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Mr Adam Clarke
Keepmoat Homes
Vico Court,
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LS12 6AN

Date: 22nd June 2018

Our Ref: C6944A/JF/8479

Dear Adam

Re: **Remedial Strategy – Ashbrow Road, Huddersfield**

1. Introduction

Sirius Geotechnical Ltd (Sirius) has been instructed by Keepmoat Homes to provide a remedial strategy for land at Ashbrow Road, Huddersfield (the "site"), to assist with the discharge of relevant planning conditions. This letter addresses the issues related to the localised presence of contamination at the site. With regard to earthworks activities an appropriate earthworks strategy will need to be completed and agreed with the warranty provider prior to remedial earthworks commencing.

The site is under consideration for the development of 110 residential properties with gardens, areas of public open space (POS), highways and associated infrastructure, as well as a 50 unit care facility, with associated communal gardens and areas of soft landscaping. A proposed development layout has been provided to Sirius by Keepmoat Homes (Drawing Ref. 114509/2003 Rev G, dated May 2016), and is included within Attachment A of this letter report.

Within the context of the proposed end use the site has been subject to a number of previous site investigations and assessments, and those most relevant to the remedial preparatory earthworks are detailed below:

- Geoenvironmental Appraisal of land off Ashbrow Road, Huddersfield for Kirklees Council, Wates Living Space, Galliford Try, Kier Living and Keepmoat Homes. Prepared by Sirius Geotechnical and Environmental Ltd, Ref. C6944A, dated June 2016.
- Ground Gas Risk Assessment Letter Report of land off Ashbrow Road, Huddersfield for Kirklees Council. Prepared by Sirius Geotechnical and Environmental Ltd, Ref. C6944A/NI/7449, dated 10th August 2016.

The reference number for the Granted Outline Planning Permission, issued by Kirklees

Council, is 2018/62/90586/W, dated 9th February 2018.

The site, occupying an area of c.4.5 hectares, has remained largely undeveloped throughout its history with the exception of two areas of sandstone quarrying along the southern and western boundaries and a small number of buildings both within the quarry areas and along the southern boundary, which are no longer present.

2. Contamination

The aforementioned site investigation works have identified the presence of two separate, localised areas of contamination requiring further investigation and remediation: Trial Pit TP114 where asbestos was recorded in the form of 'small bundles of amosite fibres', and trial pit TP112 where an elevated concentration of lead was recorded. In both cases the contaminants were present within the reworked topsoil. An exploratory hole location plan identifying these two locations is provided within Attachment B of this letter report.

3. Contamination Remedial Works

The main elements of the contamination remedial works will comprise the following:

- *Contamination* – Asbestos and lead at locations TP114 and TP112, respectively, will be delineated by removal of reworked topsoil over an area of approximately 7m by 7m, centred on the original sample point, with all removed material quarantined. Samples of residual reworked topsoil will then be recovered from the four sides of each excavation and submitted to an independent accredited laboratory for chemical testing to validate that sufficient material has been removed. Analytical results will be compared to Sirius's stage 1 generic assessment criteria for clean cover material for use in gardens of private residential properties, a copy of which is provided within Attachment C of this letter report. Should any sample not validate sufficient removal, more material will be removed from the relevant area and further testing undertaken, until validation is successfully completed.

The quarantined potentially contaminated soils from the two previously identified areas will be placed at a minimum depth of 1.0m below final finished levels within areas not subjected to excavation as part of this development i.e. away from new roads, sewers, service corridors etc. The area of deposition will be surveyed and recorded for future reference.

These works will be supervised by a suitably qualified and experienced Sirius geoenvironmental engineer.

- *Topsoil / Reworked Topsoil* – All remaining natural topsoil at the site and a proportion of the reworked topsoil is considered suitable for reuse within private gardens, soft landscaping, communal gardens and areas of POS. This material will be stripped, sorted and quarantined prior to reuse as part of the development, as appropriate. It is recommended that the site won soils are tested and assessed, as part of the enabling works, to confirm if they are suitable for re-use on site, in line with the Sirius stage 1 generic assessment criteria for clean cover materials.
- *Earthworks* – Following removal of topsoil / reworked topsoil, the remaining ground will be subject to cut and fill earthworks to establish a development platform in accordance with the client's specification.

During the earthworks programme a watching brief will be maintained for any visual and / or olfactory evidence of contamination not previously discovered. Any new areas of suspected contamination will be thoroughly investigated, assessed for potential unacceptable risks and remediated as necessary.

4. Reporting

Following completion of all remedial and preparatory earthworks, the geoenvironmental engineer will prepare a report on the works undertaken including: detailed description of works, photographic records, drawings showing full extent of placement of re-used materials, results of in-situ / ex-situ geotechnical testing, and copies of laboratory certificates of analysis for all chemical testing.

The completion report will be formally issued to the client, and any other stakeholder(s) / parties as deemed appropriate.

We trust that you find this satisfactory and that you will forward it to the regulatory authorities / warranty provider for review and approval, but if you do require any further information please do not hesitate to contact us directly.

Yours sincerely



Jenny Ford

Senior Engineer

For and on behalf of Sirius Geotechnical Ltd

Attachment A – Proposed Development Layout

Attachment B – Exploratory Hole Location Plan

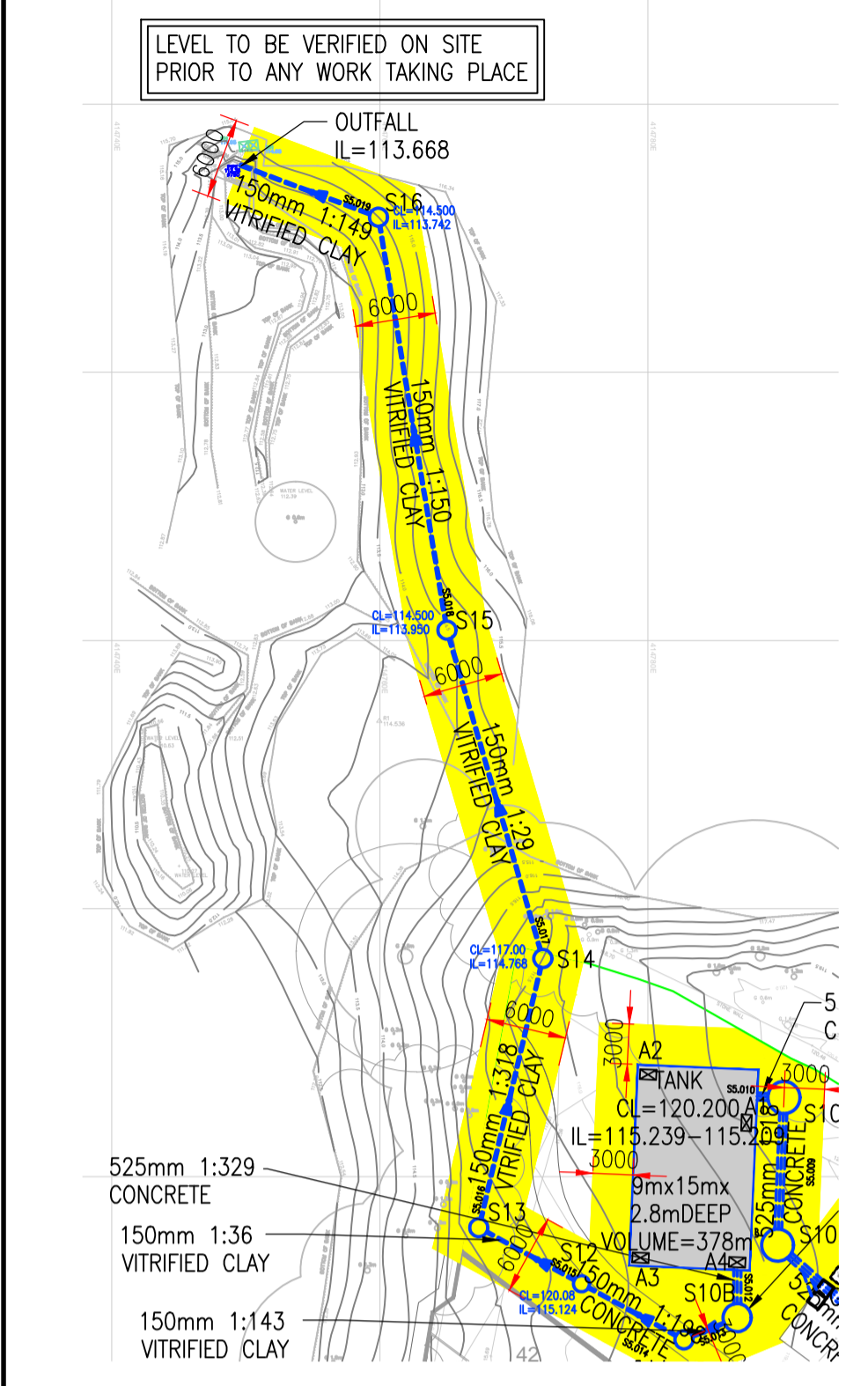
Attachment C – Sirius Generic Assessment Criteria



ATTACHMENT A

PROPOSED DEVELOPMENT
LAYOUT

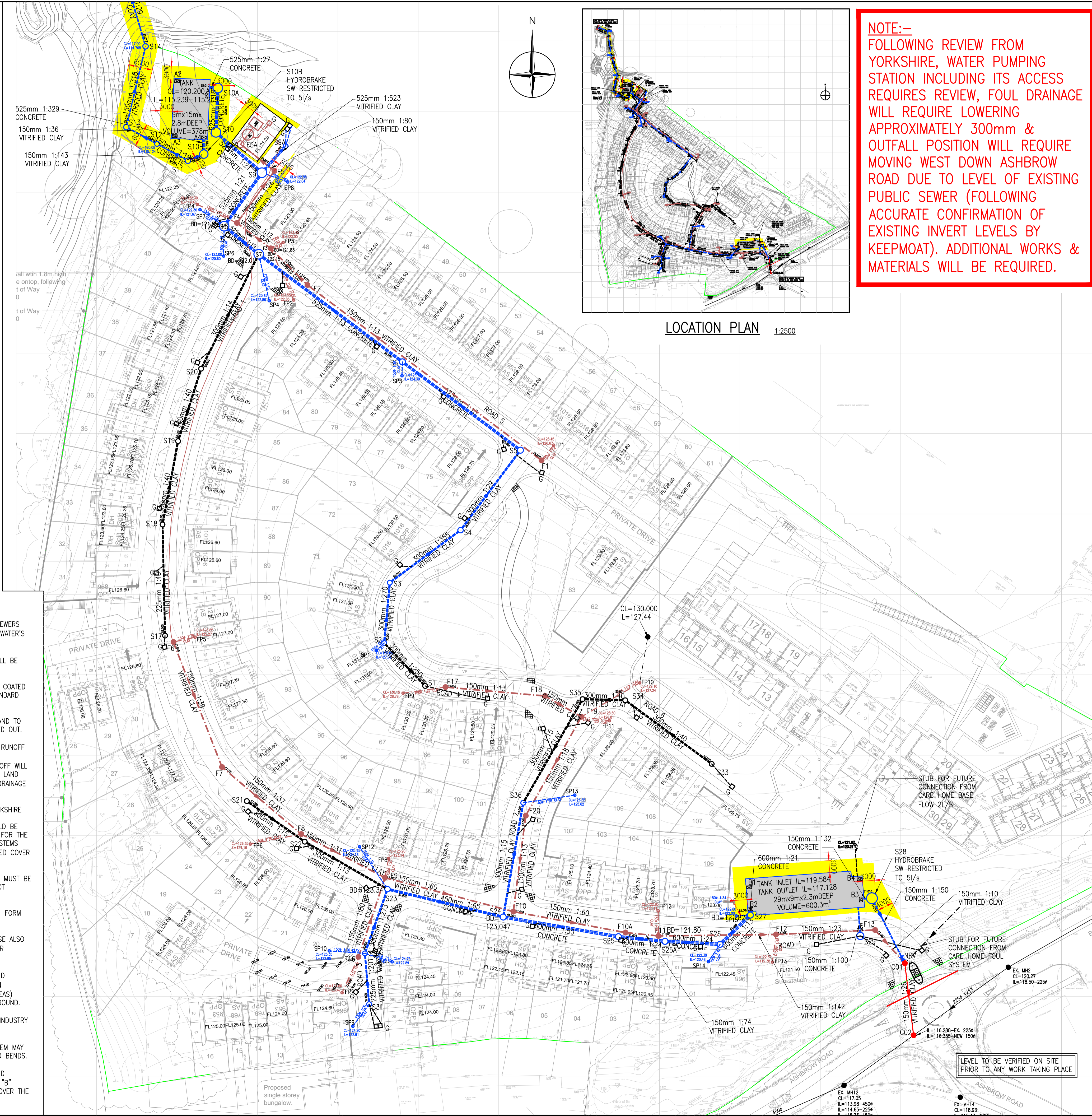
LEVEL TO BE VERIFIED ON SITE
PRIOR TO ANY WORK TAKING PLACE



NOTE:-SURFACE WATER OUTFALL TO BE INVESTIGATED OFF-SITE FOR USE AND APPROVAL WITH KIRKLEES COUNCIL / THIRD PARTY LAND OWNERS.

YORKSHIRE WATER NOTES:-

- 1) ALL ADOPTABLE SEWER WORKS AND MATERIAL TO BE IN ACCORDANCE WITH "SEWERS FOR ADOPTION" 6TH EDITION, THE RELEVANT BRITISH/EUROPEAN AND YORKSHIRE WATER'S STANDARDS/REQUIREMENTS/ADDENDUM AND KITEMARKED.
- 2) MANHOLE COVERS SHALL/MUST HAVE A CLEAR OPENING OF 600mm AND SHALL BE CLASS D400 TO BS EN 124 WITH 150mm DEEP FRAMES IN HIGHWAY.
- 3) WHERE A B125 COVER AND FRAME HAS BEEN APPROVED, THIS MUST NOT BE COATED IN PLASTIC AND MUST HAVE LIFTING EYES SUITABLY SIZED TO ACCOMMODATE STANDARD LIFTING KEYS. SCREW DOWN COVERS ARE NOT ACCEPTABLE.
- 4) FILL GROUND MUST BE FILLED AND CONSOLIDATED UNDER THE SUPERVISION AND TO THE SATISFACTION OF YORKSHIRE WATER BEFORE ANY SEWER WORKS ARE CARRIED OUT.
- 5) YORKSHIRE WATER IS NOT OBLIGED TO ACCEPT FILTER DRAIN/LAND DRAINAGE RUNOFF INTO PUBLIC SEWER NETWORK OR ADOPTABLE DRAINAGE SYSTEM (DIRECTLY OR INDIRECTLY). AN ALTERNATIVE METHOD OF DISPOSAL OF THE LAND DRAINAGE RUNOFF WILL THEREFORE BE REQUIRED AND YOU WILL HAVE TO LIAISE WITH LOCAL AUTHORITY, LAND DRAINAGE SECTION WITH REGARD TO THE DISPOSAL OF THE FILTER DRAIN/LAND DRAINAGE RUNOFF.
- 6) COVER SLABS MUST CARRY THE BSI KITEMARK OR WILL BE REJECTED BY YORKSHIRE WATER INSPECTOR. WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOADING BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING TO SIZE DOWN TO 600mm x 600mm FOR THE YORKSHIRE WATER SPECIFIED COVER SIZE. PLEASE REFER TO CONCRETE PIPE SYSTEMS ASSOCIATION (CPSA), 'TECHNICAL BULLETIN' ISSUED AUTUMN 2004 FOR KITEMARKED COVER SLAB OPENING SIZES.
- 7) SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVING SUCH PRECAUTIONS ARE NOT NECESSARY.
- 8) THE ADOPTABLE SEWERS SHOULD BE A MINIMUM OF 1m AND MANHOLES 0.5M FORM KERB FACES AND SERVICE MARGINS.
- 9) "SEWERS MUST HAVE 5 METRES CLEARANCE FROM TREES AND HEDGES (PLEASE ALSO REFER TO FIGURE 2.3 ON PAGE 33 IN "SEWERS FOR ADOPTION" 6TH EDITION FOR RESTRICTIONS ON TREE PLANTING ADJACENT TO SEWERS)".
- 10) SEWERS TO BE LAID IN CLASS "S" BEDDING (150mm GRANULAR BEDDING AND SURROUND), WHERE DEPTH OF COVER TO TOP OF SEWER IS LESS THAN 1.2m IN HIGHWAYS AND VERGES (OR LESS THAN 900mm IN NONE VEHICULAR ACCESS AREAS) THEN A CONCRETE SLAB SHOULD BE PROVIDED ABOVE GRANULAR BED AND SURROUND.
- 11) BEDDING AND BACKFILL MATERIAL TO CONFORM TO REQUIREMENT OF WATER INDUSTRY SPECIFICATION 4-08-02 (TABLE A2).
- 12) THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
- 13) YORKSHIRE WATER POLICY IS NOT TO ACCEPT TYPE "C" BRICK MANHOLES AND 1050mm DIA MANHOLE RINGS. INSTEAD IT IS PREFERRED THAT YOU USE A TYPE "B" MANHOLE WITH 1200mm DIA OR 1500mm DIA RINGS, WITH THE OPENING SITED OVER THE CHANNEL WHERE DEPTH OF COVER TO PIPE SOFFIT IS 1-1.5m.



NOTE:-
FOLLOWING REVIEW FROM YORKSHIRE, WATER PUMPING STATION INCLUDING ITS ACCESS REQUIRES REVIEW, FOUL DRAINAGE WILL REQUIRE LOWERING APPROXIMATELY 300mm & OUTFALL POSITION WILL REQUIRE MOVING WEST DOWN ASHBROW ROAD DUE TO LEVEL OF EXISTING PUBLIC SEWER (FOLLOWING ACCURATE CONFIRMATION OF EXISTING INVERT LEVELS BY KEEPMOAT). ADDITIONAL WORKS & MATERIALS WILL BE REQUIRED.

Do not scale from this drawing.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.

RISKS LISTED HERE ARE NOT EXHAUSTIVE. REFER TO DESIGN ASSESSMENT FORM NO.

CONSTRUCTION

DEMOLITION

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

NOTE:-
DETAILS SHOWN ARE SUBJECT TO SECTION 104 APPROVAL. ADDITIONAL WORKS & MATERIALS COULD BE REQUIRED.

KEY:-

- PROPOSED S104 FOUL SEWER
- PROPOSED S104 SURFACE WATER SEWER
- PROPOSED S104 COMBINED WATER SEWER
- PROPOSED HIGHWAY SURFACE WATER SEWER
- EXISTING COMBINED SEWER
- EXISTING GULLY
- FOUL WATER RISING MAIN
- PROPOSED S104 FW DEMARCATION CHAMBER
- PROPOSED S104 SW DEMARCATION CHAMBER
- PROPOSED PROPRIETARY NON RETURN VALVE
- PROPOSED TANK
- PROPOSED EASEMENT

Rev.	Date	Description	Drawn	Chkd.	Appd.
G	01/04/16	DRAINAGE AROUND PUMPING STATION UPDATED. DRAINAGE UPDATED TO AVOID CLASHES	MJS	DS	CM
F	06/01/16	NOTE ADDED, TANKS SIZES AND DRAINAGE UPDATED	MJS	CM	JRT
E	16/02/16	UPDATED TO SUIT YORKSHIRE WATERS COMMENTS VIA EMAIL DATED 10/11/2017 AND UPDATED TO SUIT CLIENTS COMMENTS	MJS	DS	JRT
D	05/01/16	YORKSHIRE WATER NOTE ADDED, RM COLOUR UPDATED	MJS	DS	JRT
C	14/01/16	UPDATED FOLLOWING COMMENTS FROM KIRKLEES COUNCIL EMAIL DATED 23/09/17. NOTES ADDED, SW & FW STUB CONNECTIONS ADDED TO SCENE CARE HOME SITE	DAS		
B	11/01/16	EASEMENT UPDATED, F21 MOVED TO SUIT COMMENTS AND GULLYS MOVED TO AVOID DRIVEWAYS.	MJS	FT	FT
A	08/01/16	STORAGE TANK ADDED	MS	FT	FT

FAIRHURST
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Keepmoat

Project Title:
**KEEPMOAT HOMES
ASHBROW ROAD
HUDDERSFIELD**

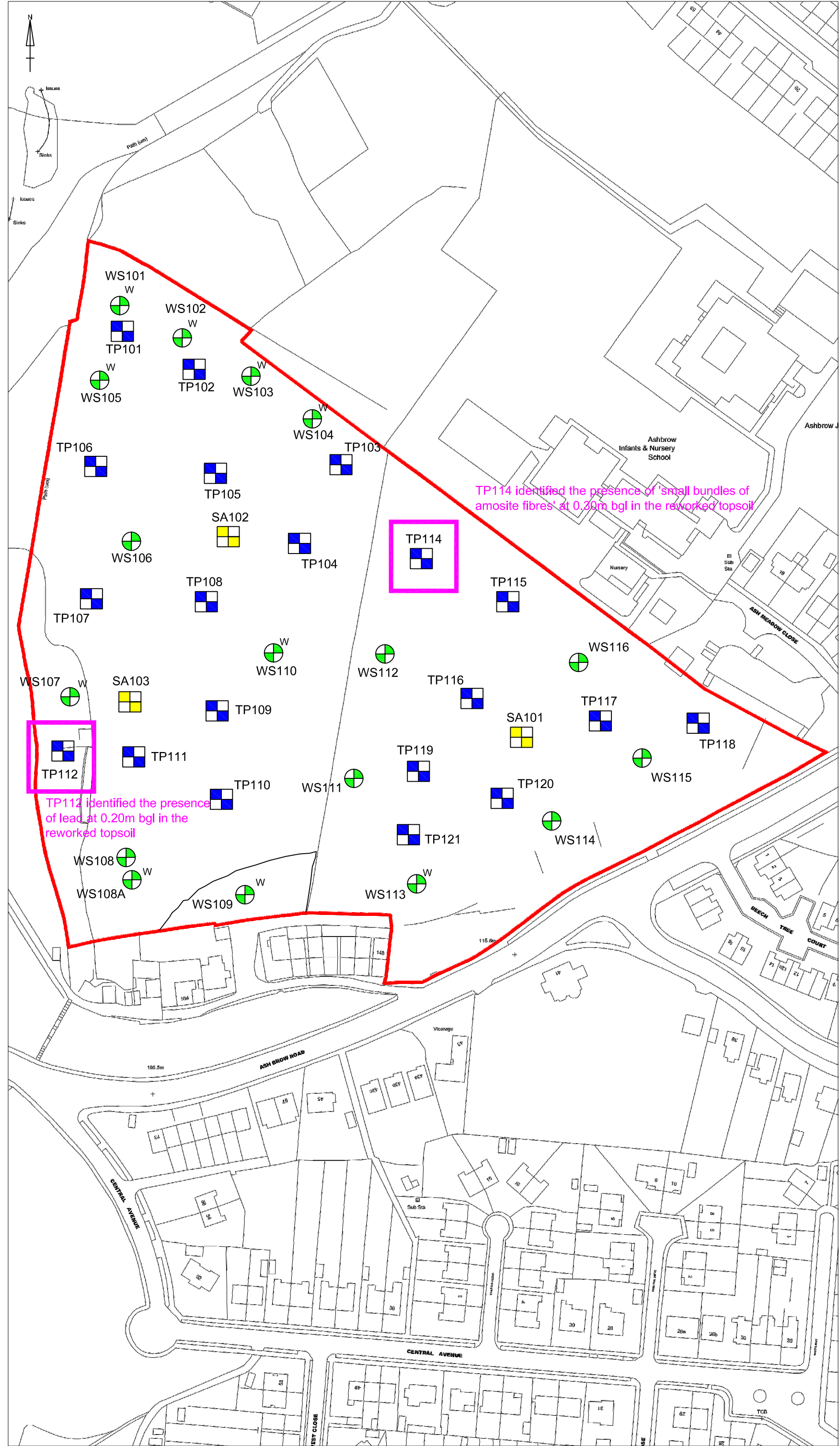
Drawing Title:
**SECTION 104
DRAINAGE LAYOUT**






Scale at A1: 1:500	Status: Preliminary
Drawn: JC	Checked: JC
Date: 18/05/16	Date: 18/05/16
Drawing No.:	Revision: 114509/2003 G



ATTACHMENT B

EXPLORATORY HOLE
LOCATION PLAN



- NOTES
-  Window Sample Borehole
 -  Window Sample Borehole with Monitoring Well
 -  Trial Pit
 -  Trial Pit with Soakaway
 -  Trial pit location where localised contamination has been found

REVISION	
0	For Information
A	>>
B	>>
C	>>
D	>>

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CLIENT
KEEPMOAT HOMES

SITE
**ASHBROW ROAD,
 HUDDERSFIELD**

DRAWING TITLE
**EXPLORATORY HOLE
 LOCATION PLAN
 (showing localised
 areas of contamination)**

DRAWING NO. C6944A/RS	REVISION NO. 0
DRAWN BY JF	APPROVED BY JD
DATE June 2018	SCALE 1:1000
	PAPER SIZE A3



ATTACHMENT C

SIRIUS GENERIC ASSESSMENT CRITERIA

The Sirius Group Stage 1 Threshold Concentrations for Clean Cover Material for Use in Gardens of Private Residential Properties

Parameter	Threshold Concentration (mg/kg, unless otherwise stated)			Comment
	1% SOM [*]	2.5% SOM	5% SOM	
Metals/Metalloids				
Arsenic (inorganic)	37			
Cadmium	11			Soil pH 6-9
Chromium (III)	910			
Copper	200			Based on phytotoxic effect
Lead	200			
Mercury (inorganic)	40			
Nickel	130			
Selenium	250			
Zinc	450			Based on phytotoxic effect
Other Inorganics				
pH	<5 or >9			Must be in range 5-9
Water-Soluble Sulphate	0.5 g/l			
Organics				
PAHs^{**}				
Total 16 PAHs	100	100	100	Professional judgement
Benzo(a)pyrene	2.1	2.1	2.2	Genotoxic surrogate
Naphthalene	1.0	2.3	4.6	
TPH[†]				
Sum of TPH fractions EC5-35	500	500	500	Professional judgement
Aliphatic EC 5-6	24	41	68	
Aliphatic EC >6-8	53	110	210	
Aliphatic EC >8-10	13	31	61	
Aliphatic EC >10-12	62	150	300	
Aliphatic EC >12-16	510	1200	2300	
Aliphatic EC >16-35	41000	70000	90000	
Aromatic EC >5-7	53	110	200	
Aromatic EC >7-8	100	240	460	
Aromatic EC >8-10	20	48	94	
Aromatic EC >10-12	63	150	290	
Aromatic EC >12-16	140	320	570	
Aromatic EC >16-21	260	540	840	
Aromatic EC >21-35	1100	1500	1700	
TPH Hazard Index (no units)	<1	<1	<1	
BTEX[‡]				
Benzene	0.063	0.13	0.24	
Miscellaneous Organics				
Phenol	110	190	330	
Other Parameters				
Asbestos	Unsuitable if any fibres present			

Based on sandy soil at a range of soil organic matter contents and assuming a standard residential with gardens land use. Alternative criteria may be specified for other soil types and SOM contents, for soils placed at depth, or for other land uses.

Notes:

* Soil organic matter; %SOM = 1.724 * %TOC.

** Soils must meet the specified criteria for each component AND the sum of 16 PAHs. The total is specified to prevent unsuitable materials being placed as cover. Where an individual PAH is not shown, then its criterion is greater than that for the sum or it is a genotoxic PAH assessed by using benzo(a)pyrene as a surrogate marker.

† Soils must meet the specified criteria for each component and the Hazard Index for TPH must be <1.0. The sum of TPH fractions must also be met to prevent unsuitable materials being placed as cover. Where an individual TPH fraction has a criterion greater than that for the sum of TPH fractions, the value is solely provided for the calculation of the Hazard Index.

‡ Components other than benzene are not genotoxic carcinogens and therefore assessed as part of the TPH mixture.

Soils must have no visual or olfactory evidence of contamination.