

## **VALIDATION REPORT**

### **EARTHWORKS AT SOOTHILL BATLEY PHASE 2**

The Soothill Batley Site comprises an irregular shaped plot of land to the South of Soothill Lane and east of Mill Forest Way in Batley West Yorkshire. The site is to be developed and 319 dwellings along with the associated roads, sewers and public open space are to be constructed

The site comprises two phases of work with Phase 1 to the lower site [below an escarpment that crosses the site in an east to west direction]. Phase 1 is further split into two parts with Phase 1A being to the south of the existing Bridleway, again crossing the site east to west, and Phase 1B being above.

The Main Contractor and Designer under the CDM Regulations of the Site is Keepmoat Homes Limited[KMH]. The construction of the roads, sewers and substructure works to the whole site were subcontracted by KMH to Caddick Civil Engineering Limited[CCE]. CCE engaged Fastsource Limited of The Old Coal Yard, Calder Vale Road, Wakefield, West Yorkshire WF1 5PH to carry out Earthworks in accordance with the drawings prepared by ARP consulting Engineers.

This Report relates to the cutting and filling excavation works to phase 2. A general arrangement of the site is included in Appendix 1.00

A Site Investigation was undertaken by Groundtech Consulting and a detailed report has been produced, refer to report Geo-Environmental Appraisal Ref 18058/536 Date 22<sup>nd</sup> Aug 2019.

Topsoil to the whole of Phase 2 has been deemed as suitable for re use in domestic dwellings and as such has been stripped and stored as necessary in stockpiles.

The earthworks were modelled off the CAD drawings provided by ARP with construction depths for Roads and plots inputted in to the model so that upon completion of earthworks, the follow up works to construct roads/ sewers and then plots was ready to commence.

Earthworks commenced for Phase 2 in October 2023, and have been ongoing until September 2024, with only the Site Welfare/Compound Area on the Phase 1 and 2 boundary requiring Earthworks completion/validation – **All Remaining Earthworks within Phase 2 of site are now complete.**

Approx 1000m<sup>3</sup> of topsoil was transferred to another KMH site at Bradford under a MMP organised by KMH, but no other material has been taken off site to date, as there should be a cut/ fill balance on this phase.

The adoptable sewers on the site are being constructed in accordance with the drainage detail and layout drawings and supervised by Yorkshire water inspectors.

The adoptable roads on the site are constructed in accordance with the highway engineering detail drawings and supervised by Kirklees Metropolitan council Highways department.

## **1.0 INTRODUCTION**

1.1 Keepmoat Homes Limited is developing land off Soothill Lane, Batley with residential properties. To facilitate the development, it will be necessary to carry out earthworks on the site in the form of a cut and fill exercise to achieve design levels. An Earthworks Specification was considered necessary to provide information to contractors on the extent and nature of the works required.

1.2 ARP Geotechnical Ltd was appointed by Keepmoat Homes Limited to provide the Earthworks Specification, and this document is the result.

1.3 A Phase 1 Geo-Environmental and Coal Mining Risk Assessment Report was produced in July 2015 by Parsons Brinkerhoff (Reference 351491A.3171 version 1) for the site. A Geo- Environmental Appraisal was prepared by Groundtech Consulting (Reference 18058/536 Rev 1.5) and was issued for the site in August 2019 for Kirklees Council. In March 2021, a supplementary ground investigation letter report was produced by Sirius Geotechnical (Reference C8906/GH/9543). In February 2022, an updated slope stability analysis was produced by Sirius Geotechnical (Reference C8906/GH/9796).

1.4 The updated slope stability analysis produced by Sirius Geotechnical (Reference C8906/GH/9796 February 2022) reviewed and analysed the up-to-date proposed slope profiles on the site and concluded that the proposed slopes were stable.

## **SITE PREPARATION AND EXCAVATIONS**

2.1 Existing vegetation has been removed and the topsoil has been stripped and stockpiled in a quarantined area, filling works commenced after the strip was completed.

2.2 The following enabling works were required prior to the commencement of development:

- Strip and remove existing vegetation and topsoil, and stockpile topsoil for reuse on site (unsuitable topsoil to be removed from site). Vegetation was disposed of appropriately and not used as fill material for any filling earthworks.
- In accordance with the most recent tree survey and development plan, removal of any trees that are not designated to stay in the development was undertaken.
- Appropriate pollution prevention measures were undertaken, for example cut off bunds, filtration, and silt settlement, to ensure that soils and any silty water run-off did not pollute the watercourse to the west of the site.
- Proof roll the resulting surfaces to be filled and remove any evident soft spots, or boulders protruding or inhibiting the founding surface.

2.3 All disposal/waste transfer documents have been retained for any material that is removed from site.

2.4 Fill material was placed into/against existing slopes, benched with steps of a minimum 1 m wide and maximum 0.5m high, where possible.

2.5 All filling operations were undertaken with suitable materials, which have been classified and compacted in accordance with this specification, as set out in Section 4.0, to bring levels to the proposed finished earthwork levels.

### 3.0 PLACEMENT AND COMPACTION OF FILL

3.1 Across the site, proposed levels are fairly similar to existing levels, with the exception of a few areas that required localised level changes, which include an area of filling on the slope in the west (to reduce the existing steep slope angle), and the area at, and downslope of a turning head in the east. Significant fill was also required for an area adjacent to the large attenuation tank excavation on site. These, and other areas of fill, required earthworks control, along with areas below/adjacent to roads and structures such as retaining walls. See appendix 2.0 for the full isopachyte drawing of all phases on site which shows the areas where cut and fill are required.

Site Won material has been tested and proven suitable for re-use/re-engineering works. To be considered suitable for re-use the materials had to meet a grading in line with the Highways Agency Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works Series 0600 (Earthworks).

Class 1A		Class 2A/2B		Class 2C		Class 6F1		Class 6F2	
BS Sieve	% Passing by Mass	BS Sieve	% Passing by Mass	BS Sieve	% Passing by Mass	BS Sieve	% Passing by Mass	BS Sieve	% Passing by Mass
125mm	95-100	125mm	100	125mm	100	125mm	100	125mm	100
		90mm		90mm		90mm	100	90mm	80-100
		75mm		75mm		75mm	100	75mm	65-100
		37.5mm		37.5mm		37.5mm	75-100	37.5mm	45-100
		10mm		10mm		10mm	40-95	10mm	15-60
		5mm		5mm		5mm	30-85	5mm	10-45
		2mm	80-100	2mm	15-80	600 µm	10-50	600µm	0-25
63µm	<15	63µm	15-100	63µm	15-80	63µm	<15	63µm	0-12

Materials considered suitable for the works have been tested in the laboratory, prior to placement for moisture content/dry density relationships (otherwise known as optimum moisture content tests) in accordance with BS 1377 Test 12 or 14, as appropriate and if cohesive in character, for plasticity index too. The Material used was MOT TYPE 1 underneath the highways and cohesive material (Class 2C) site won from stockpiles on site in General Site areas. Samples of the materials tested for

particle size distribution (PSD), revealed the materials to meet a classification of Class 2C in accordance with the Highway Agency Specification for Highway Works.

### **Plant**

The general plan used for the placement and compaction works included the following:-

Bomag Vibratory Roller BW213 DH (Tamping Drum)

Bomag 120 BW AD (Tandem Roller)

8 Tonne Komatsu P80 360 Excavator

2no. 3 Tonne Forward Tipping Dumpers

1,200 Litre Towered Bowser

Wacker Neuson RTSC3 Remote Controlled Roller

### **Layer Thickness and Passes**

The placement of the material (MOT TYPE 1) was 150mm layers, with a minimum of five passes of the Tandem Roller. The appropriate number of passes were observed and approved. The operating plant weight was 2750kg (Bomag Tandem Roller).

The placement of the material (Class 2C) was in 150mm to 200mm layers, with a minimum of nine passes of the vibratory roller. The appropriate number of passes were observed and laboratory results were carried out to confirm the appropriate degree of compaction had been achieved.

### **Compaction/Validation requirements**

In areas within influence of any adoptable roads, the fill compacted was required to have a dry density of 95% of the maximum dry density. Testing confirms that was achieved (see lab results in Appendix 4.0). CBR results were required by Kirklees Highways at formation level of the adoptable roads. A plan showing the positions of

the CBR results along with the CBR results are in Appendix 4.0. The testing has followed the requirements stated within the ARP Earthworks Specification.

### **Compaction/Validation requirements for General Site Areas**

In areas outside the influence of any adoptable roads or pertinent structures, the fill compacted shall have a minimum field dry density of 85% of the maximum dry density. If the material is coarse (grading such as 6F2) then maximum dry density tests are not practical and a CBR test should be used with a minimum 5% achieved.

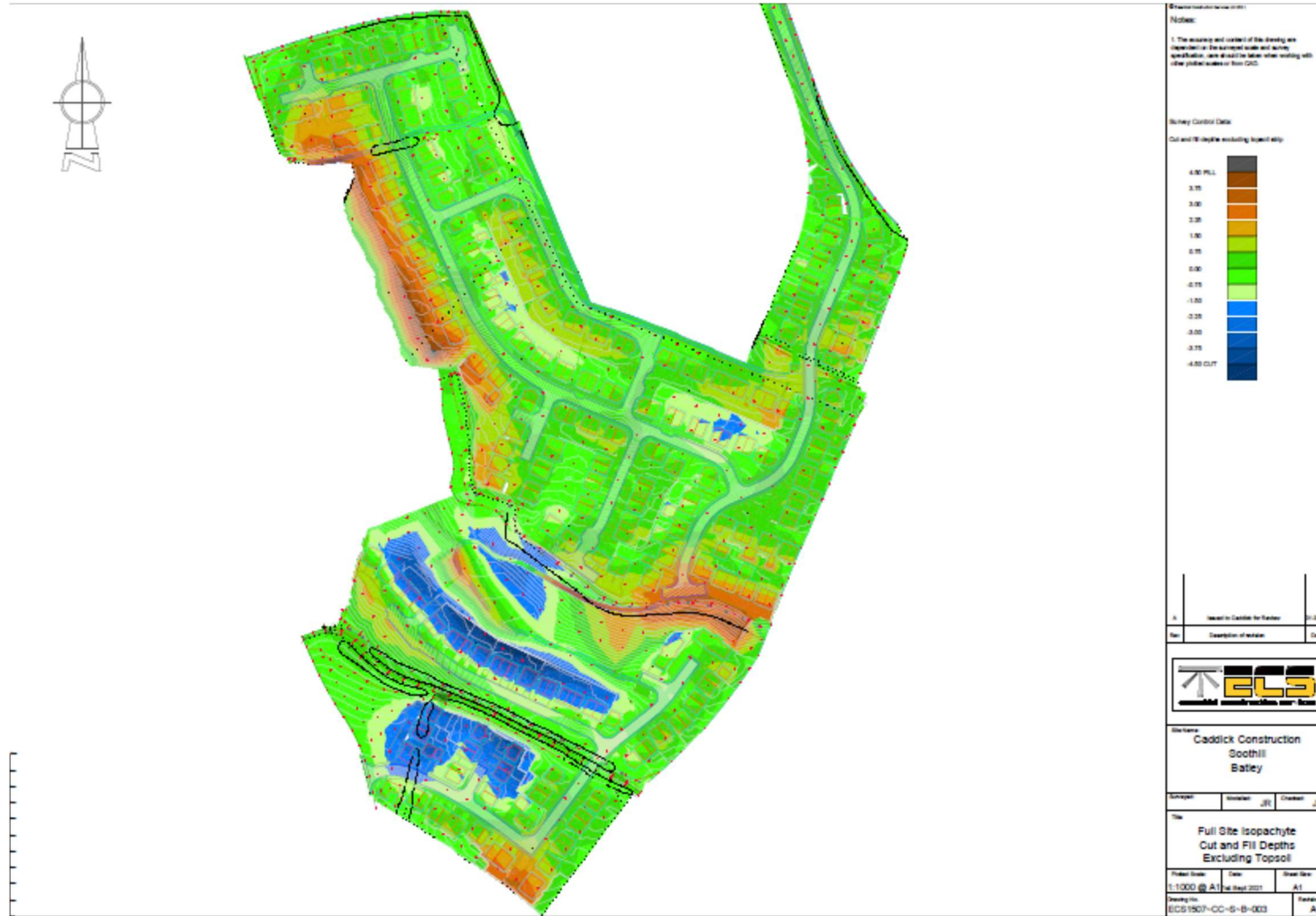
**For further information/detail – please refer to the ARP Earthworks Specification Report KMT/25r1 V2 by ARP.**

Appendix 1.0

Soothill Lane Batley – General Layout Drawing



Appendix 2.00 - 20210901 - Full Site Isopachyte- ECS1507~CC~S~B~003



### **Appendix 3.0 – Core Testing**

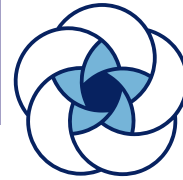
Core Testing was carried out by White Rose Laboratory Services within Phase 2.

As shown on the Isopachyte drawing (Appendix 2.0), The areas where there are significant Fill within Phase 2 are the embankments coloured Red. Currently, the site Welfare and Compound are located within the area on the eastern boundary of the drawing so this section will be completed on removal of the Site Welfare/Compound.

The area on the western boundary has been reference as “Embankment behind Plots 118-103” and the results of the core testing are listed below, in accordance with the Earthworks Specification.

# TEST REPORT

Caddick Construction Ltd  
 Calder Grange  
 Knottingley  
 West Yorkshire  
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White  
 Rose  
 Laboratory  
 Services  
 Ltd

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Report	WRL/24/1469cc	Sample Log N°	WRL/24/1469
Report Date	05/09/24	Test Date	29/08/24
Site	Soothill Lane, Soothill, Batley, WF17 6EZ		
Material	Slightly gravelly blay CLAY (Coal Fragments)		
Supplier	Ex Site	Weather conditions	Sunny
Source	Ex Site		

## BS 1377-9 1990 CI 2.4 Determination of insitu density by core cutter method

Reference MDD	1.75 Mg/m <sup>3</sup>	OMC/MDD report number	Mean of S/23/2154,
Reference OMC	- %		2155 & 2156

Test N°	Location	Bulk Density Mg/m <sup>3</sup>	Moisture Content %	Dry Density Mg/m <sup>3</sup>	% MDD %
1469A	Core 5 Terrace 7/8	1.99	19	1.68	95.7
1469B	Core 6 Terrace 7/8	1.85	17	1.58	90.1
1469C	Core 7 Terrace 7/8	1.88	18	1.60	91.3
1469D	Core 8 Terrace 7/8	1.95	16	1.69	96.3

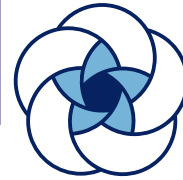
Tests were performed insitu at site and location shown. Results apply only to material tested.  
 \*indicates data supplied by customer

J Church MSc  
 Managing Director

RT009b/24/01

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Report	WRL/24/1410R1cc	Sample Log N°	WRL/24/1410R1
Report Date	18/9/24	Test Date	29/8/24
Site	Soothill Lane, Soothill, Batley, WF17 6EZ		
Material	Dark grey cohesive gravelly colliery Spoil		
Supplier	Ex Site	Weather conditions	Sunny
Source	Ex Site		

## BS 1377-9 1990 CI 2.4 Determination of insitu density by core cutter method

Reference MDD	1.49 Mg/m <sup>3</sup>	OMC/MDD report number	Mean of S/24/0801,
Reference OMC	- %		0799 & 0849

Test N°	Location	Bulk Density	Moisture Content	Dry Density	% MDD
		Mg/m <sup>3</sup>	%	Mg/m <sup>3</sup>	%
1410R1A	Embankment 1 53.71218N 1.61065W	1.83	18	1.56	104.7
1410R1B	Embankment 2 53.71191N 1.61151W	1.81	19	1.53	102.6
1410R1C	Embankment 3 53.71199N 1.61148W	1.88	18	1.59	106.7
1410R1D	Embankment 4 53.71185N 1.61134W	1.87	18	1.58	106.3

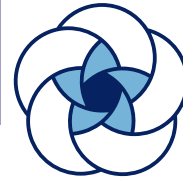
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R Cowles  
 Laboratory Technical Supervisor

RT009b/24/01

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Report	WRL/24/1410cc	Sample Log N°	WRL/24/1410
Report Date	05/09/24	Test Date	29/08/24
Site	Soothill Lane, Soothill, Batley, WF17 6EZ		
Material	Dark grey cohesive gravelly colliery Spoil		
Supplier	Ex Site	Weather conditions	Sunny
Source	Ex Site		

## BS 1377-9 1990 CI 2.4 Determination of insitu density by core cutter method

Reference MDD	1.75 Mg/m <sup>3</sup>	OMC/MDD report number	Mean of S/23/2154,
Reference OMC	- %		2155 & 2156

Test N°	Location	Bulk Density Mg/m <sup>3</sup>	Moisture Content %	Dry Density Mg/m <sup>3</sup>	% MDD
1410A	Embankment 53.71218N 1.61065W	1.83	18	1.56	89.1
1410B	Embankment 53.71191N 1.61151W	1.81	19	1.53	87.3
1410C	Embankment 53.71199N 1.61148W	1.88	18	1.59	90.8
1410D	Embankment 53.71185N 1.61134W	1.87	18	1.58	90.5

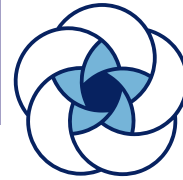
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Report Date	18/9/24	Test Date	3/9/24
Site	Soothill Lane, Soothill, Batley, WF17 6EZ		
Material	Slightly gravelly black CLAY (Coal Fragments)		
Supplier	Ex Site	Weather conditions	Sunny
Source	Ex Site		

## BS 1377-9 1990 CI 2.4 Determination of insitu density by core cutter method

Reference MDD	1.49 Mg/m <sup>3</sup>	OMC/MDD report number	Mean of S/24/0801,
Reference OMC	- %		0799 & 0849

Test N°	Location	Bulk Density Mg/m <sup>3</sup>	Moisture Content %	Dry Density Mg/m <sup>3</sup>	% MDD %
1469A	Core 5 Terrace 7/8	1.99	19	1.68	112.4
1469B	Core 6 Terrace 7/8	1.85	17	1.58	105.8
1469C	Core 7 Terrace 7/8	1.88	18	1.60	107.2
1469D	Core 8 Terrace 7/8	1.95	16	1.69	113.1

Tests were performed insitu at site and location shown. Results apply only to material tested.  
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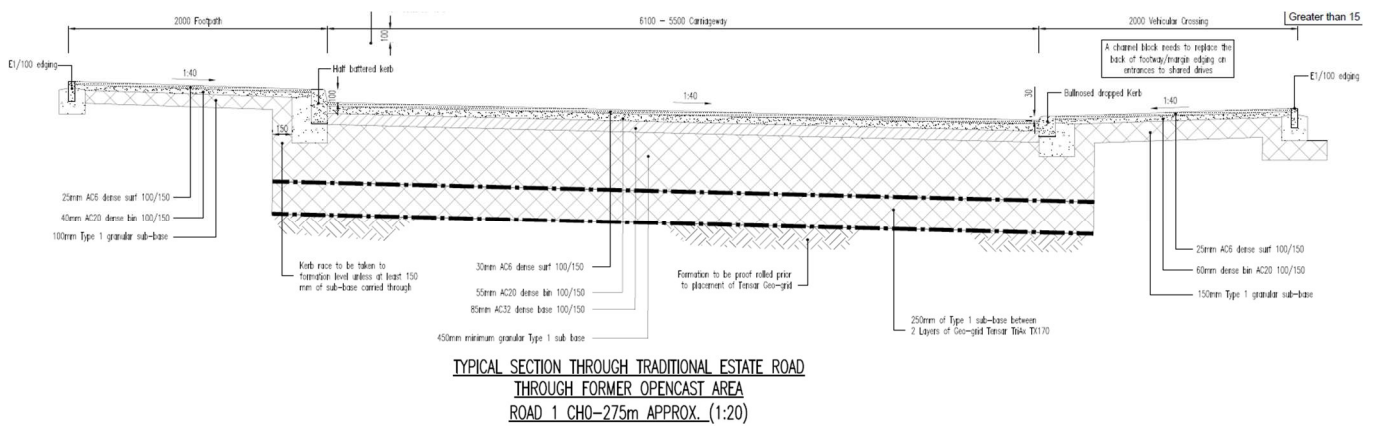
J Whelan MIQ  
 Laboratory Manager

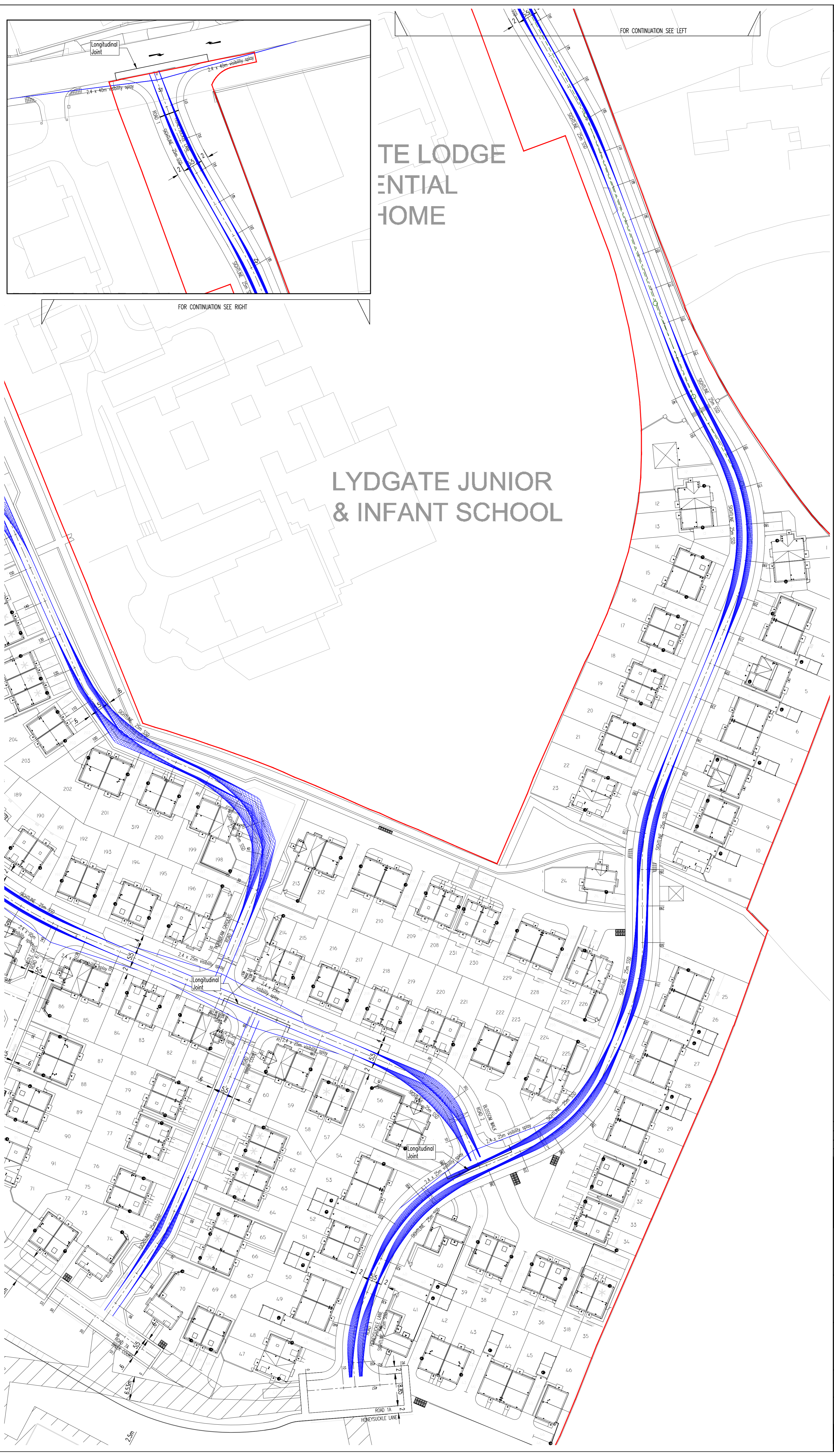
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## Appendix 4.0 – CBR Testing

Roads 01, 02 and 07 are the completed Roads within Phase 2 and testing has been completed on those. Listed below are the results which have been produced by White Rose Laboratory Services. Plans showing the locations of the CBR tests are referenced below on the ARP General Arrangement drawing using the Road Chainages, along with results listed below which are in accordance with Kirklees Highways and the Earthworks Specification. Re-testing was carried out from chainage 175 back to the entrance of site due to poor CBR results. An increase in the depth of capping was required to achieve a greater CBR result as per agreed Highways specification from Kirklees Council (see below). Introduction of geogrid and capping in areas where soft spots were recorded helps achieve the acceptable results which are shown below once constructed.

All CBR testing was carried out under the supervision of Kirklees Council (Highways).





N O T E S

Rev	By	Date	Revision	Chk	Apvd
B	JC	24.05.24	Updated to suit S38 comments	MI	MI
A	JC	08.09.23	Updated to new junction layout	MI	MI
/	DJG	05.10.22	Issued for approval	MI	MI

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ARP Associates is a trading division of ARP Geotechnical Ltd, a company registered in England and Wales with company number 3771811, whose registered office is at 5/6 Northwest Business Park, Servia Hill, Leeds LS6 2QH

TITLE  
**GENERAL  
ARRANGEMENT LAYOUT  
PHASE 2**

PROJECT  
**SOOTHILL LANE,  
BATLEY**

CLIENT  
**KEEPMOAT HOMES**

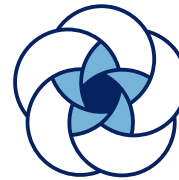
DRAWING STATUS  
**CONSTRUCTION ISSUE**

Scale	Date	Drawn	DJG
1:500 @ A1	OCT 22	Chk.	MI

Drwg. No.  
**Y045-ARP-XX-DR-C-272\_143\_02.10**

# TEST REPORT

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 West Yorkshire  
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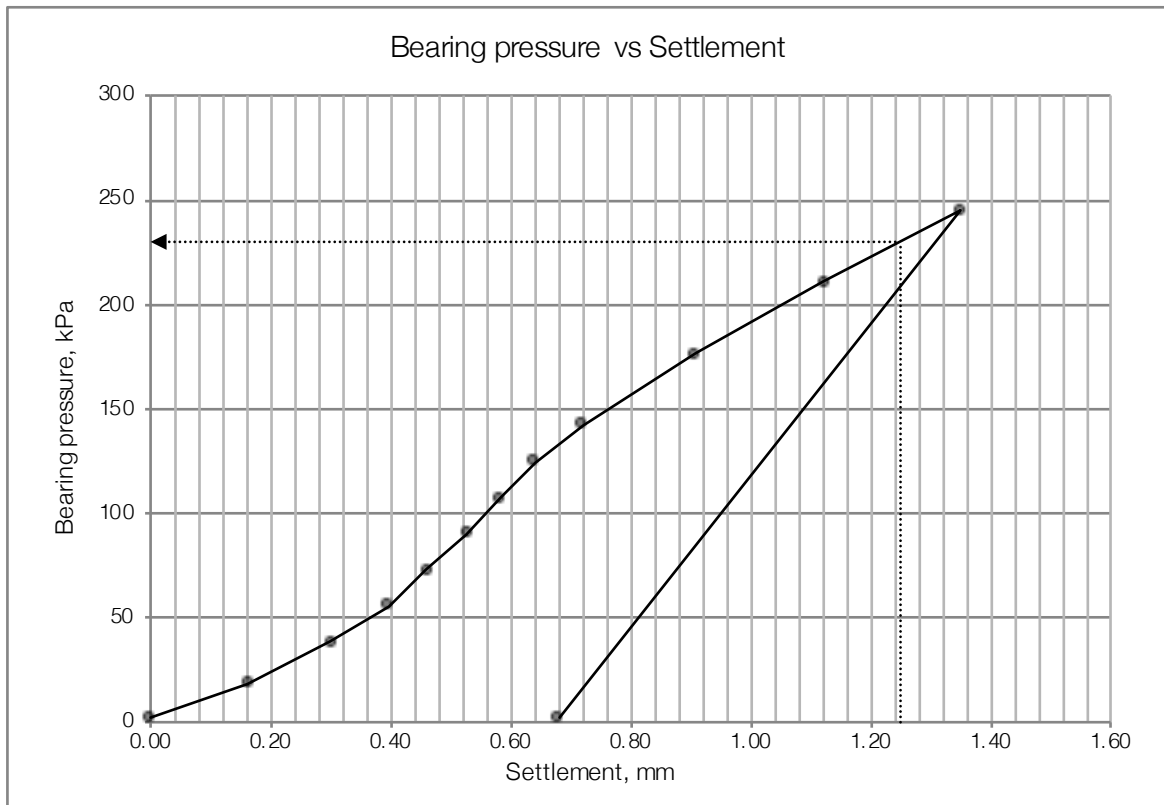
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Report	WRL/23/2684Apbt	Log Reference	S/23/2684A
Report Date	19/12/23	Test Date	12/12/23
Site	Mill Forest Way, Batley		
Material	Recycled Type 1 Sub Base		
Location	Phase 2 Road 1 Ch03		
Supplier	Ex Site	Test level	Surface
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	607 mm	Maximum deformation	1.35 mm
Plate correction factor	0.813	Maximum applied load	70 kN
Weight of equipment	65.5 kg	Max applied pressure	245 kPa
Jacking reaction	21T 360	Weather conditions	Overcast



Force at 1.25mm settlement	65.9 kN	Recovery	50 %
Pressure at 1.25mm settlement	229.9 kPa		
Modulus of subgrade reaction, $k_{762}$	149.5 kN/m <sup>2</sup> /mm	Equivalent CBR value	57 %

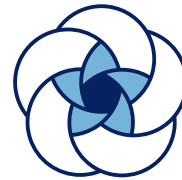
Tests were performed in situ at site and location shown. Results apply only to material tested.  
 \*indicates data supplied by customer

J Whelan  
 Laboratory Services Section Manager

RT013a/21/03

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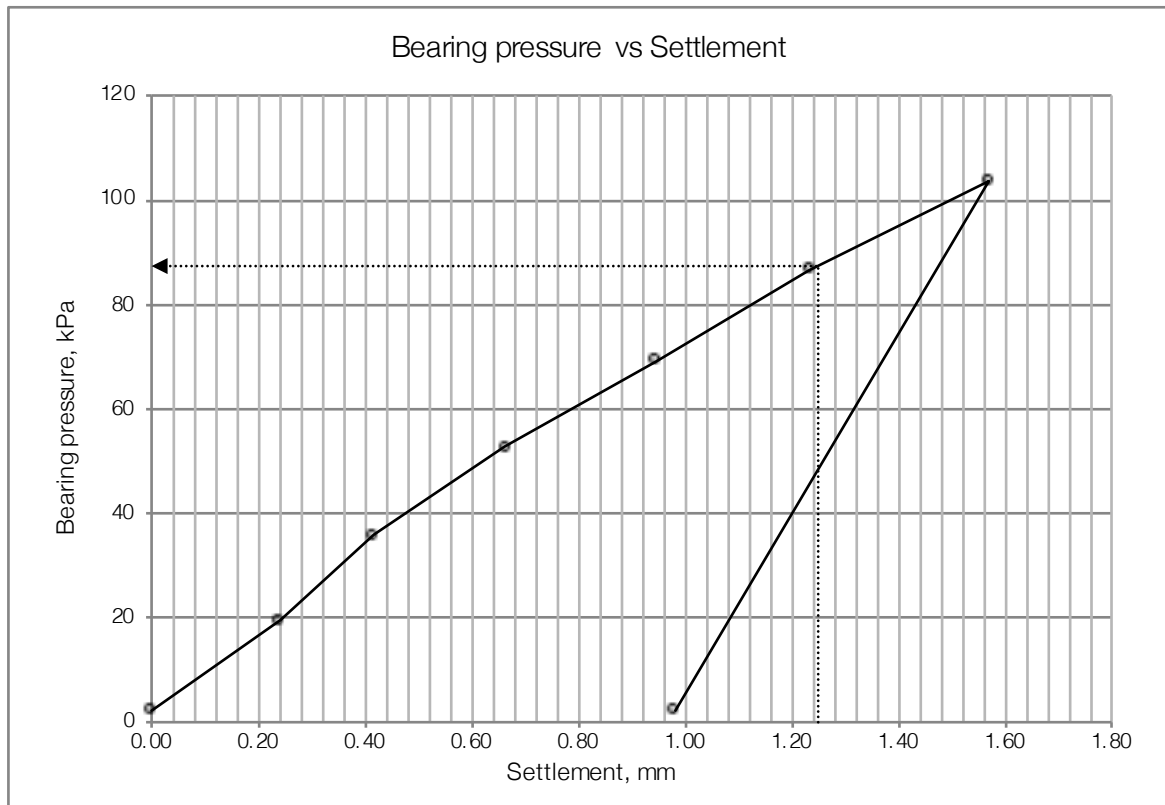
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Report	WRL/23/2304Fpbt	Log Reference	S/23/2304F
Report Date	11/10/23	Test Date	09/10/23
Site	The Orchards, Soothill		
Material	Gravelly brown mottled grey Clay		
Location	Road 1 CH25		
Supplier	Ex Site	Test level	Formation
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	605 mm	Maximum deformation	1.57 mm
Plate correction factor	0.810	Maximum applied load	29 kN
Weight of equipment	64.7 kg	Max applied pressure	104 kPa
Jacking reaction	25T Excavator	Weather conditions	Sunny



Force at 1.25mm settlement	24.5 kN	Recovery	38 %
Pressure at 1.25mm settlement	87.3 kPa		
Modulus of subgrade reaction, $k_{762}$	56.6 kN/m <sup>2</sup> /mm	Equivalent CBR value	11 %

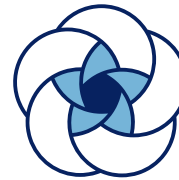
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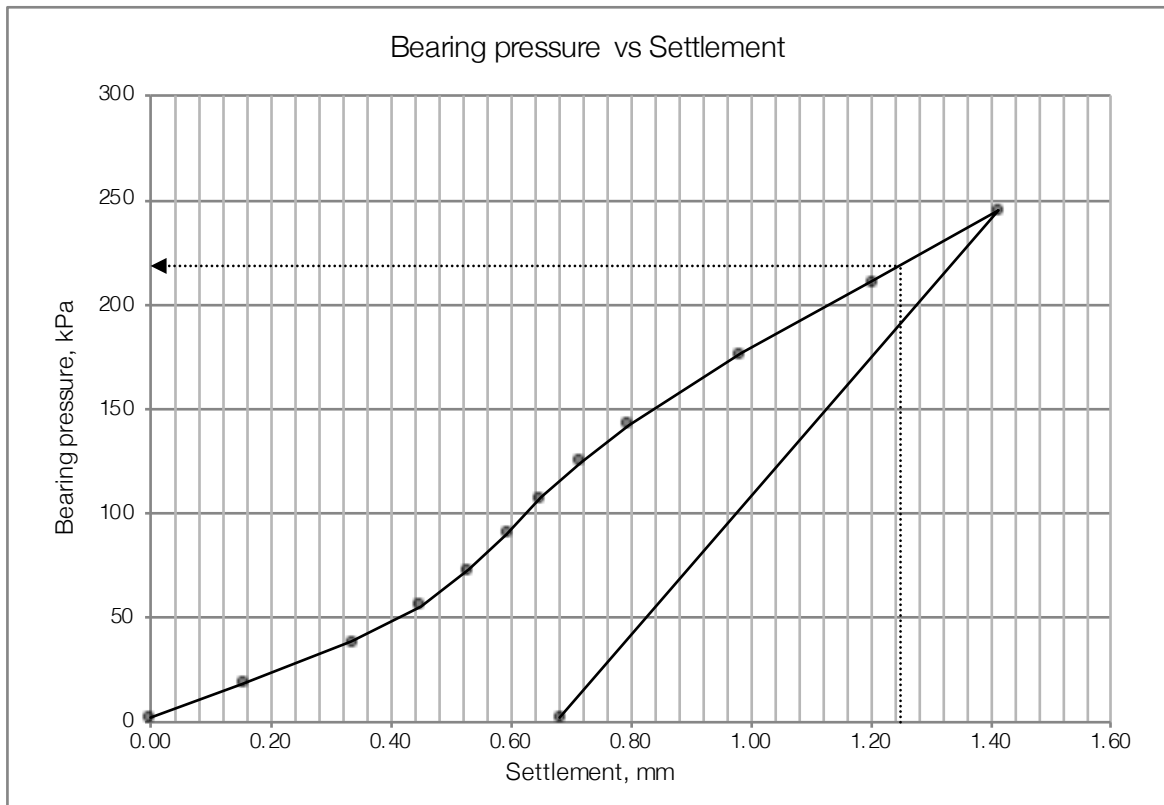
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Report	WRL/23/2684Bpbt	Log Reference	S/23/2684B
Report Date	19/12/23	Test Date	12/12/23
Site	Mill Forest Way, Batley		
Material	Recycled Type 1 Sub Base		
Location	Phase 2 Road 1 Ch25		
Supplier	Ex Site	Test level	Surface
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	607 mm	Maximum deformation	1.41 mm
Plate correction factor	0.813	Maximum applied load	70 kN
Weight of equipment	65.5 kg	Max applied pressure	245 kPa
Jacking reaction	21T 360	Weather conditions	Overcast



Force at 1.25mm settlement	62.6 kN	Recovery	52 %
Pressure at 1.25mm settlement	218.4 kPa	Equivalent CBR value	52 %
Modulus of subgrade reaction, $k_{762}$	142.0 kN/m <sup>2</sup> /mm		

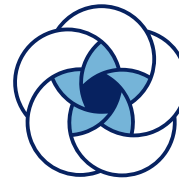
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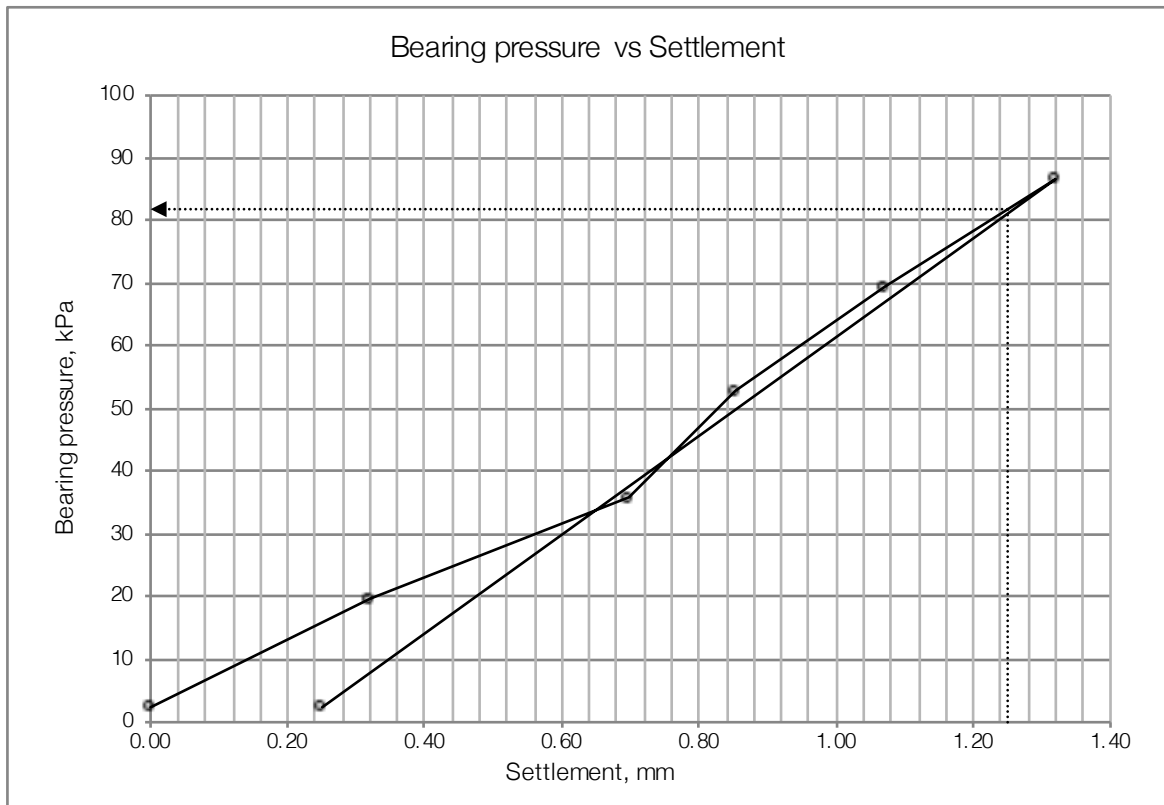
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Report	WRL/23/2171Apbt	Log Reference	S/23/2171A
Report Date	28/09/23	Test Date	22/09/23
Site	The Orchards, Soothill		
Material	Brown Clay with weathered Mudstone		
Location	Road 1 CH40 CL		
Supplier	Ex Site	Test level	Formation
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	605 mm	Maximum deformation	1.32 mm
Plate correction factor	0.810	Maximum applied load	24 kN
Weight of equipment	69.7 kg	Max applied pressure	87 kPa
Jacking reaction	30T Excavator	Weather conditions	Overcast



Force at 1.25mm settlement	22.8 kN	Recovery	81 %
Pressure at 1.25mm settlement	81.9 kPa		
Modulus of subgrade reaction, $k_{762}$	53.1 kN/m <sup>2</sup> /mm	Equivalent CBR value	9.4 %

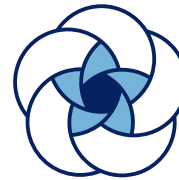
Tests were performed insitu at site and location shown. Results apply only to material tested.  
 \*indicates data supplied by customer

J Whelan  
 Laboratory Services Section Manager

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# TEST REPORT

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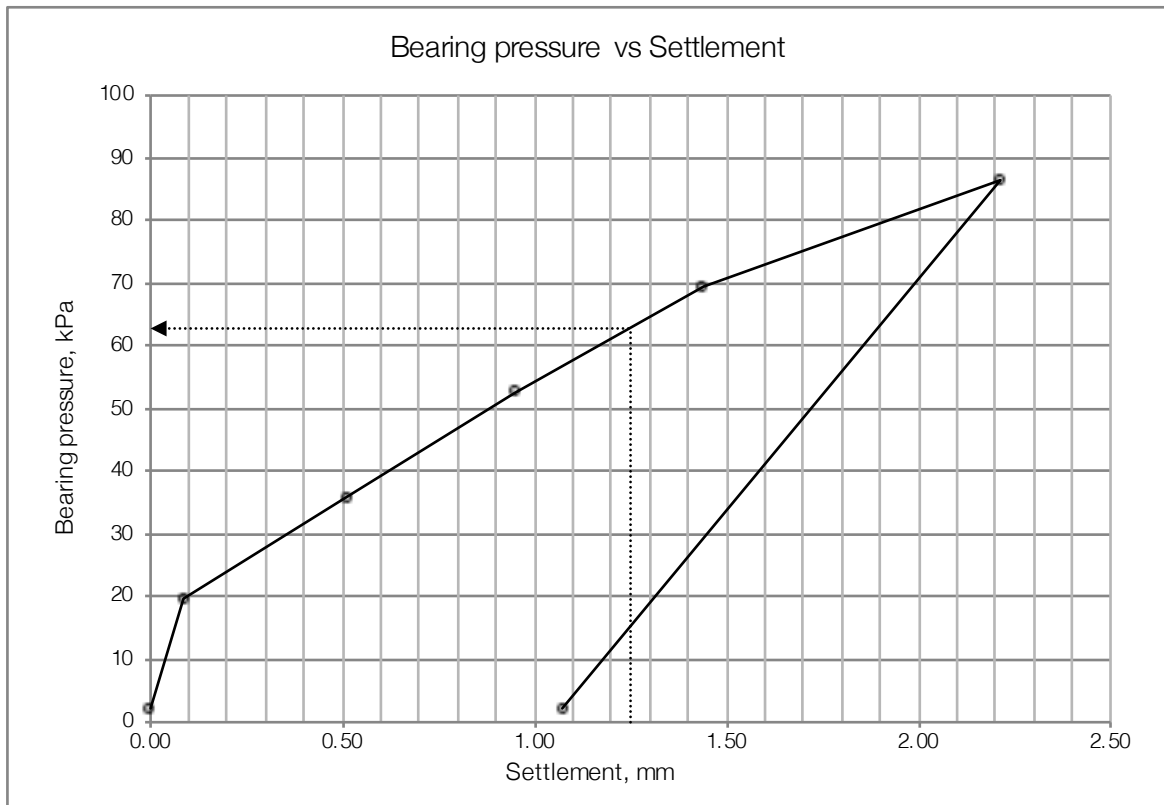
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Report	WRL/23/2304Epb	Log Reference	S/23/2304E
Report Date	11/10/23	Test Date	09/10/23
Site	The Orchards, Soothill		
Material	Gravelly brown mottled grey Clay		
Location	Road 1 CH50		
Supplier	Ex Site	Test level	Formation
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	605 mm	Maximum deformation	2.21 mm
Plate correction factor	0.810	Maximum applied load	24 kN
Weight of equipment	64.7 kg	Max applied pressure	86 kPa
Jacking reaction	25T Excavator	Weather conditions	Sunny



Force at 1.25mm settlement	17.4 kN	Recovery	52 %
Pressure at 1.25mm settlement	62.8 kPa		
Modulus of subgrade reaction, $k_{762}$	40.7 kN/m <sup>2</sup> /mm	Equivalent CBR value	5.9 %

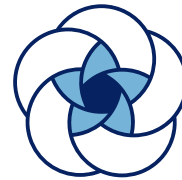
Tests were performed in situ at site and location shown. Results apply only to material tested.  
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 Managing Director

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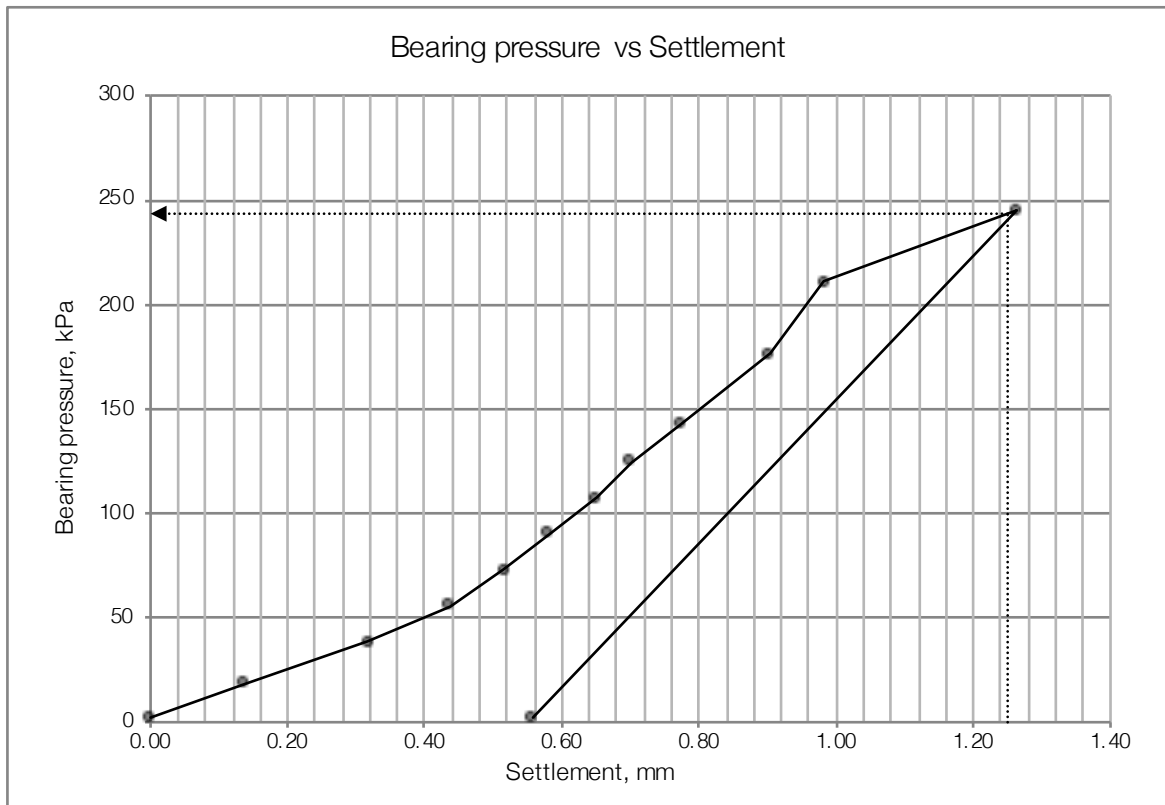
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Report	WRL/23/2684Cpbt	Log Reference	S/23/2684C
Report Date	19/12/23	Test Date	12/12/23
Site	Mill Forest Way, Batley		
Material	Recycled Type 1 Sub Base		
Location	Phase 2 Road 1 Ch50		
Supplier	Ex Site	Test level	Surface
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	607 mm	Maximum deformation	1.26 mm
Plate correction factor	0.813	Maximum applied load	70 kN
Weight of equipment	65.5 kg	Max applied pressure	245 kPa
Jacking reaction	21T 360	Weather conditions	Overcast



Force at 1.25mm settlement	69.8 kN	Recovery	56 %
Pressure at 1.25mm settlement	243.4 kPa	Equivalent CBR value	63 %
Modulus of subgrade reaction, $k_{762}$	158.3 kN/m <sup>2</sup> /mm		

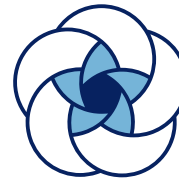
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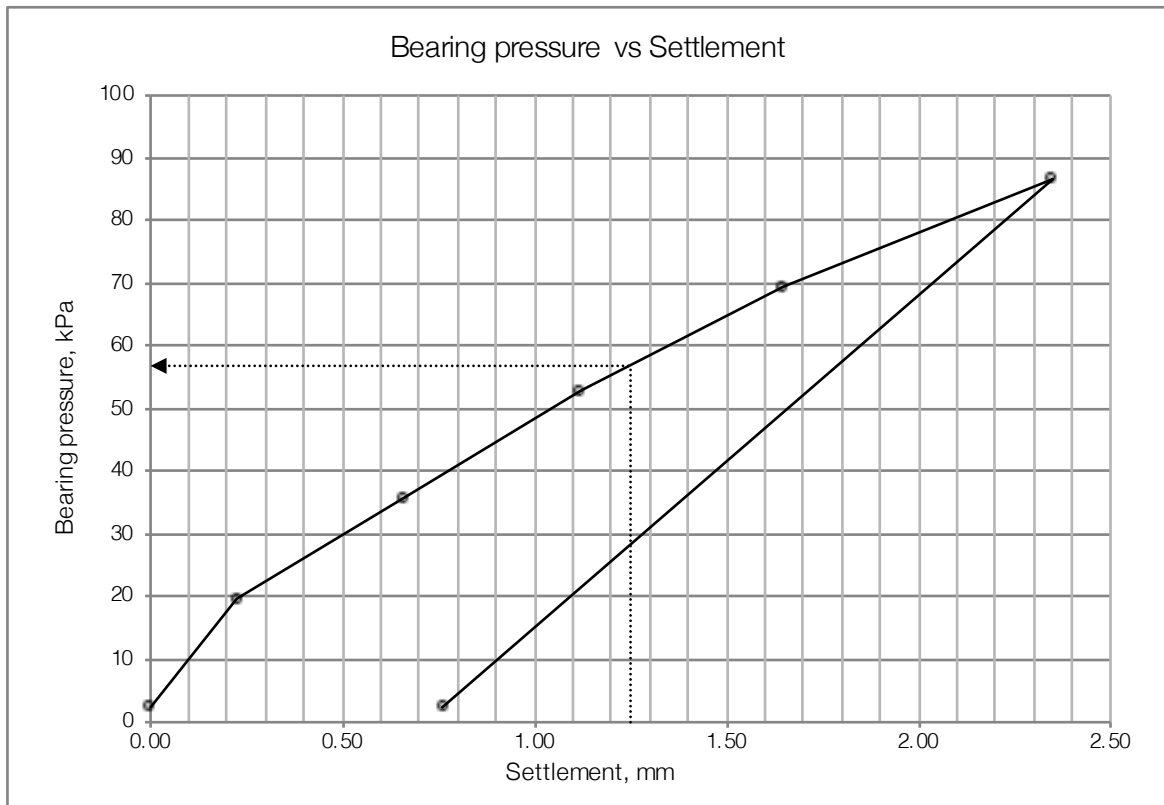
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Report	WRL/23/2171Bpbt	Log Reference	S/23/2171B
Report Date	28/09/23	Test Date	22/09/23
Site	The Orchards, Soothill		
Material	Brown Clay, weathered Mudstone with Coal traces		
Location	Road 1 CH60 CL		
Supplier	Ex Site	Test level	Formation
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	605 mm	Maximum deformation	2.35 mm
Plate correction factor	0.810	Maximum applied load	24 kN
Weight of equipment	69.7 kg	Max applied pressure	87 kPa
Jacking reaction	30T Excavator	Weather conditions	Sunny



Force at 1.25mm settlement	15.7 kN	Recovery	68 %
Pressure at 1.25mm settlement	56.9 kPa		
Modulus of subgrade reaction, $k_{762}$	36.9 kN/m <sup>2</sup> /mm	Equivalent CBR value	5.0 %

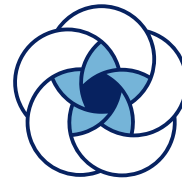
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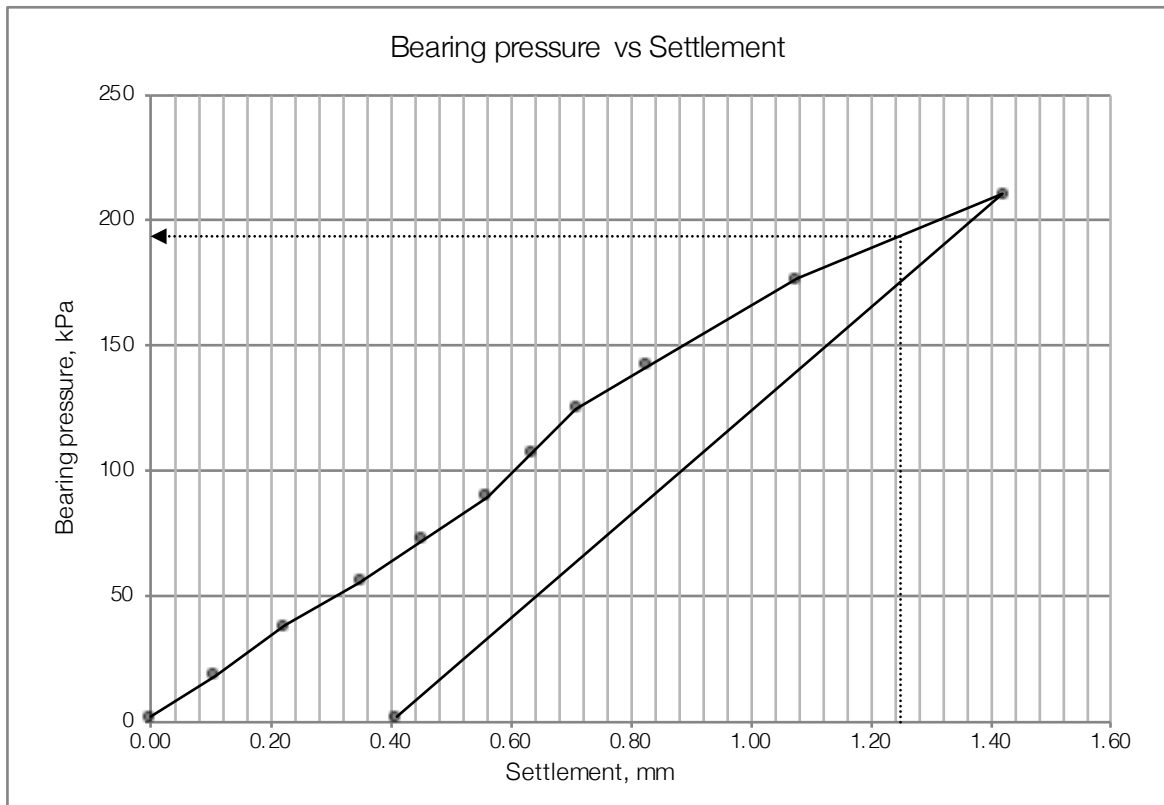
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Report	WRL/23/2684Dpbt	Log Reference	S/23/2684D
Report Date	19/12/23	Test Date	12/12/23
Site	Mill Forest Way, Batley		
Material	Recycled Type 1 Sub Base		
Location	Phase 2 Road 1 Ch75		
Supplier	Ex Site	Test level	Surface
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	607 mm	Maximum deformation	1.42 mm
Plate correction factor	0.813	Maximum applied load	70 kN
Weight of equipment	65.5 kg	Max applied pressure	211 kPa
Jacking reaction	21T 360	Weather conditions	Overcast



Force at 1.25mm settlement	55.4 kN	Recovery	71 %
Pressure at 1.25mm settlement	193.8 kPa	Equivalent CBR value	42 %
Modulus of subgrade reaction, $k_{762}$	126.0 kN/m <sup>2</sup> /mm		

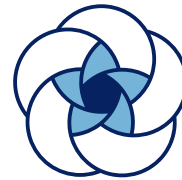
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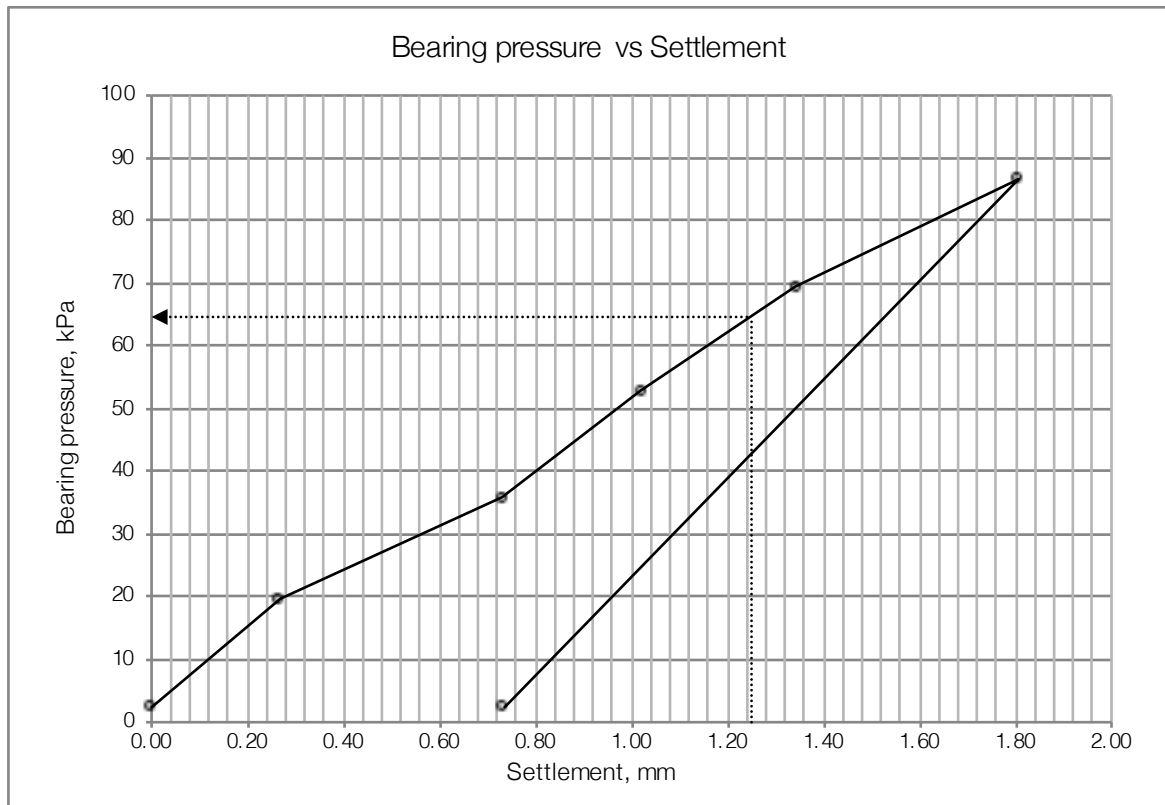
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Report	WRL/23/2171Cpbt	Log Reference	S/23/2171C
Report Date	28/09/23	Test Date	22/09/23
Site	The Orchards, Soothill		
Material	Brown Clay, weathered Mudstone with Coal traces		
Location	Road 1 CH8 CL		
Supplier	Ex Site	Test level	Formation
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	605 mm	Maximum deformation	1.81 mm
Plate correction factor	0.810	Maximum applied load	24 kN
Weight of equipment	69.7 kg	Max applied pressure	87 kPa
Jacking reaction	30T Excavator	Weather conditions	Sunny



Force at 1.25mm settlement	17.9 kN	Recovery	59 %
Pressure at 1.25mm settlement	64.7 kPa		
Modulus of subgrade reaction, $k_{762}$	41.9 kN/m <sup>2</sup> /mm	Equivalent CBR value	6.3 %

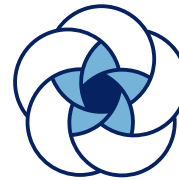
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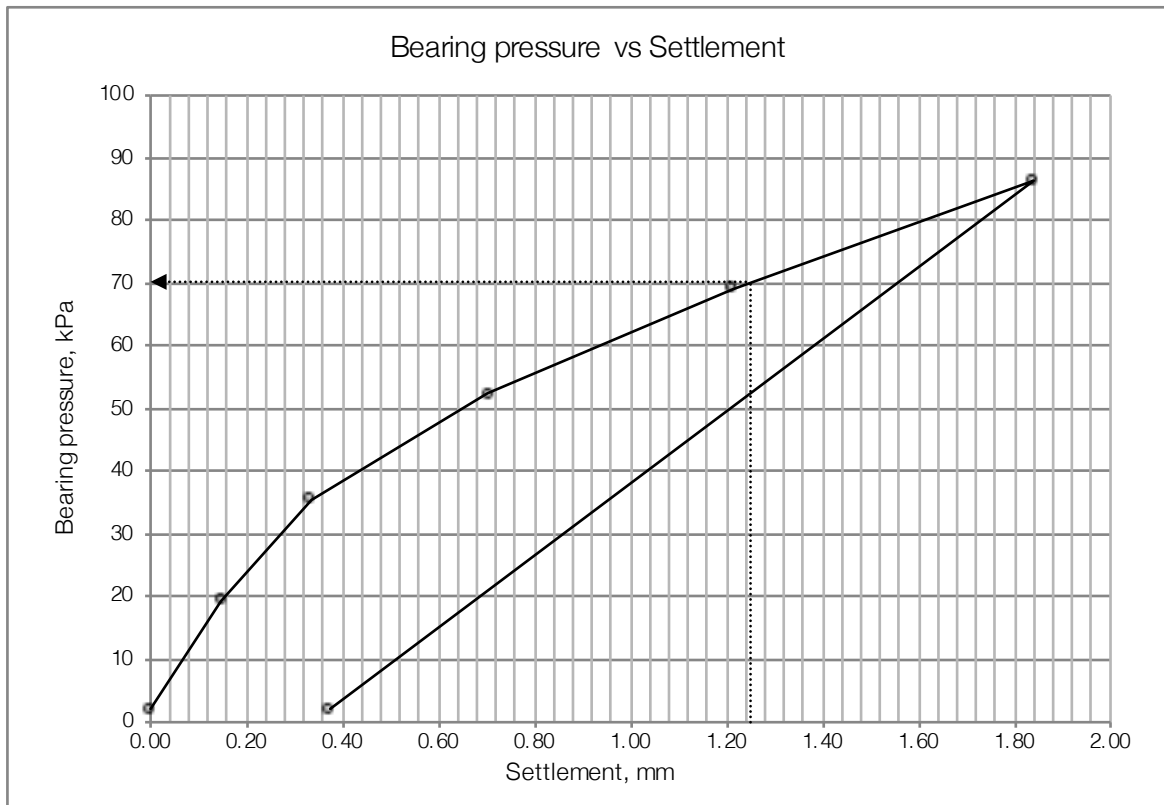
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Report	WRL/23/2332Dpbt	Log Reference	S/23/2332D
Report Date	17/10/23	Test Date	11/10/23
Site	The Orchards, Soothill		
Material	Grey gravelly Clay		
Location	Road 1 CH80 LHC + 1.5		
Supplier	Ex Site	Test level	Formation
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	605 mm	Maximum deformation	1.84 mm
Plate correction factor	0.810	Maximum applied load	29 kN
Weight of equipment	62.3 kg	Max applied pressure	86 kPa
Jacking reaction	25T Excavator	Weather conditions	Light Rain



Force at 1.25mm settlement	19.6 kN	Recovery	80 %
Pressure at 1.25mm settlement	70.3 kPa		
Modulus of subgrade reaction, $k_{762}$	45.6 kN/m <sup>2</sup> /mm	Equivalent CBR value	7.2 %

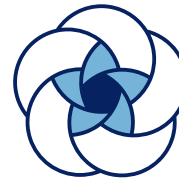
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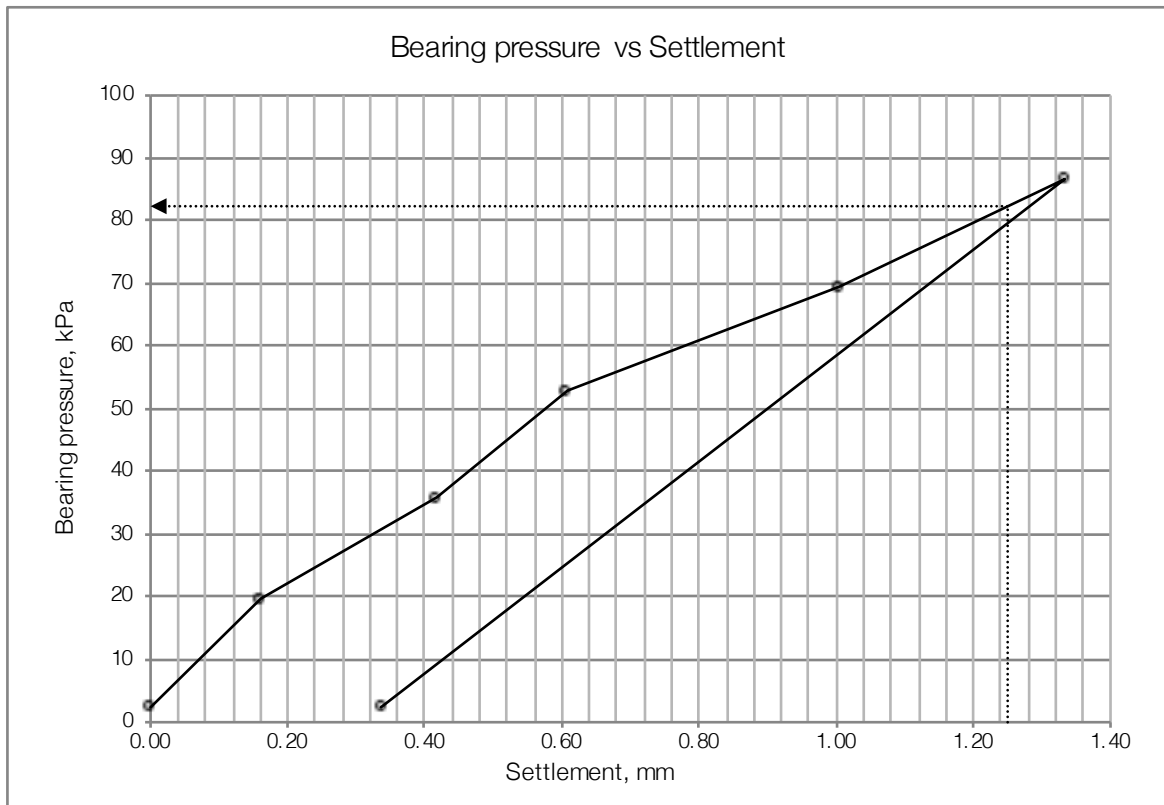
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Report	WRL/23/2171Dpbt	Log Reference	S/23/2171D
Report Date	28/09/23	Test Date	22/09/23
Site	The Orchards, Soothill		
Material	Brown Clay, weathered Mudstone with Coal traces		
Location	Road 1 CH100 CL		
Supplier	Ex Site	Test level	Formation
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	605 mm	Maximum deformation	1.33 mm
Plate correction factor	0.810	Maximum applied load	24 kN
Weight of equipment	69.7 kg	Max applied pressure	87 kPa
Jacking reaction	30T Excavator	Weather conditions	Sunny



Force at 1.25mm settlement	23.0 kN	Recovery	75 %
Pressure at 1.25mm settlement	82.3 kPa		
Modulus of subgrade reaction, $k_{762}$	53.4 kN/m <sup>2</sup> /mm	Equivalent CBR value	9.5 %

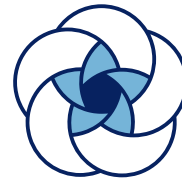
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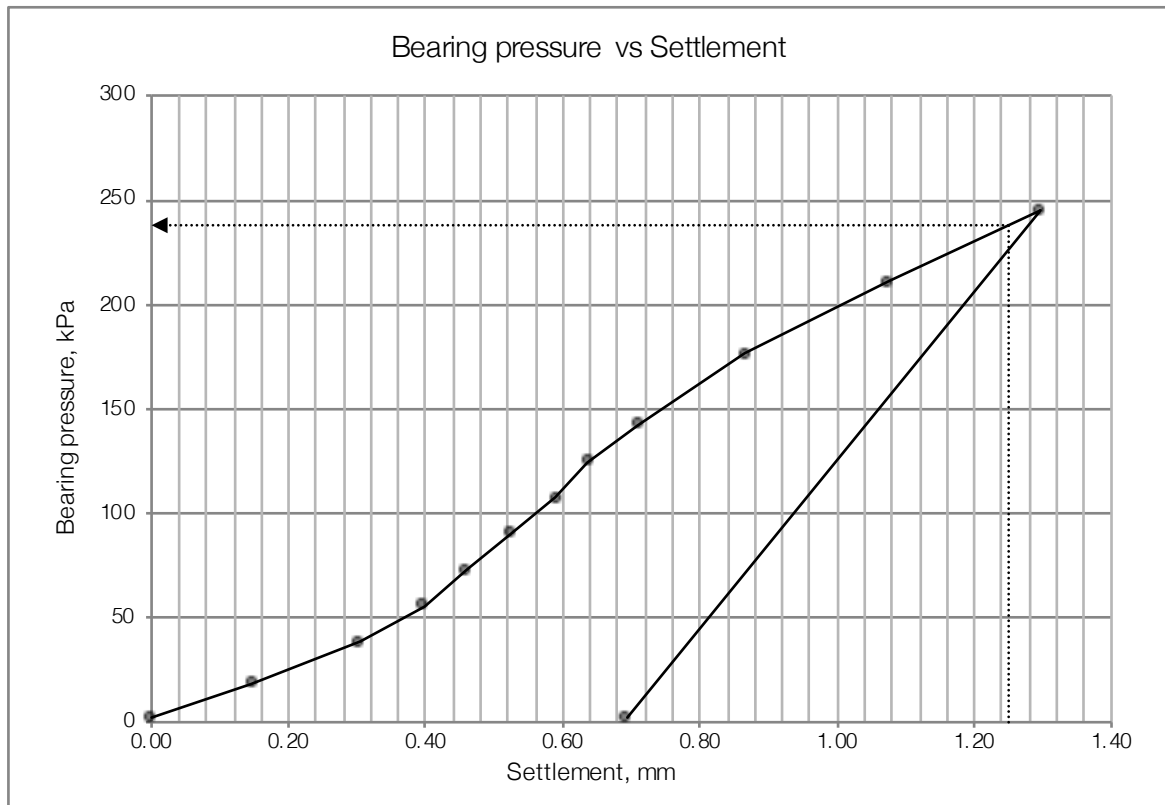
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Report	WRL/23/2684Epb	Log Reference	S/23/2684E
Report Date	19/12/23	Test Date	12/12/23
Site	Mill Forest Way, Batley		
Material	Recycled Type 1 Sub Base		
Location	Phase 2 Road 1 Ch100		
Supplier	Ex Site	Test level	Surface
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	607 mm	Maximum deformation	1.30 mm
Plate correction factor	0.813	Maximum applied load	70 kN
Weight of equipment	65.5 kg	Max applied pressure	245 kPa
Jacking reaction	21T 360	Weather conditions	Overcast



Force at 1.25mm settlement	68.2 kN	Recovery	47 %
Pressure at 1.25mm settlement	237.9 kPa	Equivalent CBR value	60 %
Modulus of subgrade reaction, $k_{762}$	154.7 kN/m <sup>2</sup> /mm		

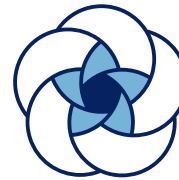
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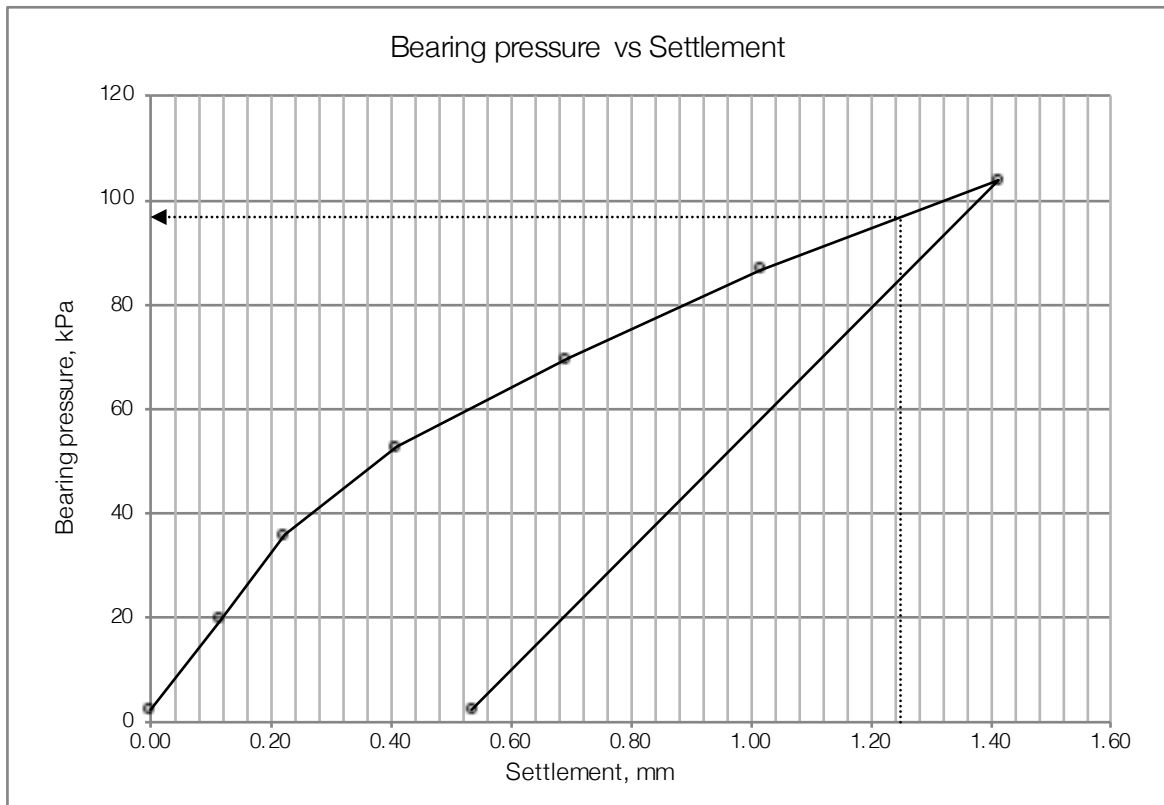
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Report	WRL/23/2171Epbt	Log Reference	S/23/2171E
Report Date	28/09/23	Test Date	22/09/23
Site	The Orchards, Soothill		
Material	Brown Clay, weathered Mudstone & Coal fines		
Location	Road 1 CH120 CL		
Supplier	Ex Site	Test level	Formation
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	605 mm	Maximum deformation	1.41 mm
Plate correction factor	0.810	Maximum applied load	29 kN
Weight of equipment	69.7 kg	Max applied pressure	104 kPa
Jacking reaction	30T Excavator	Weather conditions	Sunny



Force at 1.25mm settlement	27.1 kN	Recovery	62 %
Pressure at 1.25mm settlement	96.7 kPa	Equivalent CBR value	13 %
Modulus of subgrade reaction, $k_{762}$	62.7 kN/m <sup>2</sup> /mm		

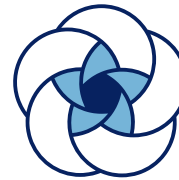
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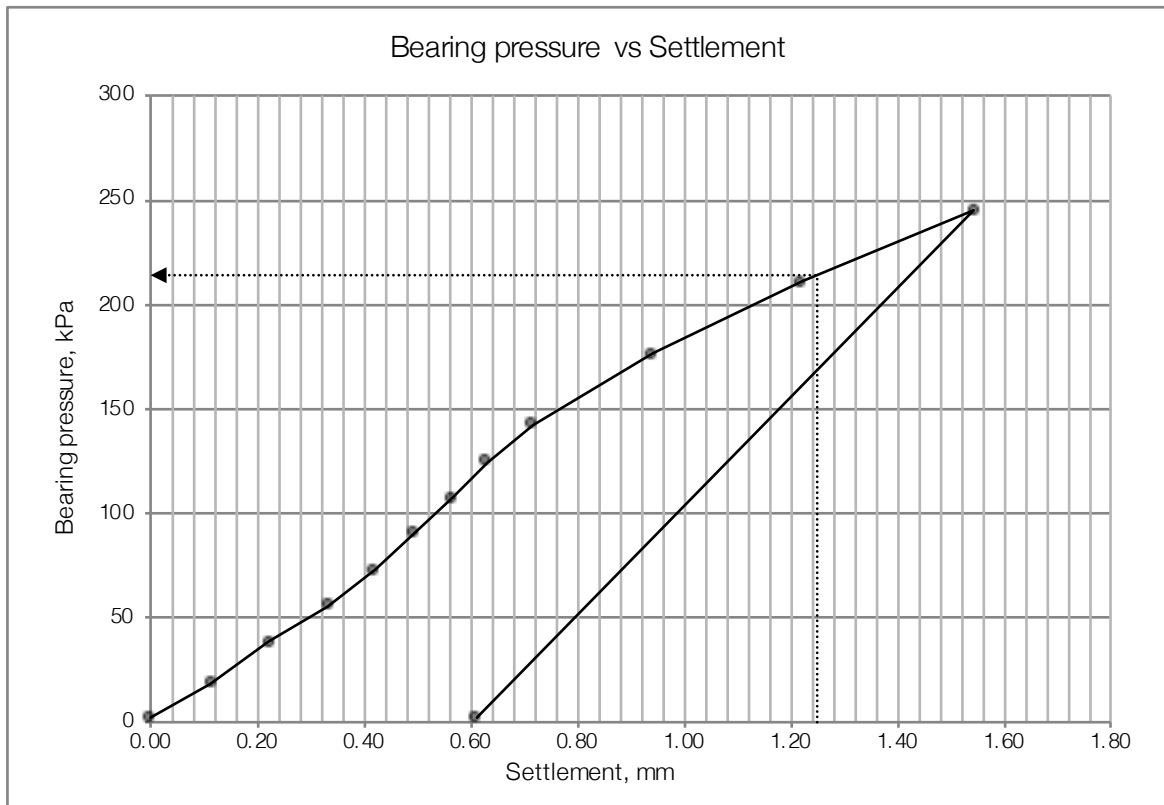
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Report	WRL/23/2684Fpbt	Log Reference	S/23/2684F
Report Date	19/12/23	Test Date	12/12/23
Site	Mill Forest Way, Batley		
Material	Recycled Type 1 Sub Base		
Location	Phase 2 Road 1 Ch125		
Supplier	Ex Site	Test level	Surface
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	607 mm	Maximum deformation	1.54 mm
Plate correction factor	0.813	Maximum applied load	70 kN
Weight of equipment	65.5 kg	Max applied pressure	245 kPa
Jacking reaction	21T 360	Weather conditions	Overcast/Light Rain



Force at 1.25mm settlement	61.3 kN	Recovery	60 %
Pressure at 1.25mm settlement	214.0 kPa	Equivalent CBR value	50 %
Modulus of subgrade reaction, $k_{762}$	139.2 kN/m <sup>2</sup> /mm		

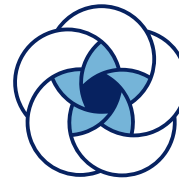
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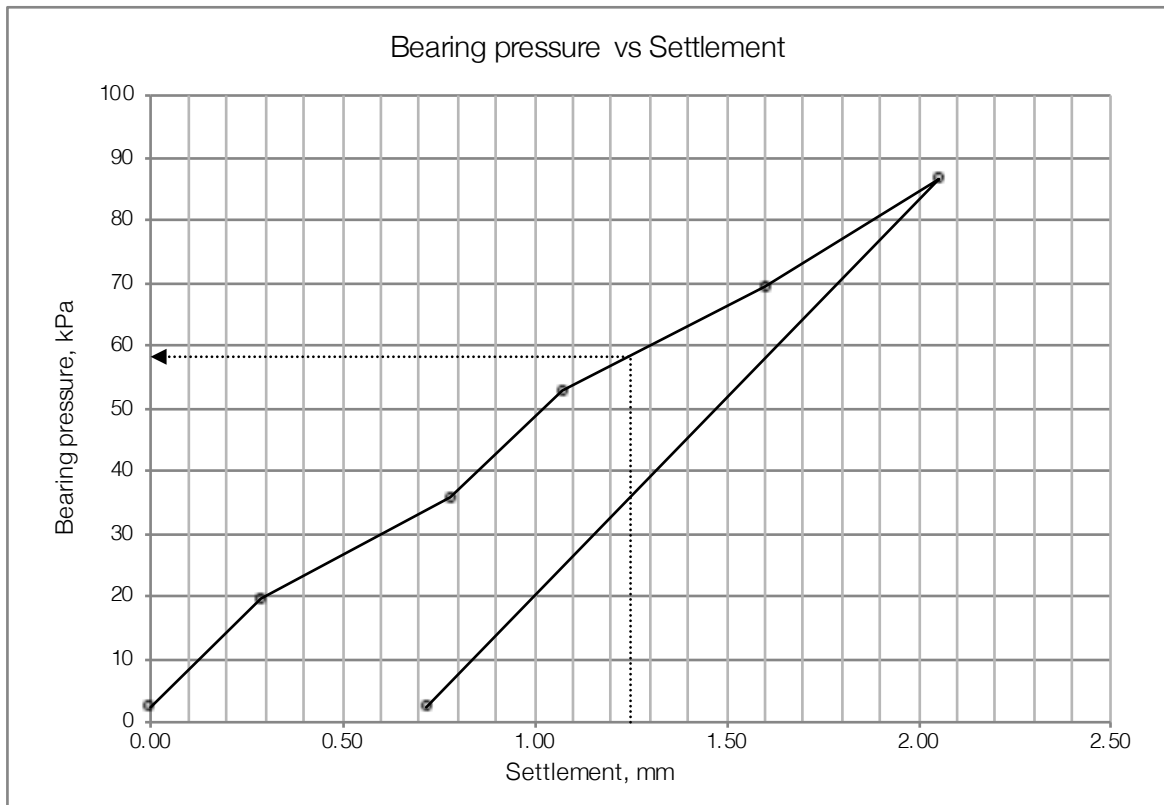
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Report	WRL/23/2171Fpbt	Log Reference	S/23/2171F
Report Date	28/09/23	Test Date	22/09/23
Site	The Orchards, Soothill		
Material	Brown Clay, weathered Mudstone Coal Traces		
Location	Road 1 CH140 CL		
Supplier	Ex Site	Test level	Formation
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	605 mm	Maximum deformation	2.05 mm
Plate correction factor	0.810	Maximum applied load	29 kN
Weight of equipment	69.7 kg	Max applied pressure	87 kPa
Jacking reaction	30T Excavator	Weather conditions	Sunny



Force at 1.25mm settlement	16.1 kN	Recovery	65 %
Pressure at 1.25mm settlement	58.3 kPa		
Modulus of subgrade reaction, $k_{762}$	37.8 kN/m <sup>2</sup> /mm	Equivalent CBR value	5.2 %

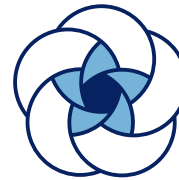
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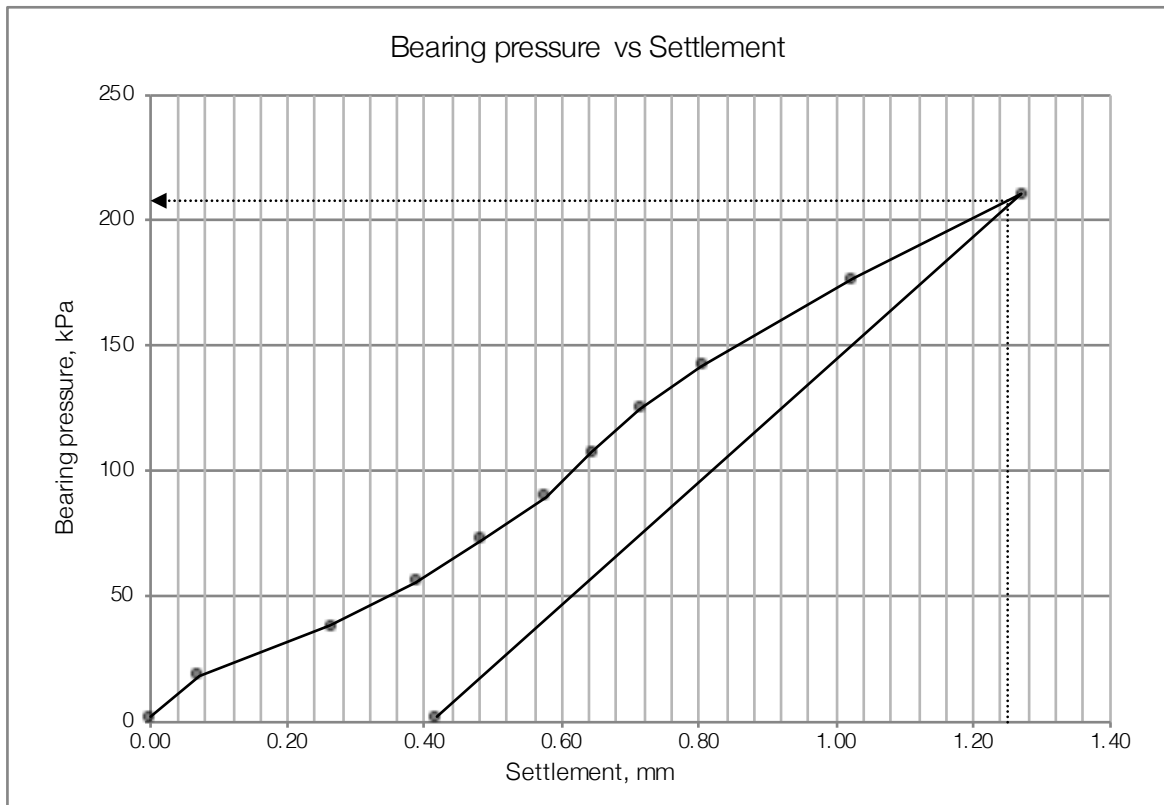
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Report	WRL/23/2684Gpbt	Log Reference	S/23/2684G
Report Date	19/12/23	Test Date	12/12/23
Site	Mill Forest Way, Batley		
Material	Recycled Type 1 Sub Base		
Location	Phase 2 Road 1 Ch150		
Supplier	Ex Site	Test level	Surface
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	607 mm	Maximum deformation	1.27 mm
Plate correction factor	0.813	Maximum applied load	70 kN
Weight of equipment	65.5 kg	Max applied pressure	211 kPa
Jacking reaction	21T 360	Weather conditions	Overcast/Light Rain



Force at 1.25mm settlement	59.6 kN	Recovery	67 %
Pressure at 1.25mm settlement	208.0 kPa		
Modulus of subgrade reaction, $k_{762}$	135.3 kN/m <sup>2</sup> /mm	Equivalent CBR value	48 %

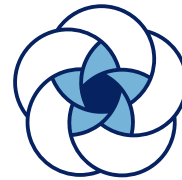
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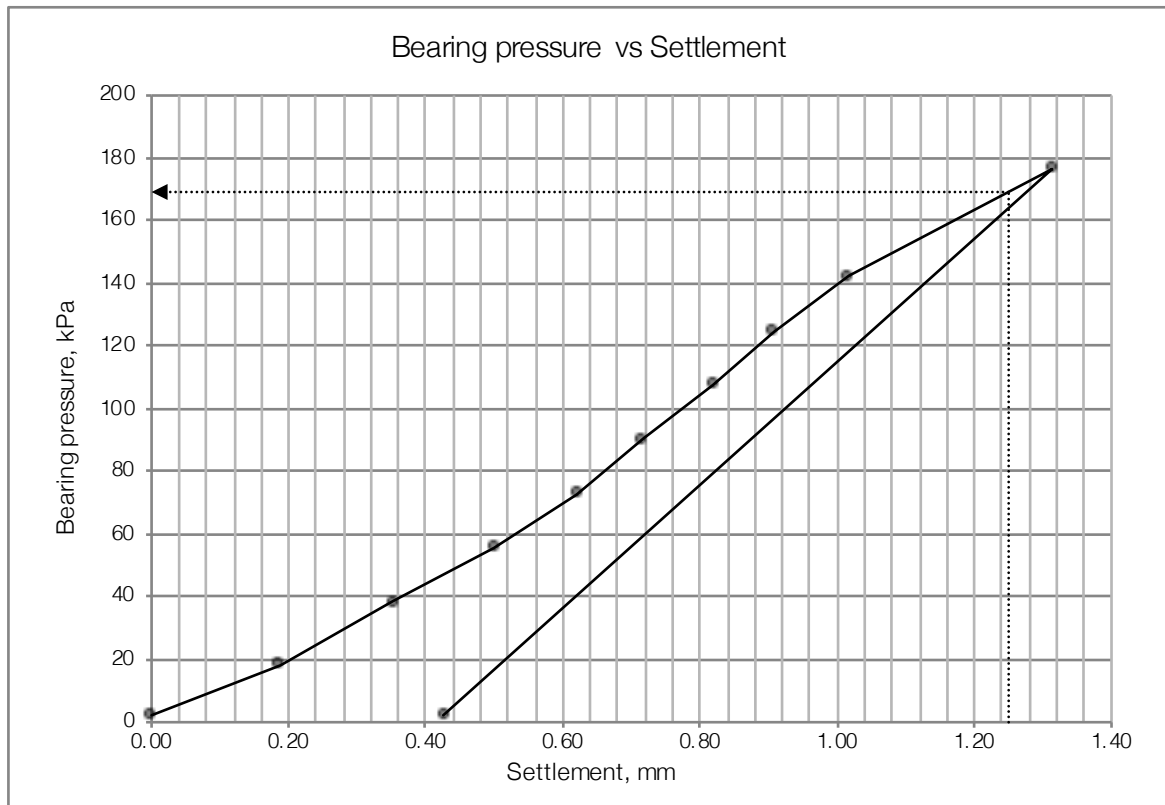
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Report	WRL/23/2684Hpbt	Log Reference	S/23/2684H
Report Date	19/12/23	Test Date	12/12/23
Site	Mill Forest Way, Batley		
Material	Recycled Type 1 Sub Base		
Location	Phase 2 Road 1 Ch175		
Supplier	Ex Site	Test level	Surface
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	607 mm	Maximum deformation	1.31 mm
Plate correction factor	0.813	Maximum applied load	70 kN
Weight of equipment	65.5 kg	Max applied pressure	177 kPa
Jacking reaction	21T 360	Weather conditions	Overcast/Light Rain



Force at 1.25mm settlement	48.3 kN	Recovery	68 %
Pressure at 1.25mm settlement	169.2 kPa		
Modulus of subgrade reaction, $k_{762}$	110.0 kN/m <sup>2</sup> /mm	Equivalent CBR value	33 %

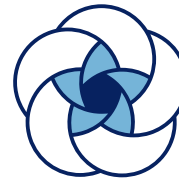
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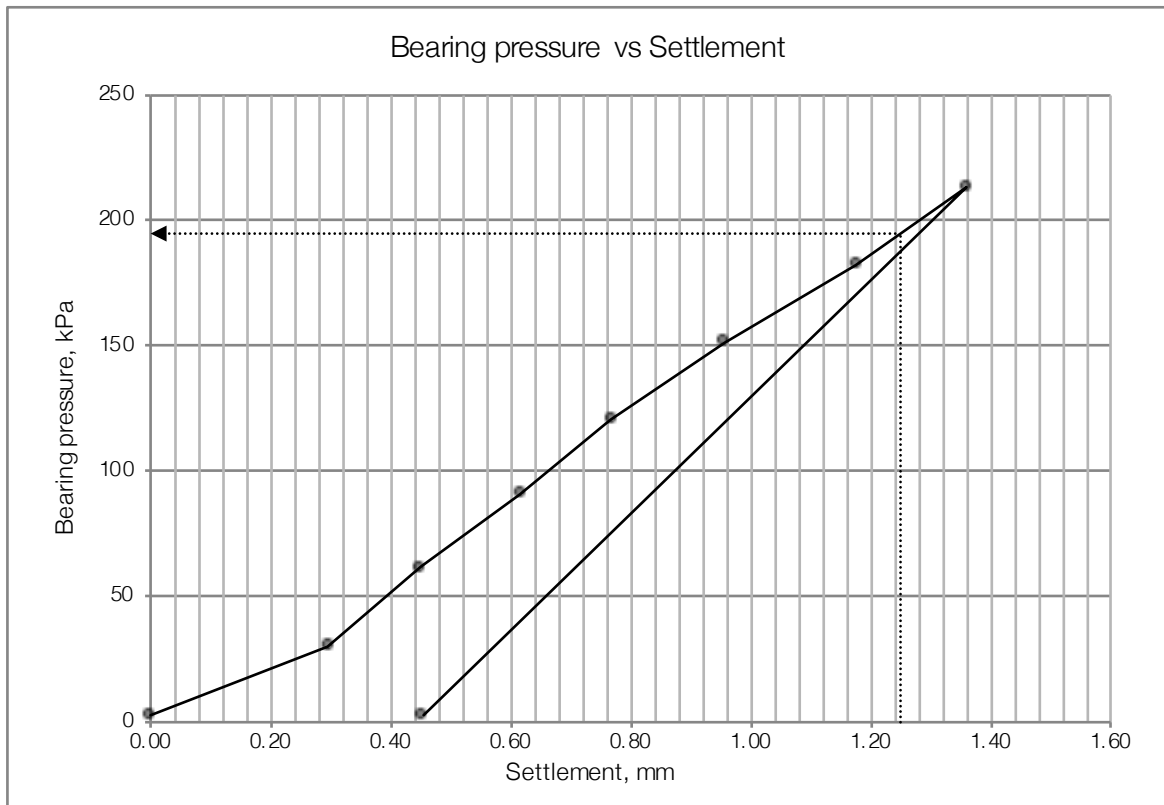
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Report	WRL/24/0212Apbt	Log Reference	S/24/0212A
Report Date	24/2/24	Test Date	22/2/24
Site	Mill Forest Way, Batley		
Material	Recycled Type 1 Sub Base		
Location	190		
Supplier	Blue Phoenix	Test level	Surface
Source	Blue Phoenix		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	452 mm	Maximum deformation	1.36 mm
Plate correction factor	0.625	Maximum applied load	34 kN
Weight of equipment	45.6 kg	Max applied pressure	213 kPa
Jacking reaction	25T Excavator	Weather conditions	Overcast



Force at 1.25mm settlement	30.8 kN	Recovery	67 %
Pressure at 1.25mm settlement	194.9 kPa		
Modulus of subgrade reaction, $k_{762}$	97.5 kN/m <sup>2</sup> /mm	Equivalent CBR value	27 %

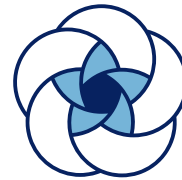
Tests were performed insitu at site and location shown. Results apply only to material tested.  
 \*indicates data supplied by customer

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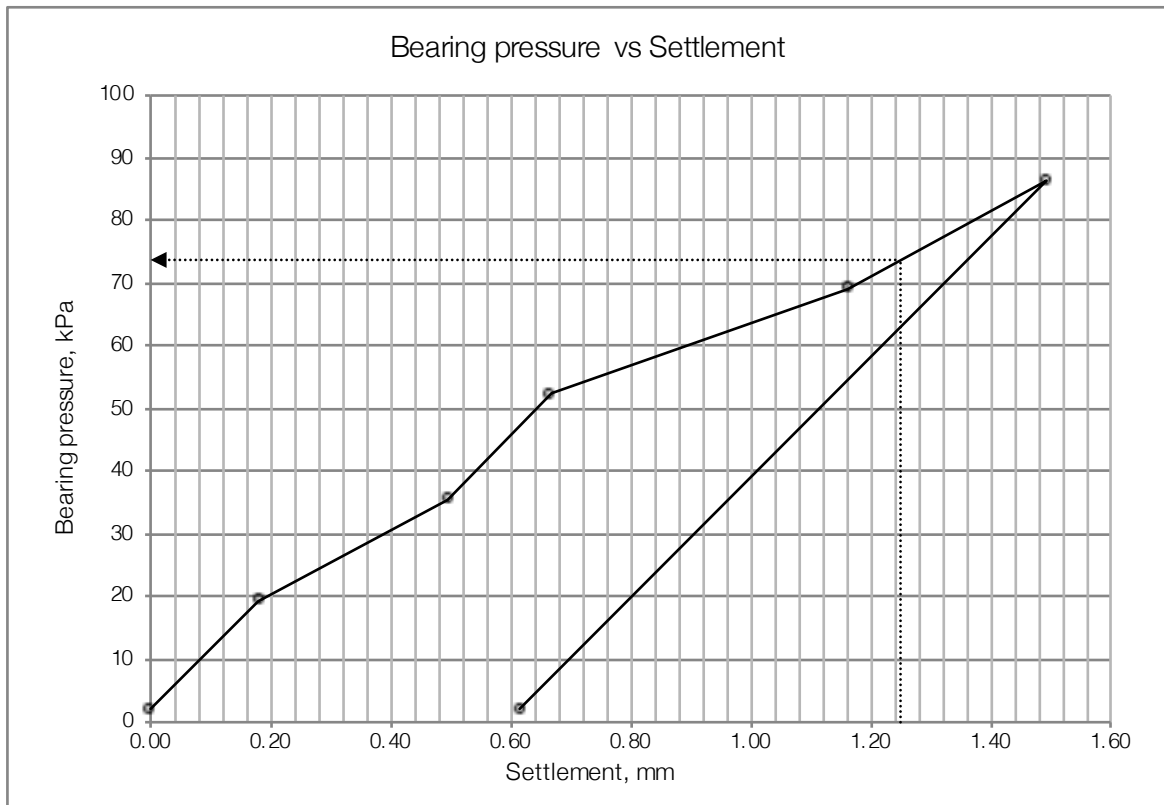
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 01977 520625 • enquiries@whiteroselabs.co.uk

Report	WRL/23/2332Hpbt	Log Reference	S/23/2332H
Report Date	17/10/23	Test Date	11/10/23
Site	The Orchards, Soothill		
Material	Grey gravelly Clay		
Location	Road 1 CH200		
Supplier	Ex Site	Test level	Formation
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	605 mm	Maximum deformation	1.49 mm
Plate correction factor	0.810	Maximum applied load	29 kN
Weight of equipment	62.3 kg	Max applied pressure	86 kPa
Jacking reaction	25T Excavator	Weather conditions	Overcast



Force at 1.25mm settlement	20.6 kN	Recovery	59 %
Pressure at 1.25mm settlement	73.8 kPa		
Modulus of subgrade reaction, $k_{762}$	47.8 kN/m <sup>2</sup> /mm	Equivalent CBR value	7.9 %

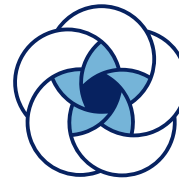
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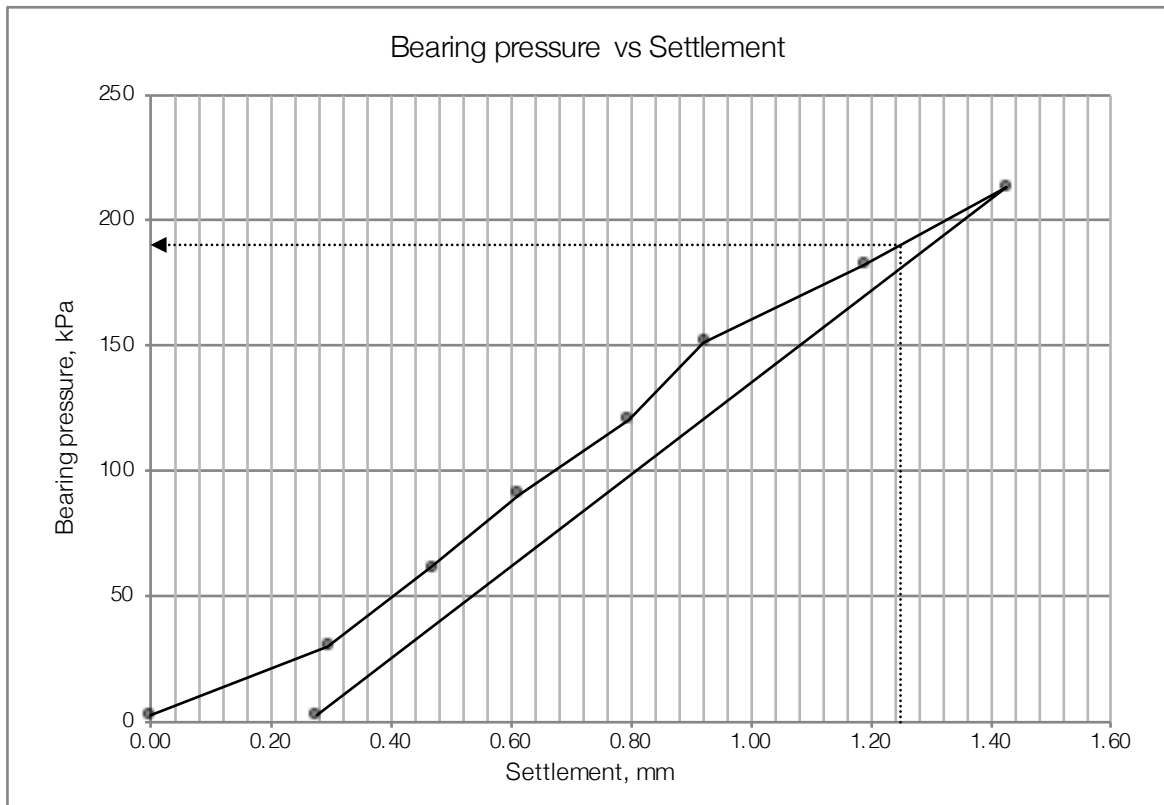
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Report	WRL/24/0212Bpbt	Log Reference	S/24/0212B
Report Date	24/2/24	Test Date	22/2/24
Site	Mill Forest Way, Batley		
Material	Recycled Type 1 Sub Base		
Location	210		
Supplier	Blue Phoenix	Test level	Surface
Source	Blue Phoenix		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	452 mm	Maximum deformation	1.43 mm
Plate correction factor	0.625	Maximum applied load	34 kN
Weight of equipment	45.6 kg	Max applied pressure	213 kPa
Jacking reaction	25T Excavator	Weather conditions	Overcast



Force at 1.25mm settlement	30.1 kN	Recovery	81 %
Pressure at 1.25mm settlement	190.4 kPa		
Modulus of subgrade reaction, $k_{762}$	95.3 kN/m <sup>2</sup> /mm	Equivalent CBR value	26 %

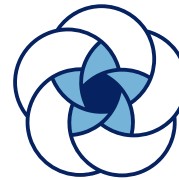
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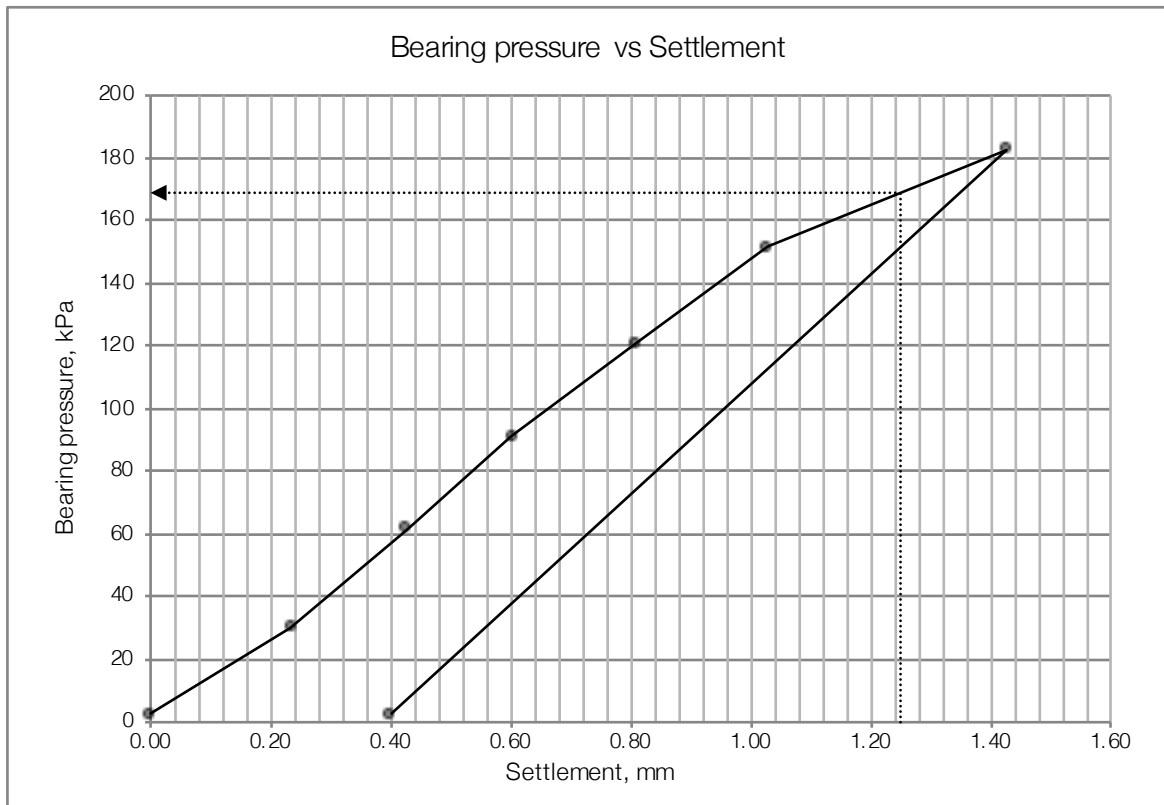
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Report	WRL/24/0212Dpbt	Log Reference	S/24/0212D
Report Date	24/2/24	Test Date	22/2/24
Site	Mill Forest Way, Batley		
Material	Recycled Type 1 Sub Base		
Location	249		
Supplier	Blue Phoenix	Test level	Surface
Source	Blue Phoenix		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	452 mm	Maximum deformation	1.43 mm
Plate correction factor	0.625	Maximum applied load	34 kN
Weight of equipment	45.6 kg	Max applied pressure	183 kPa
Jacking reaction	25T Excavator	Weather conditions	Overcast



Force at 1.25mm settlement	26.7 kN	Recovery	72 %
Pressure at 1.25mm settlement	169.0 kPa		
Modulus of subgrade reaction, $k_{762}$	84.5 kN/m <sup>2</sup> /mm	Equivalent CBR value	21 %

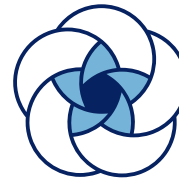
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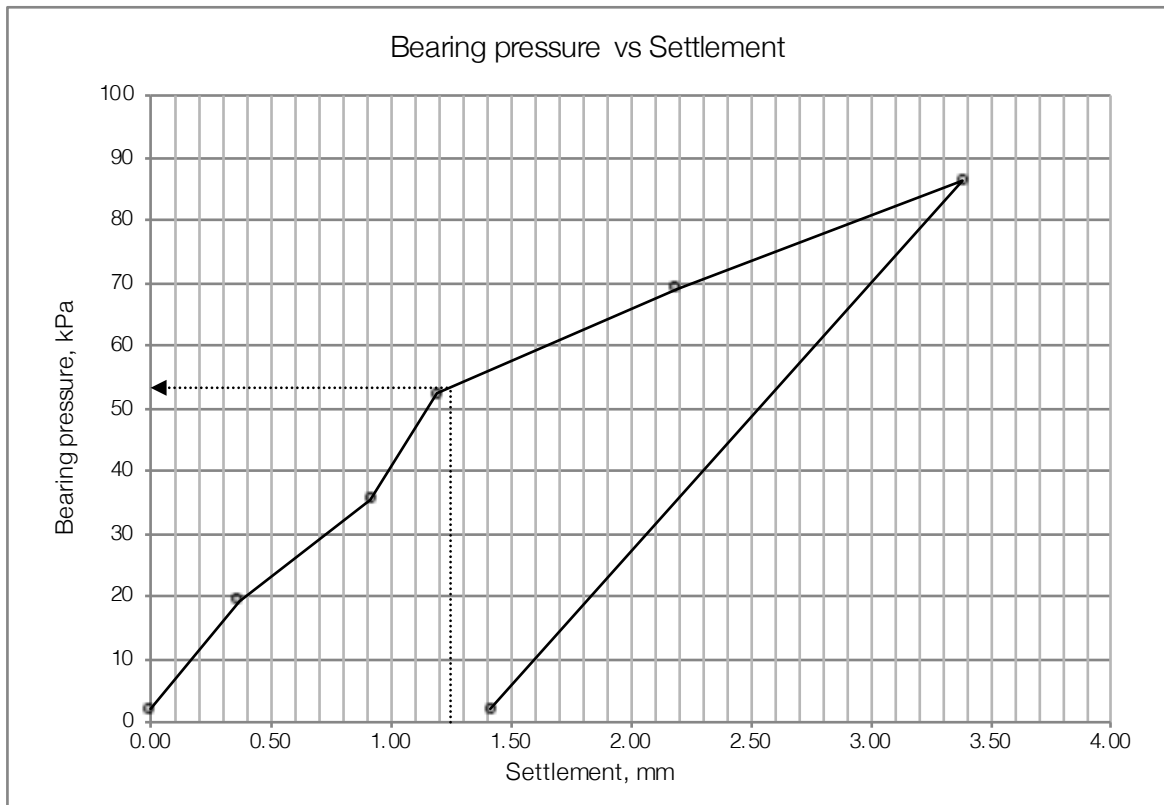
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Report	WRL/23/2332Fpbt	Log Reference	S/23/2332F
Report Date	17/10/23	Test Date	11/10/23
Site	The Orchards, Soothill		
Material	Grey gravelly Clay		
Location	Road 1 CH250		
Supplier	Ex Site	Test level	Formation
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	605 mm	Maximum deformation	3.38 mm
Plate correction factor	0.810	Maximum applied load	29 kN
Weight of equipment	62.3 kg	Max applied pressure	86 kPa
Jacking reaction	25T Excavator	Weather conditions	Overcast



Force at 1.25mm settlement	14.7 kN	Recovery	58 %
Pressure at 1.25mm settlement	53.4 kPa		
Modulus of subgrade reaction, $k_{762}$	34.6 kN/m <sup>2</sup> /mm	Equivalent CBR value	4.5 %

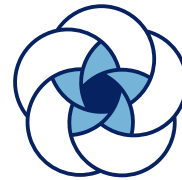
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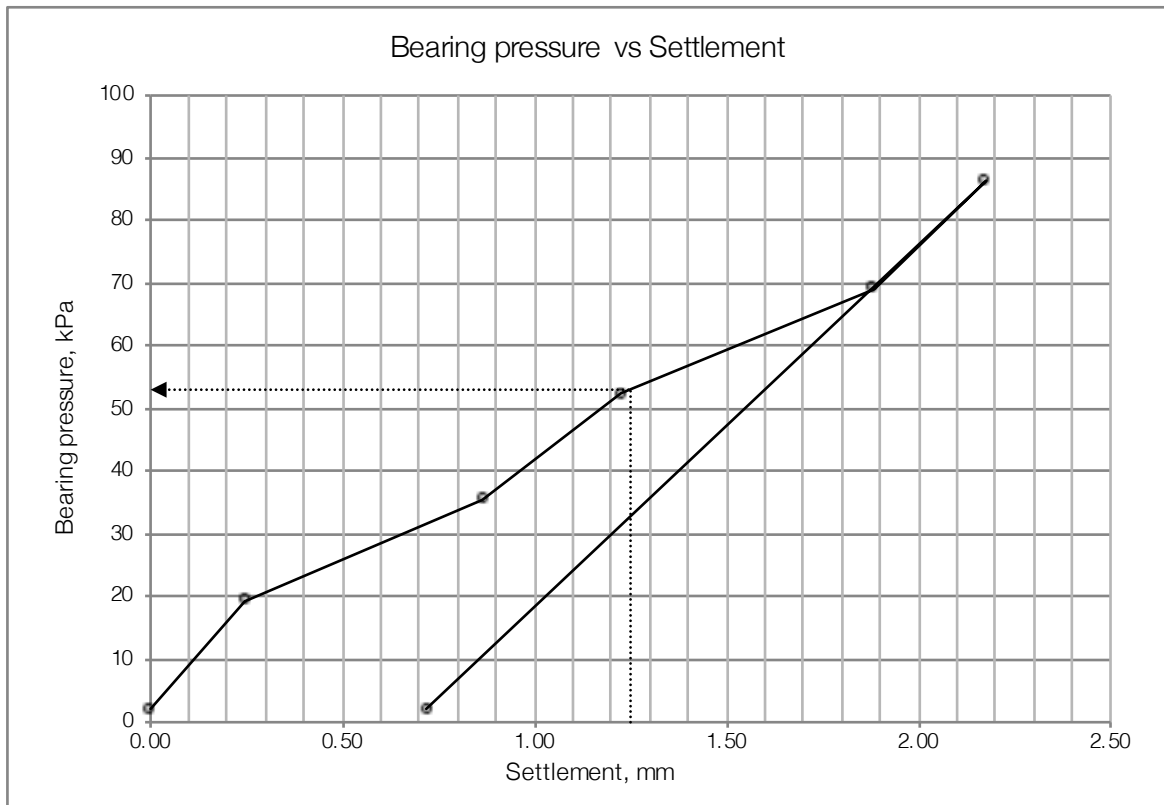
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Report	WRL/23/2332Gpbt	Log Reference	S/23/2332G
Report Date	17/10/23	Test Date	11/10/23
Site	The Orchards, Soothill		
Material	Grey gravelly Clay		
Location	Road 1 CH225		
Supplier	Ex Site	Test level	Formation
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	605 mm	Maximum deformation	2.18 mm
Plate correction factor	0.810	Maximum applied load	29 kN
Weight of equipment	62.3 kg	Max applied pressure	86 kPa
Jacking reaction	25T Excavator	Weather conditions	Light Rain



Force at 1.25mm settlement	14.6 kN	Recovery	67 %
Pressure at 1.25mm settlement	53.1 kPa		
Modulus of subgrade reaction, $k_{762}$	34.4 kN/m <sup>2</sup> /mm	Equivalent CBR value	4.4 %

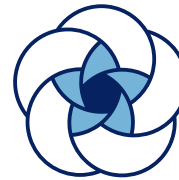
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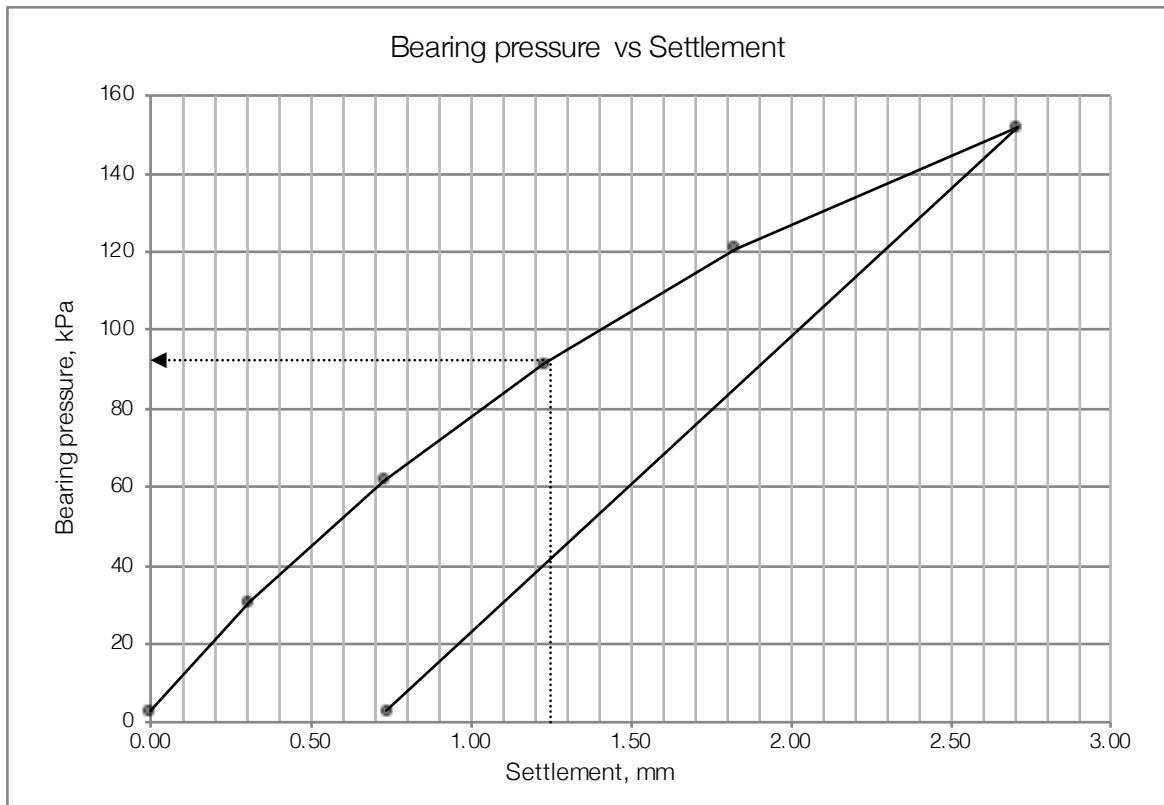
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Report	WRL/24/0124Apbt	Log Reference	S/24/0124A
Report Date	2/2/24	Test Date	31/1/24
Site	Mill Forest Way, Batley		
Material	Brown sandy gravelly Clay		
Location	CH280 Road Test 3		
Supplier	Ex Site	Test level	FC-600
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	452 mm	Maximum deformation	2.71 mm
Plate correction factor	0.625	Maximum applied load	29 kN
Weight of equipment	48.1 kg	Max applied pressure	152 kPa
Jacking reaction	25T Excavator	Weather conditions	Overcast



Force at 1.25mm settlement	14.4 kN	Recovery	73 %
Pressure at 1.25mm settlement	92.4 kPa		
Modulus of subgrade reaction, $k_{762}$	46.2 kN/m <sup>2</sup> /mm	Equivalent CBR value	7.4 %

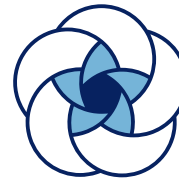
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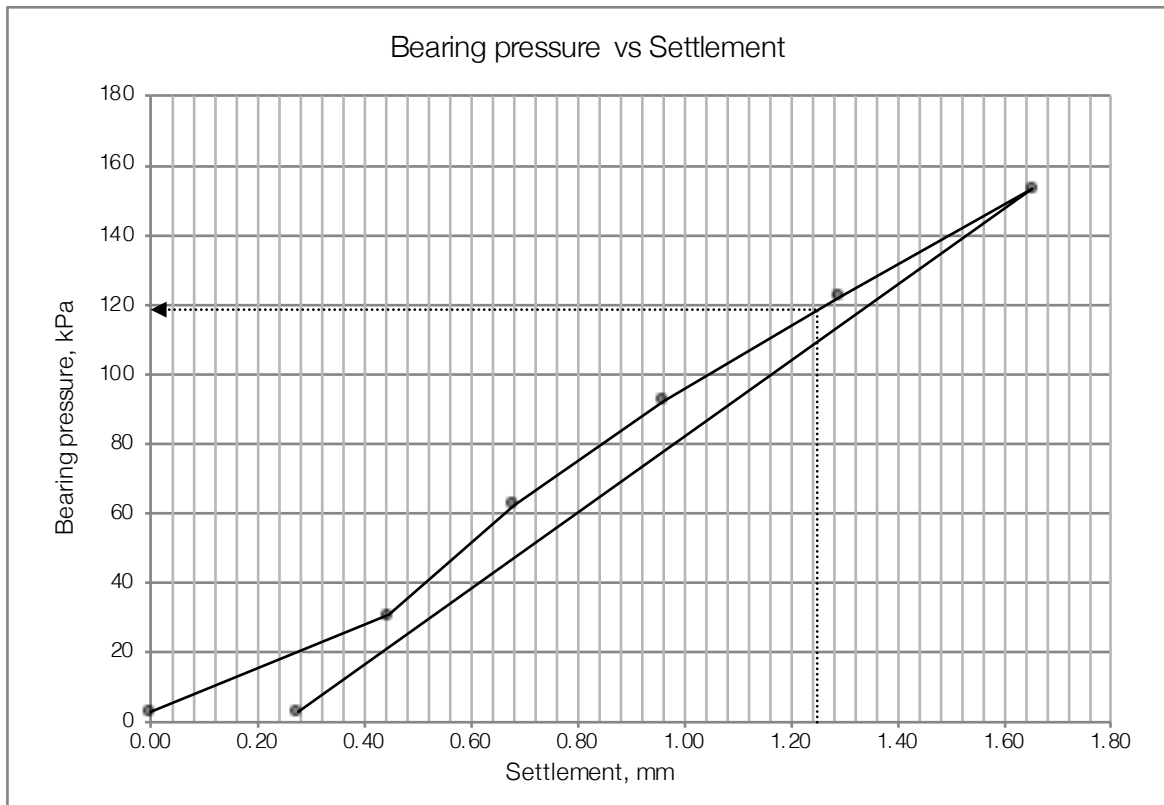
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Report	WRL/24/0122Dpbt	Log Reference	S/24/0122D
Report Date	2/2/24	Test Date	30/1/24
Site	Mill Forest Way, Batley		
Material	Brown sandy gravelly Clay		
Location	CH305 Road 1		
Supplier	Ex Site	Test level	FC-600
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	450 mm	Maximum deformation	1.65 mm
Plate correction factor	0.623	Maximum applied load	24 kN
Weight of equipment	48.1 kg	Max applied pressure	153 kPa
Jacking reaction	25T Excavator	Weather conditions	Overcast



Force at 1.25mm settlement	18.4 kN	Recovery	83 %
Pressure at 1.25mm settlement	118.5 kPa		
Modulus of subgrade reaction, $k_{762}$	59.1 kN/m <sup>2</sup> /mm	Equivalent CBR value	11 %

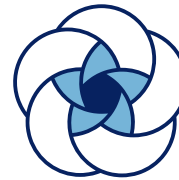
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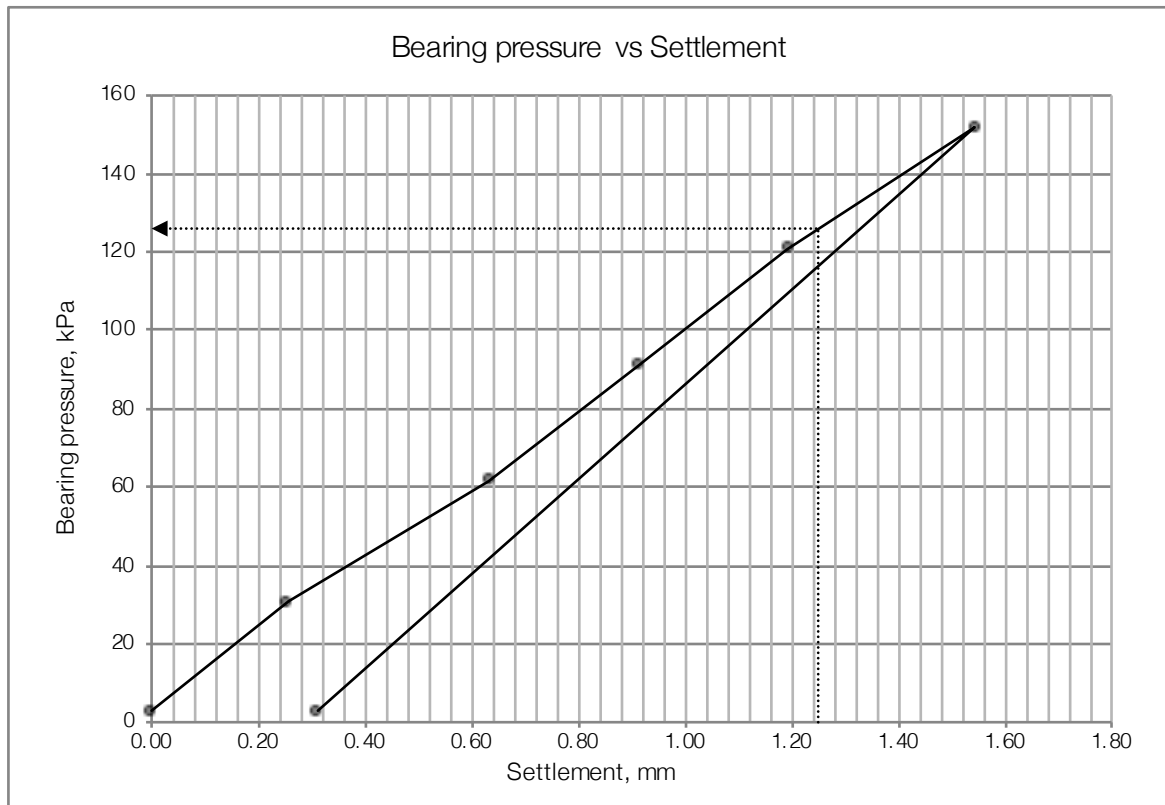
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Report	WRL/24/0124Dpbt	Log Reference	S/24/0124D
Report Date	2/2/24	Test Date	31/1/24
Site	Mill Forest Way, Batley		
Material	Brown sandy gravelly Clay		
Location	CH330 Road 1 Test 2		
Supplier	Ex Site	Test level	FC-600
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	452 mm	Maximum deformation	1.54 mm
Plate correction factor	0.625	Maximum applied load	29 kN
Weight of equipment	48.1 kg	Max applied pressure	152 kPa
Jacking reaction	25T Excavator	Weather conditions	Overcast



Force at 1.25mm settlement	19.8 kN	Recovery	80 %
Pressure at 1.25mm settlement	126.0 kPa		
Modulus of subgrade reaction, $k_{762}$	63.1 kN/m <sup>2</sup> /mm	Equivalent CBR value	13 %

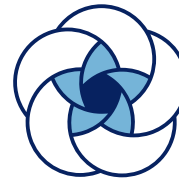
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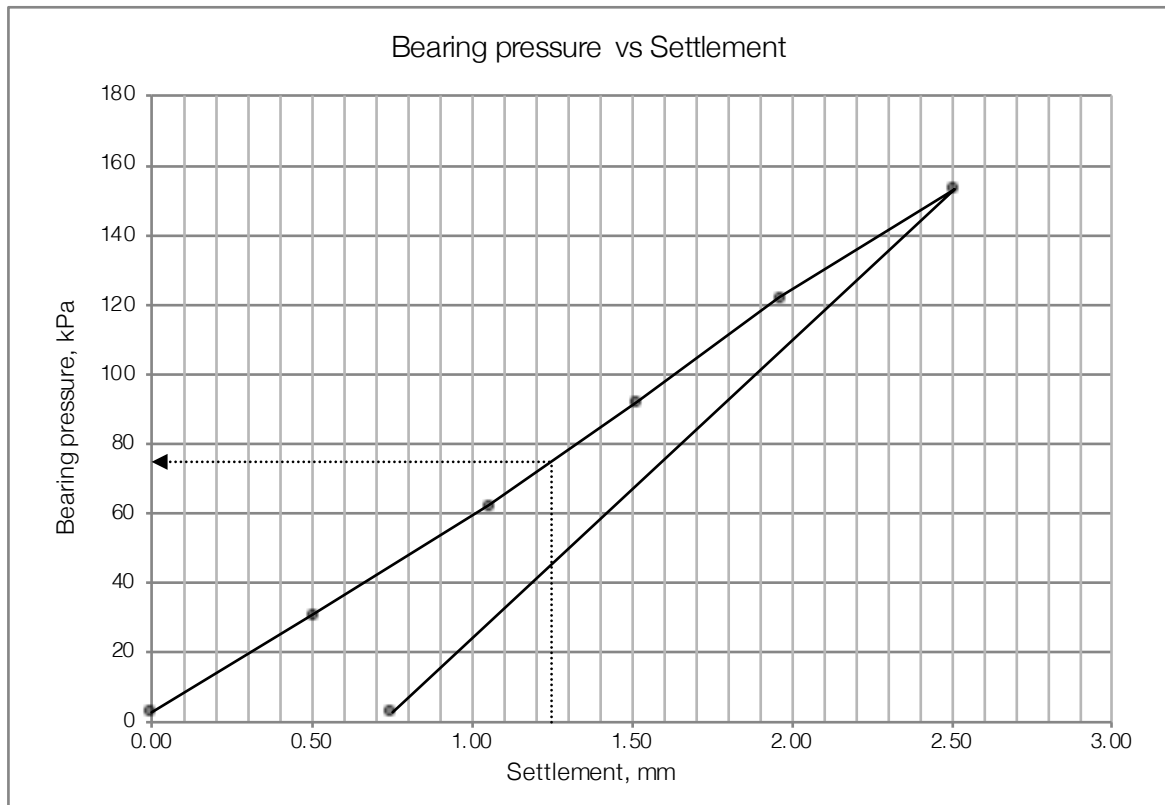
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Report	WRL/24/0122Bpbt	Log Reference	S/24/0122B
Report Date	2/2/24	Test Date	30/1/24
Site	Mill Forest Way, Batley		
Material	Brown sandy gravelly Clay		
Location	CH345		
Supplier	Ex Site	Test level	FC-600
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	450 mm	Maximum deformation	2.51 mm
Plate correction factor	0.623	Maximum applied load	24 kN
Weight of equipment	45.6 kg	Max applied pressure	153 kPa
Jacking reaction	25T Excavator	Weather conditions	Overcast



Force at 1.25mm settlement	11.4 kN	Recovery	70 %
Pressure at 1.25mm settlement	74.8 kPa		
Modulus of subgrade reaction, $k_{762}$	37.3 kN/m <sup>2</sup> /mm	Equivalent CBR value	5.1 %

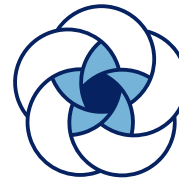
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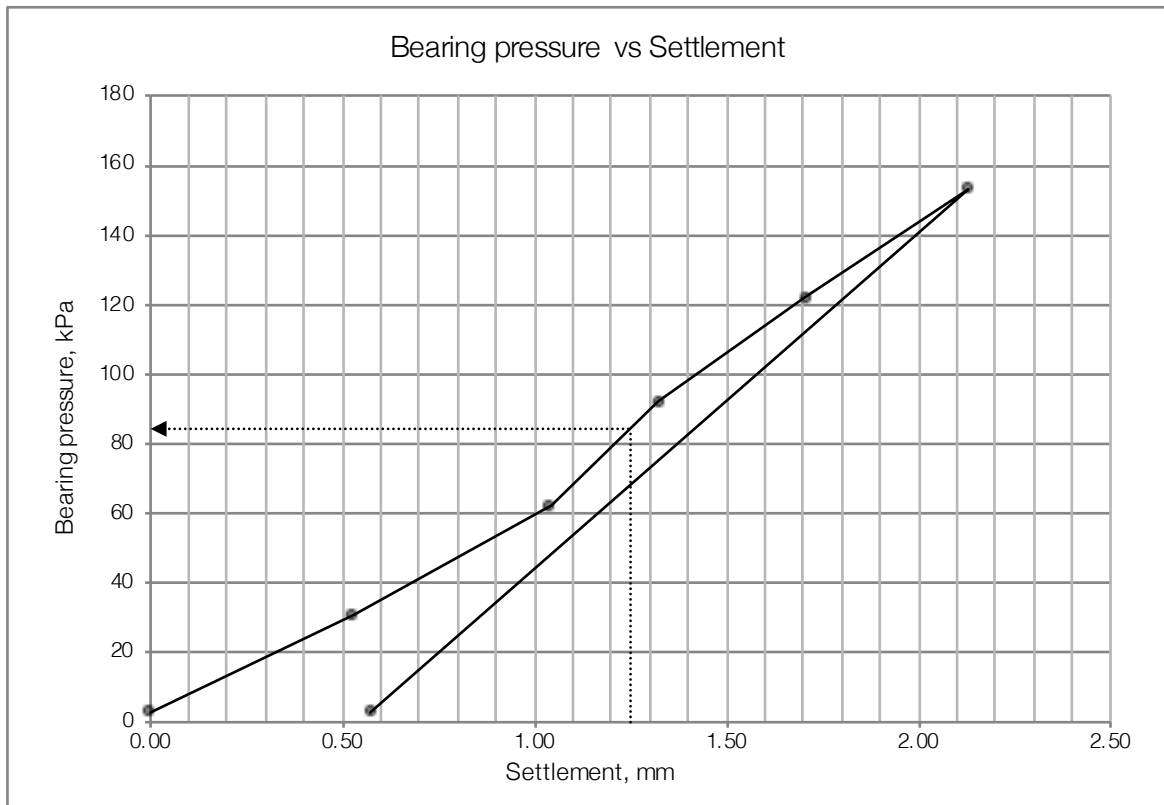
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Report	WRL/24/0122Apbt	Log Reference	S/24/0122A
Report Date	2/2/24	Test Date	30/1/24
Site	Mill Forest Way, Batley		
Material	Brown sandy gravelly Clay		
Location	CH380 Road 1		
Supplier	Ex Site	Test level	FC-600
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	450 mm	Maximum deformation	2.13 mm
Plate correction factor	0.623	Maximum applied load	24 kN
Weight of equipment	45.6 kg	Max applied pressure	153 kPa
Jacking reaction	25T Excavator	Weather conditions	Overcast



Force at 1.25mm settlement	13.0 kN	Recovery	73 %
Pressure at 1.25mm settlement	84.3 kPa		
Modulus of subgrade reaction, $k_{762}$	42.0 kN/m <sup>2</sup> /mm	Equivalent CBR value	6.3 %

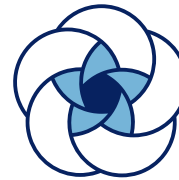
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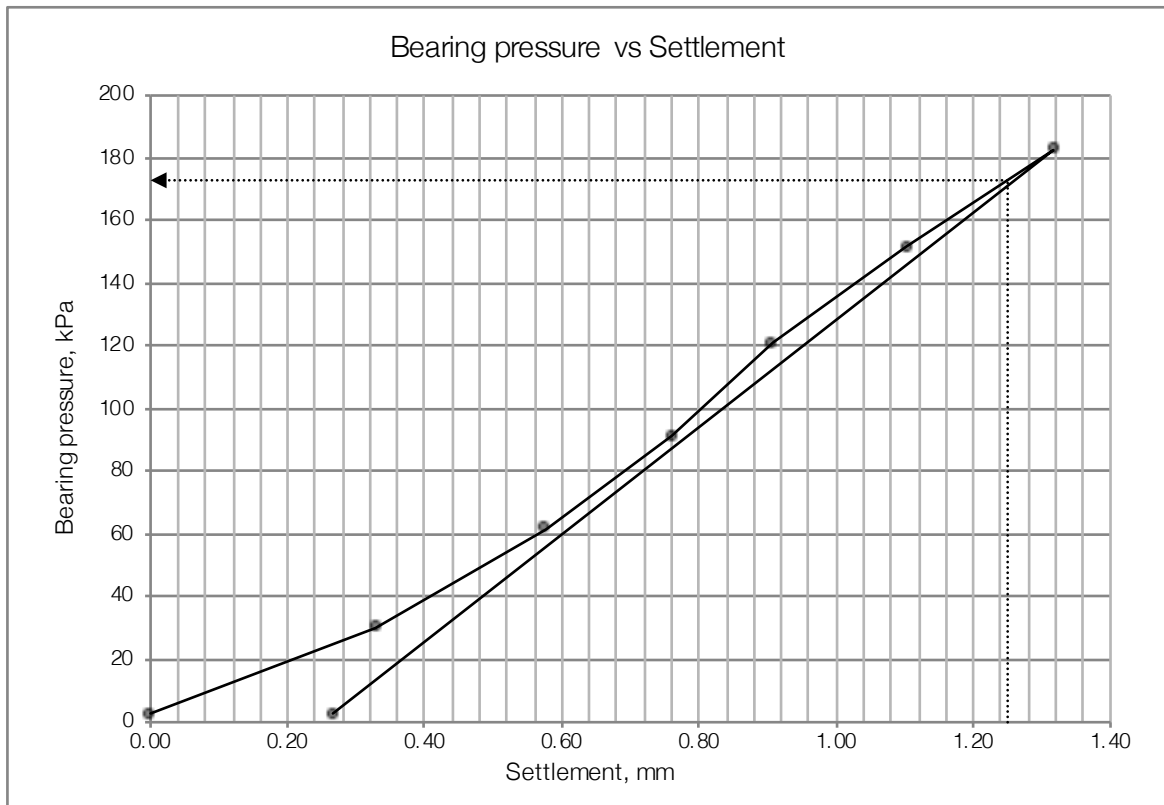
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Report	WRL/24/0124Cpbt	Log Reference	S/24/0124C
Report Date	2/2/24	Test Date	31/1/24
Site	Mill Forest Way, Batley		
Material	Brown sandy gravelly Clay		
Location	CH405 Road 1		
Supplier	Ex Site	Test level	FC-600
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	452 mm	Maximum deformation	1.32 mm
Plate correction factor	0.625	Maximum applied load	29 kN
Weight of equipment	45.6 kg	Max applied pressure	183 kPa
Jacking reaction	25T Excavator	Weather conditions	Overcast



Force at 1.25mm settlement	27.3 kN	Recovery	80 %
Pressure at 1.25mm settlement	172.9 kPa		
Modulus of subgrade reaction, $k_{762}$	86.5 kN/m <sup>2</sup> /mm	Equivalent CBR value	22 %

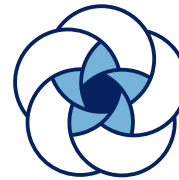
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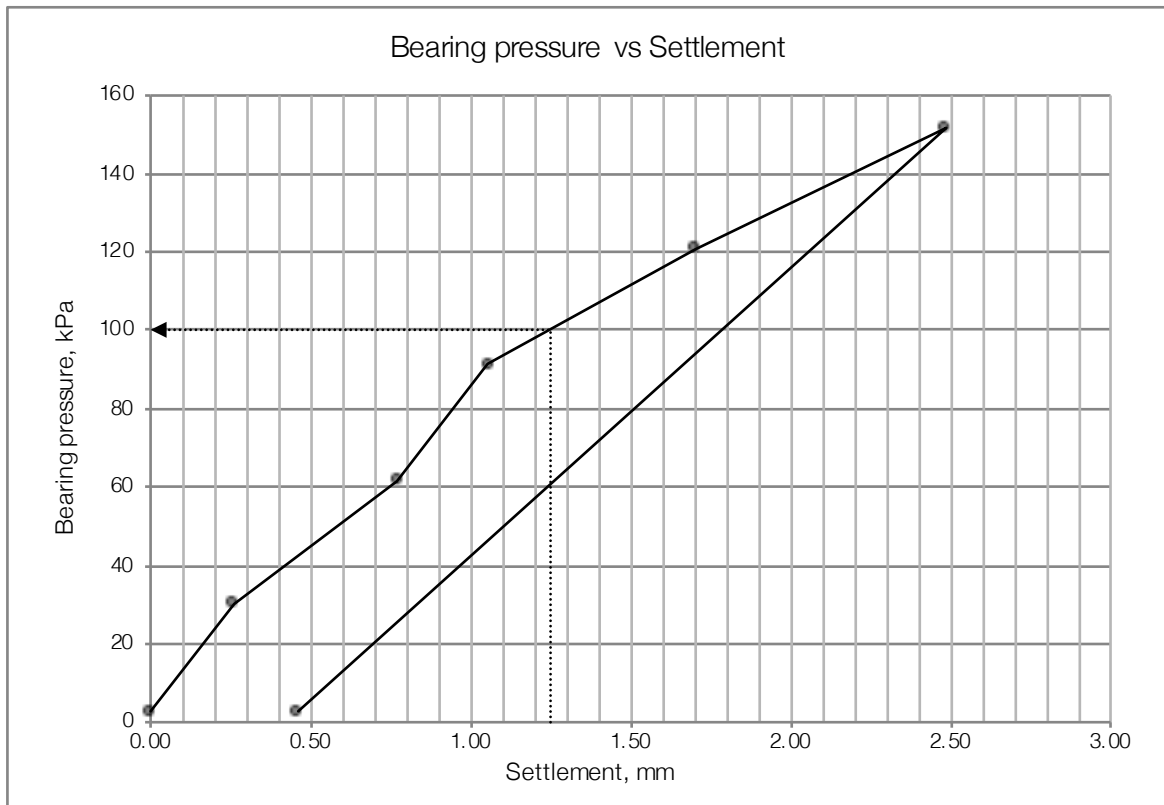
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Report	WRL/24/0124Bpbt	Log Reference	S/24/0124B
Report Date	2/2/24	Test Date	31/1/24
Site	Mill Forest Way, Batley		
Material	Brown sandy gravelly Clay		
Location	CH430 Road 1		
Supplier	Ex Site	Test level	FC-600
Source	Ex Site		

## IAN 73/06 Plate bearing test for equivalent CBR

Plate diameter	452 mm	Maximum deformation	2.49 mm
Plate correction factor	0.625	Maximum applied load	24 kN
Weight of equipment	45.6 kg	Max applied pressure	152 kPa
Jacking reaction	25T Excavator	Weather conditions	Overcast



Force at 1.25mm settlement	15.6 kN	Recovery	82 %
Pressure at 1.25mm settlement	100.2 kPa		
Modulus of subgrade reaction, $k_{762}$	50.1 kN/m <sup>2</sup> /mm	Equivalent CBR value	8.5 %

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## Appendix 5.0 – Reports/References

- Geo-Environmental Appraisal Ref 18058/536 Date 22nd Aug 2019 by GeoTech
- Remedial Specification Ref 18058/633 Date 1<sup>st</sup> October 2019 by GeoTech
- NHBC Site Reference – 0006135894
- Earthworks Specification Ref KMT/25r1 V2 by ARP