.10m		TP16 ES1 @ 0.10m		WS01 ES1 @ 0.10m	
Date Sampled		23-MAR-2017		23-MAR-2017		23-MAR-2017		23-MAR-2017	
Matrix Class		Sandy Soil		Sandy Soil		Sandy Soil		Topsoil	
Determinand	Method	Test Sample	LOD	Units					
Antimony	T257	A40	5	mg/kg	<5	<5	<5	<5	
Arsenic	T257	A40	2	mg/kg	10	9	11	10	
Beryllium	T245	A40	1	mg/kg	<1	<1	<1	<1	
Cadmium	T257	A40	0.1	mg/kg	0.2	0.1	0.3	0.1	
Chromium	T257	A40	0.5	mg/kg	22	15	17	14	
Copper	T257	A40	2	mg/kg	27	21	24	20	
Lead	T257	A40	2	mg/kg	42	33	52	48	
Mercury	T245	A40	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	
Nickel	T257	A40	0.5	mg/kg	14	13	13	12	
Selenium	T257	A40	3	mg/kg	<3	<3	<3	<3	
Vanadium	T257	A40	0.1	mg/kg	23	23	23	21	
Zinc	T257	A40	2	mg/kg	71	60	78	63	
Chromium VI	T82	A40	1	mg/kg	<1	<1	<1	<1	
Organic Matter	T258	A40	0.5	%	-	2.3	2.3	-	
pH	T7	A40			7.6	7.7	7.6	7.8	
Cyanide(Total)	T921	AR	1	mg/kg	<1	<1	<1	<1	
Phenols(Mono)	T921	AR	1	mg/kg	<1	<1	<1	<1	
Moisture @105C	T162	AR	0.1	%	19	19	19	17	
Retained on 2mm	T2	A40	0.1	%	<0.1	0.4	<0.1	<0.1	

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01					
Soil Miscellaneous					
Concept Reference				643464 004	
Customer Sample Reference				TP05 ES1 @ 0.10m	
Date Sampled				23-MAR-2017	
Matrix Class				Sandy Soil	
Determinand	Method	Test Sample	LOD	Units	
Nitrate	T686	A40	1	mg/kg	38
Phosphorous	T257	A40	5	mg/kg	1700
Phosphate	T686	A40	1	mg/kg	37
K (Extractable BS 3882)	T272	A40	10	mg/l	430
Ammoniacal nitrogen	T4	AR	0.5	mg/kg	2.5

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01								
Soil Total and Speciated USEPA16 PAH (SE) (MCERTS) Analysed as Soil								
Concept Reference					643464 003	643464 004	643464 017	643464 023
Customer Sample Reference					TP04 ES1 @ 0.10m	TP05 ES1 @ 0.10m	TP16 ES1 @ 0.10m	WS01 ES1 @ 0.10m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Matrix Class					Sandy Soil	Sandy Soil	Sandy Soil	Topsoil
Determinand	Method	Test Sample	LOD	Units				
Naphthalene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T16	AR	0.1	mg/kg	<0.1	0.8	0.3	0.7
Anthracene	T16	AR	0.1	mg/kg	<0.1	0.2	<0.1	0.2
Fluoranthene	T16	AR	0.1	mg/kg	0.2	2.1	0.8	1.2
Pyrene	T16	AR	0.1	mg/kg	0.2	1.7	0.7	1.0
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	<0.1	0.9	0.3	0.5
Chrysene	T16	AR	0.1	mg/kg	<0.1	0.9	0.3	0.5
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	<0.1	0.9	0.2	0.5
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	<0.1	0.9	0.3	0.4
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	<0.1	1.0	0.2	0.5
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	<0.1	0.4	<0.1	0.3
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	<0.1	0.4	<0.1	0.3
PAH(total)	T16	AR	0.1	mg/kg	0.4	10	3.1	6.0

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01								
Soil TPH (CWG) with MTBE & BTEX SE Analysed as Soil								
Concept Reference					643464 003	643464 004	643464 017	643464 023
Customer Sample Reference					TP04 ES1 @ 0.10m	TP05 ES1 @ 0.10m	TP16 ES1 @ 0.10m	WS01 ES1 @ 0.10m
Date Sampled					23-MAR-2017	23-MAR-2017	23-MAR-2017	23-MAR-2017
Matrix Class					Sandy Soil	Sandy Soil	Sandy Soil	Topsoil
Determinand	Method	Test Sample	LOD	Units				
Benzene	T209	AR	10	µg/kg	<10	<10	<10	<10
Toluene	T209	AR	10	µg/kg	<10	<10	<10	<10
EthylBenzene	T209	AR	10	µg/kg	<10	<10	<10	<10
M/P Xylene	T209	AR	10	µg/kg	<10	<10	<10	<10
O Xylene	T209	AR	10	µg/kg	<10	<10	<10	<10
Methyl tert-Butyl Ether	T209	AR	10	µg/kg	43	48	<10	<10
TPH (C5-C6 aliphatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10
TPH (C6-C7 aromatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10
TPH (C6-C8 aliphatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10
TPH (C7-C8 aromatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10
TPH (C8-C10 aliphatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10
TPH (C8-C10 aromatic)	T54	AR	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	6	6	6	<2
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	3	3	<2	<2
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	4	5	4	<2
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	6	7	4	<2
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	<2	<2	<2	<2
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	5	12	5	7
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	9	3	3	9
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	8	26	10	38

Concept Reference: 643464					
Project Site: Land adjacent to 72 Station Road, Surfleet					
Customer Reference: DJM/17.041/00/01					
Soil Analysed as Soil					
Organo-Tin (Tributyl, Triphenyl)					
Concept Reference				643464 004	
Customer Sample Reference				TP05 ES1 @ 0.10m	
Date Sampled				23-MAR-2017	
Matrix Class				Sandy Soil	
Determinand	Method	Test Sample	LOD	Units	
Tributyl tin	T72	AR	0.01	mg/kg	<0.01
Triphenyl Tin	T72	AR	0.01	mg/kg	<0.01

Concept Reference: 643464					
Project Site: Land adjacent to 72 Station Road, Surfleet					
Customer Reference: DJM/17.041/00/01					
Soil Analysed as Soil					
Organochlorine insecticides					
Concept Reference				643464 004	
Customer Sample Reference				TP05 ES1 @ 0.10m	
Date Sampled				23-MAR-2017	
Matrix Class				Sandy Soil	
Determinand	Method	Test Sample	LOD	Units	
Hexachlorocyclohexane	T16	AR	0.01	mg/kg	<0.01
Hexachlorobenzene	T1	AR	0.01	mg/kg	<0.01
Heptachlor	T16	AR	0.01	mg/kg	<0.01
Aldrin	T16	AR	0.01	mg/kg	<0.01
Heptachlor epoxide	T16	AR	0.01	mg/kg	<0.01
Chlordane	T16	AR	0.01	mg/kg	<0.01
Endosulphan	T16	AR	0.01	mg/kg	<0.01
DDE	T16	AR	0.01	mg/kg	<0.01
Dieldrin	T16	AR	0.01	mg/kg	<0.01
Endrin	T16	AR	0.01	mg/kg	<0.01
DDD	T16	AR	0.01	mg/kg	<0.01
DDT	T16	AR	0.01	mg/kg	(147) 0.05

Concept Reference: 643464					
Project Site: Land adjacent to 72 Station Road, Surfleet					
Customer Reference: DJM/17.041/00/01					
Soil Analysed as Soil					
Organophosphorous insecticides					
Concept Reference				643464 004	
Customer Sample Reference				TP05 ES1 @ 0.10m	
Date Sampled				23-MAR-2017	
Matrix Class				Sandy Soil	
Determinand	Method	Test Sample	LOD	Units	
Dichlorvos	T16	AR	0.01	mg/kg	<0.01
Mevinphos	T16	AR	0.01	mg/kg	<0.01
Dimethoate	T16	AR	0.01	mg/kg	<0.01
Diazinon	T16	AR	0.01	mg/kg	<0.01
Pyrimiphos methyl	T16	AR	0.01	mg/kg	<0.01
Malathion	T16	AR	0.01	mg/kg	<0.01
Fenitrothion	T16	AR	0.01	mg/kg	<0.01
Parathion	T16	AR	0.01	mg/kg	<0.01
Azinphos methyl	T16	AR	0.01	mg/kg	<0.01

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01 Soil Analysed as Soil Triazines suite 2					
Concept Reference				643464 004	
Customer Sample Reference				TP05 ES1 @ 0.10m	
Date Sampled				23-MAR-2017	
Matrix Class				Sandy Soil	
Determinand	Method	Test Sample	LOD	Units	
Simazine	T16	AR	0.01	mg/kg	<0.01
Atrazine	T16	AR	0.01	mg/kg	<0.01
Propazine	T16	AR	0.01	mg/kg	<0.01
Trietazine	T16	AR	0.01	mg/kg	<0.01
Prometryn	T16	AR	0.01	mg/kg	<0.01
Terbutryn	T16	AR	0.01	mg/kg	<0.01

Concept Reference: 643464 Project Site: Land adjacent to 72 Station Road, Surfleet Customer Reference: DJM/17.041/00/01 Soil Analysed as Soil Phenoxy Acetic acid herbicides					
Concept Reference				643464 004	
Customer Sample Reference				TP05 ES1 @ 0.10m	
Date Sampled				23-MAR-2017	
Matrix Class				Sandy Soil	
Determinand	Method	Test Sample	LOD	Units	
Mecoprop	T16	AR	0.01	mg/kg	<0.01
Phenoxy Acetic acid herbicide: MCPA	T16	AR	0.01	mg/kg	<0.01
Dichlorprop	T16	AR	0.01	mg/kg	<0.01
Phenoxy Acetic acid herbicide: 2,4-D	T16	AR	0.01	mg/kg	<0.01
Fenoprop	T16	AR	0.01	mg/kg	<0.01
Phenoxy Acetic acid herbicide: 2,4,5-T	T16	AR	0.01	mg/kg	<0.01

Index to symbols used in Supplement 1 to Report Number 643464-3

Value	Description
AR	As Received
A40	Assisted dried < 40C
2	LOD Raised Due to Matrix Interference
147	Result has been Recovery corrected.
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Supplement 1 report reissued to only report results pertaining to samples TP04 ES1 @ 0.10m, TP05 ES1 @ 0.10m, TP16 ES1 @ 0.10m and WS01 ES1 @ 0.10m.
Retained on 2mm is removed before analysis
Asbestos subcontracted to REC Limited
Reported results on as received samples are corrected to a 105 degree centigrade dry weight basis except Ammonia, TPH c5-c35 aro/ali split, OCP/OPP, Phenoxy Acetic Acid, Triazines and Organo-tins

Method Index

Value	Description
T921	Colorimetry (CF) (MCERT)
T1	GC/MS (HR)
T2	Grav
T7	Probe
T72	GC/MS (Deriv.)
T219	GC/FID (SE)

T245	ICP/OES (Aqua Regia Extraction)
T258	Titration (Dichromate)
T272	ICP/OES (Ammonium Nitrate)
T54	GC/MS (Headspace)
T4	Colorimetry
T162	Grav (1 Dec) (105 C)
T27	PLM
T257	ICP/OES (SIM) (Aqua Regia Extraction)
T686	Discrete Analyser
T82	ICP/OES (Sim)
T16	GC/MS
T209	GC/MS (Head Space)(MCERTS)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Nitrate	T686	A40	1	mg/kg	N	004
Phosphorous	T257	A40	5	mg/kg	N	004
Phosphate	T686	A40	1	mg/kg	N	004
K (Extractable BS 3882)	T272	A40	10	mg/l	N	004
Ammoniacal nitrogen	T4	AR	0.5	mg/kg	N	004
Asbestos ID	T27	A40			SU	023
Hexachlorocyclohexane	T16	AR	0.01	mg/kg	U	004
Hexachlorobenzene	T1	AR	0.01	mg/kg	U	004
Heptachlor	T16	AR	0.01	mg/kg	U	004
Aldrin	T16	AR	0.01	mg/kg	U	004
Heptachlor epoxide	T16	AR	0.01	mg/kg	U	004
Chlordane	T16	AR	0.01	mg/kg	U	004
Endosulphan	T16	AR	0.01	mg/kg	U	004
DDE	T16	AR	0.01	mg/kg	U	004
Dieldrin	T16	AR	0.01	mg/kg	U	004
Endrin	T16	AR	0.01	mg/kg	U	004
DDD	T16	AR	0.01	mg/kg	U	004
DDT	T16	AR	0.01	mg/kg	U	004
Simazine	T16	AR	0.01	mg/kg	N	004
Atrazine	T16	AR	0.01	mg/kg	N	004
Propazine	T16	AR	0.01	mg/kg	N	004
Trietazine	T16	AR	0.01	mg/kg	N	004
Prometryn	T16	AR	0.01	mg/kg	N	004
Terbutryn	T16	AR	0.01	mg/kg	N	004
Mecoprop	T16	AR	0.01	mg/kg	N	004
Phenoxy Acetic acid herbicide: MCPA	T16	AR	0.01	mg/kg	N	004
Dichlorprop	T16	AR	0.01	mg/kg	N	004
Phenoxy Acetic acid herbicide: 2,4-D	T16	AR	0.01	mg/kg	N	004
Fenoprop	T16	AR	0.01	mg/kg	N	004
Phenoxy Acetic acid herbicide: 2,4,5-T	T16	AR	0.01	mg/kg	N	004
Dichlorvos	T16	AR	0.01	mg/kg	U	004
Mevinphos	T16	AR	0.01	mg/kg	U	004
Dimethoate	T16	AR	0.01	mg/kg	U	004
Diazinon	T16	AR	0.01	mg/kg	U	004
Pirimiphos methyl	T16	AR	0.01	mg/kg	U	004
Malathion	T16	AR	0.01	mg/kg	U	004
Fenitrothion	T16	AR	0.01	mg/kg	U	004
Parathion	T16	AR	0.01	mg/kg	U	004
Azinphos methyl	T16	AR	0.01	mg/kg	U	004
Tributyl tin	T72	AR	0.01	mg/kg	N	004
Triphenyl Tin	T72	AR	0.01	mg/kg	N	004
Antimony	T257	A40	5	mg/kg	N	003-004,017,023
Arsenic	T257	A40	2	mg/kg	M	003-004,017,023
Beryllium	T245	A40	1	mg/kg	U	003-004,017,023
Cadmium	T257	A40	0.1	mg/kg	M	003-004,017,023
Chromium	T257	A40	0.5	mg/kg	M	003-004,017,023
Copper	T257	A40	2	mg/kg	M	003-004,017,023
Lead	T257	A40	2	mg/kg	M	003-004,017,023
Mercury	T245	A40	1.0	mg/kg	U	003-004,017,023
Nickel	T257	A40	0.5	mg/kg	M	003-004,017,023
Selenium	T257	A40	3	mg/kg	U	003-004,017,023
Vanadium	T257	A40	0.1	mg/kg	U	003-004,017,023
Zinc	T257	A40	2	mg/kg	M	003-004,017,023
Chromium VI	T82	A40	1	mg/kg	N	003-004,017,023

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Organic Matter	T258	A40	0.5	%	N	004,017
pH	T7	A40			M	003-004,017,023
Cyanide(Total)	T921	AR	1	mg/kg	M	003-004,017,023
Phenols(Mono)	T921	AR	1	mg/kg	M	003-004,017,023
Moisture @105C	T162	AR	0.1	%	N	003-004,017,023
Retained on 2mm	T2	A40	0.1	%	N	003-004,017,023
Benzene	T209	AR	10	µg/kg	M	003-004,017,023
Toluene	T209	AR	10	µg/kg	M	003-004,017,023
EthylBenzene	T209	AR	10	µg/kg	M	003-004,017,023
M/P Xylene	T209	AR	10	µg/kg	M	003-004,017,023
O Xylene	T209	AR	10	µg/kg	M	003-004,017,023
Methyl tert-Butyl Ether	T209	AR	10	µg/kg	M	003-004,017,023
TPH (C5-C6 aliphatic)	T54	AR	0.10	mg/kg	N	003-004,017,023
TPH (C6-C7 aromatic)	T54	AR	0.10	mg/kg	N	003-004,017,023
TPH (C6-C8 aliphatic)	T54	AR	0.10	mg/kg	N	003-004,017,023
TPH (C7-C8 aromatic)	T54	AR	0.10	mg/kg	N	003-004,017,023
TPH (C8-C10 aliphatic)	T54	AR	0.10	mg/kg	N	003-004,017,023
TPH (C8-C10 aromatic)	T54	AR	0.10	mg/kg	N	003-004,017,023
TPH (C10-C12 aliphatic)	T219	AR	2	mg/kg	N	003-004,017,023
TPH (C10-C12 aromatic)	T219	AR	2	mg/kg	N	003-004,017,023
TPH (C12-C16 aliphatic)	T219	AR	2	mg/kg	N	003-004,017,023
TPH (C12-C16 aromatic)	T219	AR	2	mg/kg	N	003-004,017,023
TPH (C16-C21 aliphatic)	T219	AR	2	mg/kg	N	003-004,017,023
TPH (C16-C21 aromatic)	T219	AR	2	mg/kg	N	003-004,017,023
TPH (C21-C35 aliphatic)	T219	AR	2	mg/kg	N	003-004,017,023
TPH (C21-C35 aromatic)	T219	AR	2	mg/kg	N	003-004,017,023
Naphthalene	T16	AR	0.1	mg/kg	U	003-004,017,023
Acenaphthylene	T16	AR	0.1	mg/kg	U	003-004,017,023
Acenaphthene	T16	AR	0.1	mg/kg	M	003-004,017,023
Fluorene	T16	AR	0.1	mg/kg	M	003-004,017,023
Phenanthrene	T16	AR	0.1	mg/kg	U	003-004,017,023
Anthracene	T16	AR	0.1	mg/kg	M	003-004,017,023
Fluoranthene	T16	AR	0.1	mg/kg	N	003-004,017,023
Pyrene	T16	AR	0.1	mg/kg	N	003-004,017,023
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	M	003-004,017,023
Chrysene	T16	AR	0.1	mg/kg	M	003-004,017,023
Benzo(b)fluoranthene	T16	AR	0.1	mg/kg	U	003-004,017,023
Benzo(k)fluoranthene	T16	AR	0.1	mg/kg	N	003-004,017,023
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	M	003-004,017,023
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	M	003-004,017,023
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	M	003-004,017,023
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	M	003-004,017,023
PAH(total)	T16	AR	0.1	mg/kg	U	003-004,017,023

APPENDIX D: DRAWINGS

Drawing 17.041/PhaseII/Add/1

Drawing 17.041/PhaseII/Add/2

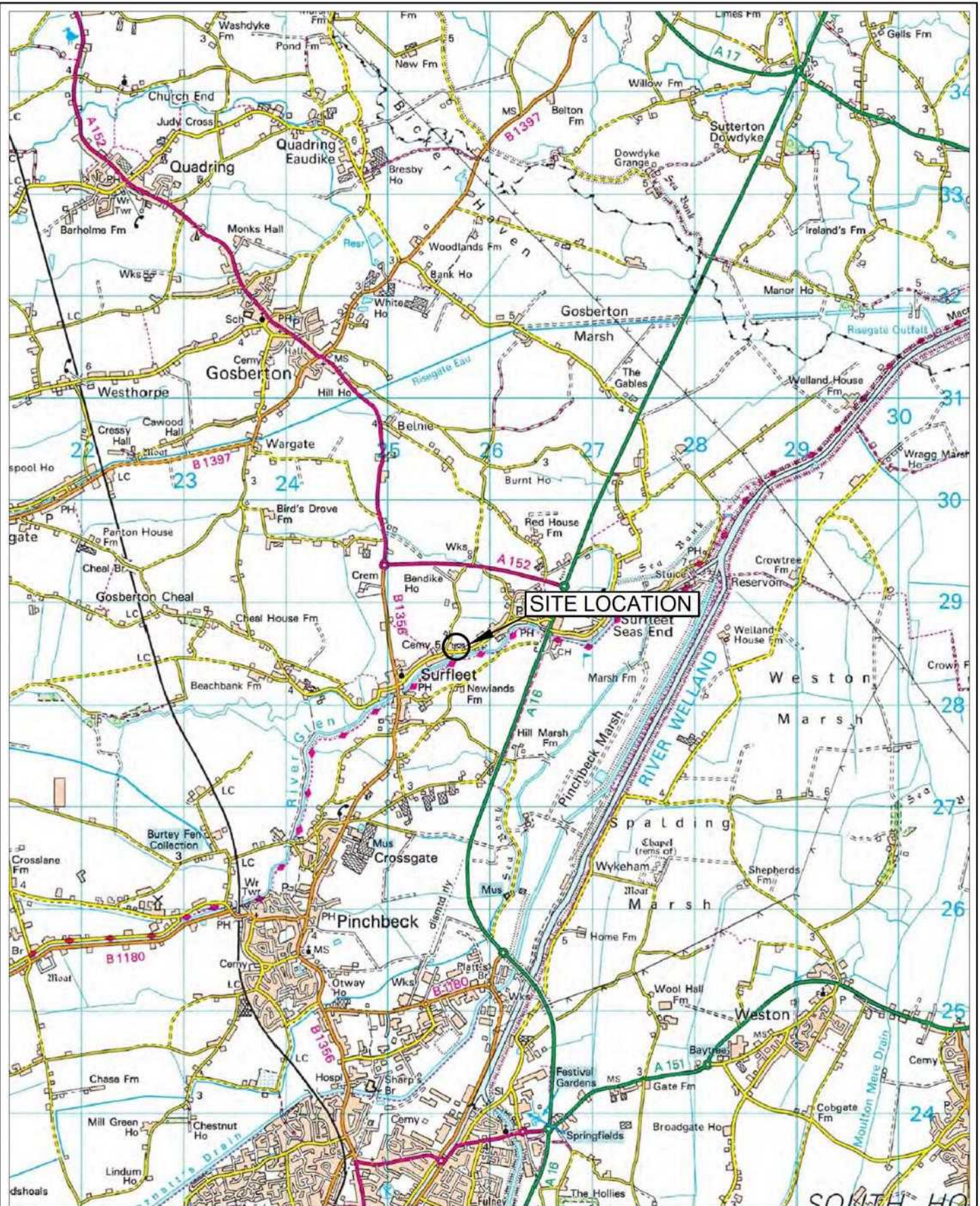
Sketch Layout – 5 No. Plots

Site Location Plan

Exploratory Hole Location Plan

Site Plan (dated November 2014)





North



Circle indicates approximate location of site



A F Howland Associates
Geotechnical Engineers

Site: Land adjacent to 72 Station Road, Surfleet, PE11 4DB

SITE LOCATION PLAN

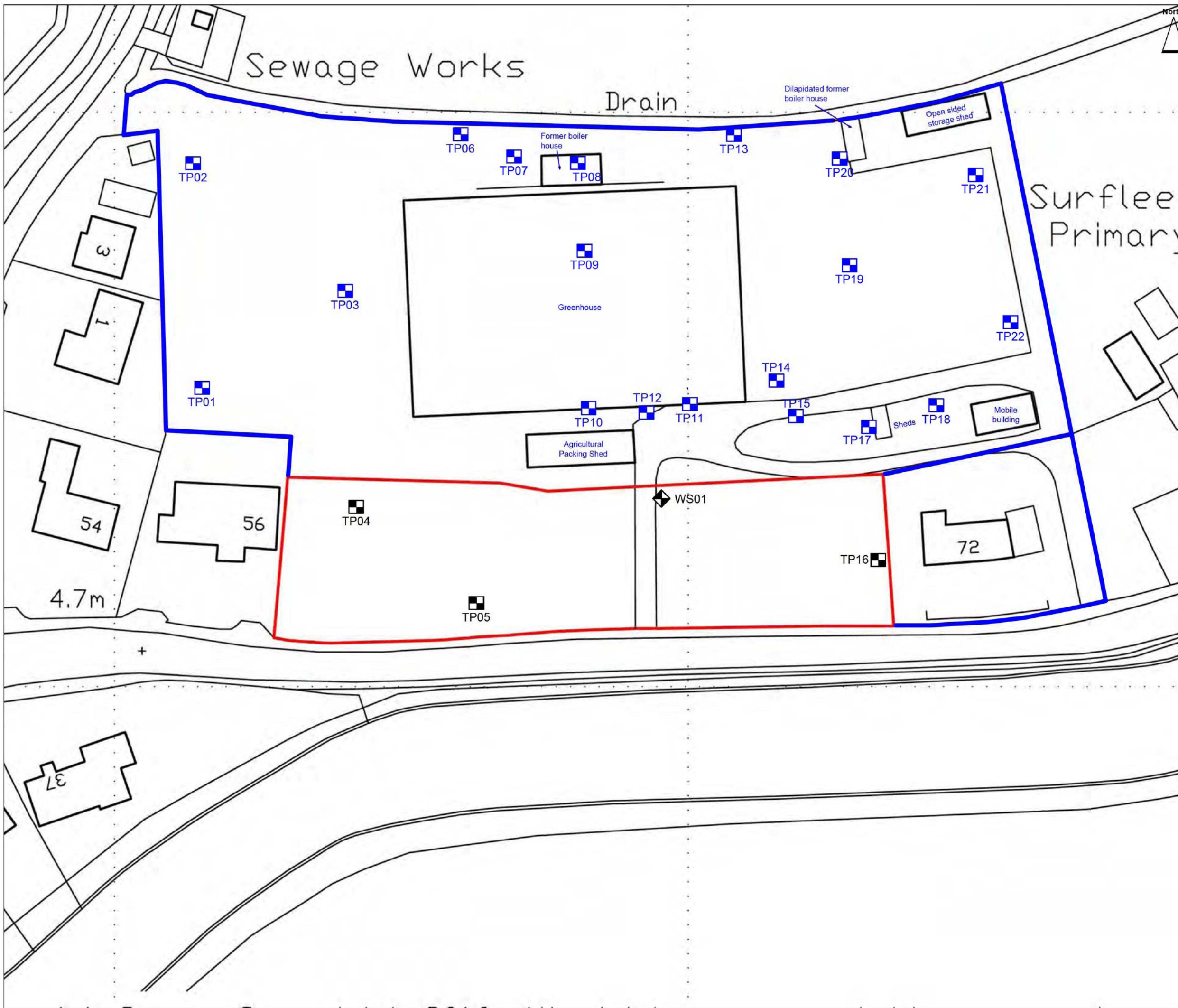
Client : Mr J W & Mrs G M Needham

Date : July 2017

Dwg : 17.041/PhaselI/Add/1

Scale 1: 50,000 @ A4

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown Copyright Licence No. AL 100002157



Key:

On Site

- Window sample location and reference
- Trial pit location and reference
- Site boundary

Off Site

- Trial pit location and reference (Off site, [AFHA, 2017b])
- Wider site area (as defined in AFHA, 2017b)

Reproduced by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown Copyright Licence No. AL 100002157

Rev	Date	Revision Description	Drwn	Chkd

A F Howland Associates
Geotechnical Engineers

A F Howland Associates Ltd
The Old Exchange
Newmarket Road
Cringleford
Norwich
NR4 6UF

Tel: 01603 250754 Fax: 01603 250749
web: www.howland.co.uk
mail: admin@howland.co.uk

Client: Mr J W & Mrs G M Needham

Site:
Land adjacent to 72 Station Road, Surfleet, PE11 4DB

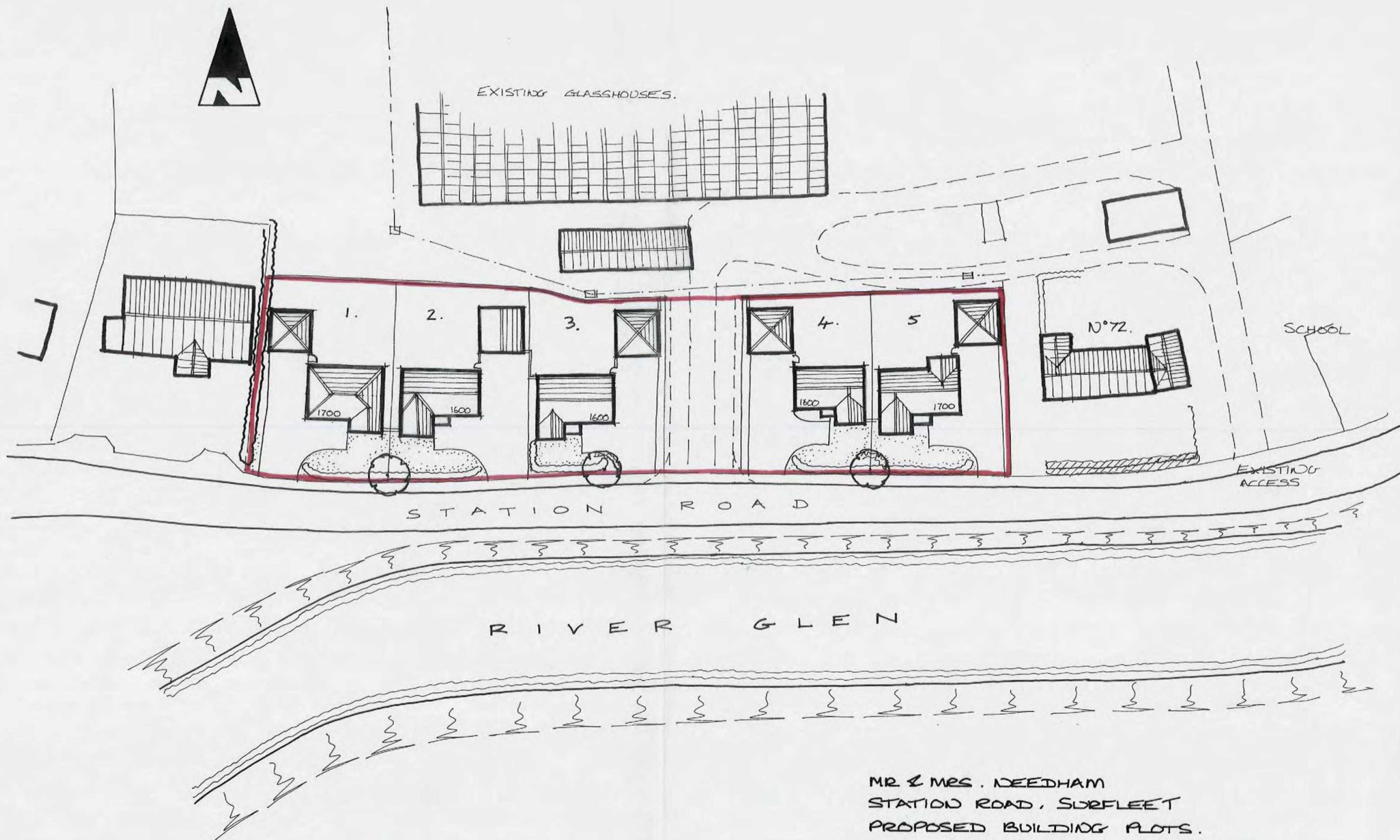
Job No.: 17.041

Drawing Title:
EXPLORATORY HOLE LOCATION PLAN

Date: July 2017

Drawing No: 17.041/PhaseII/Add/2

Scale: 1:625 @ A3



MR & MRS. DEEDHAM
STATION ROAD, SURFLEET
PROPOSED BUILDING PLOTS.

SKETCH LAYOUT - 5 N° PLOTS

1:500 @ A3 . NOV 2014

APPENDIX E: RISK ASSESSMENT CLASSIFICATION

Classification	Definition	Examples
Severe	Short term (acute) risk to human health. Short term risk of pollution of sensitive water resource. Catastrophic damage to buildings/property. A short term risk to a particular ecosystem, or organism forming part of such ecosystem.	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water.
Medium	Chronic damage to Human Health. Pollution of sensitive water resources. A significant change in a particular ecosystem, or organism forming part of such ecosystem.	Concentrations of a contaminant from site exceeds the generic, or site specific assessment criteria. Leaching of contaminants from a site to an aquifer.
Mild	Pollution of non-sensitive water resources. Significant damage to buildings/structures and crops ("significant harm" as defined in the Circular on Contaminated Land, DETR, 2000). Damage to sensitive buildings/structures or the environment.	Pollution of non-classified groundwater. Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as Personal Protective Clothing, etc). Easily repairable effects of damage to buildings/structures.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme.

Classification of consequence



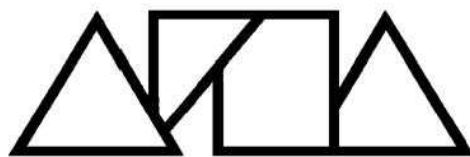
Classification	Definition
High Likelihood	There is a pollution linkage and an event which would either appear very likely in the short term and almost inevitable over the long term, or, there is evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term

Classification of probability

		CONSEQUENCE			
		Severe	Medium	Mild	Minor
PROBABILITY	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate/ Low Risk
	Likely	High Risk	Moderate Risk	Moderate/ Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/ Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/ Low Risk	Low Risk	Very Low Risk	Very Low Risk

Comparison of consequence against probability





A F Howland Associates

The Old Exchange
Newmarket Road
Cringleford
Norwich
NR4 6UF

Tel: 01603 250754

Fax: 01603 250749

Email: admin@howland.co.uk

www: <http://www.howland.co.uk>