

Trial Pit 71

G.L. to 1.35m Black ash and gravel
1.35m-2.20m Greyish brown clay
Groundwater not encountered

Trial Pit 72

G.L. to 3.0m Black ash and gravel
3.0m-3.60m Light brown and grey clay
Groundwater not encountered

Trial Pit 73

G.L. to 3.10m Black ash and gravel
3.10m-3.80m Grey clay
Water seepage to 3.10m

Trial Pit 74

G.L. to 2.90m Black ash and gravel
2.90m-3.20m Light brown clay
Groundwater not encountered

Trial Pit 75

G.L. to 2.0m Black ash and gravel
2.0m-2.40m Light brown clay
Groundwater not encountered
10 No. 10kg bulk samples taken G.L. 2.0m

Trial Pit 76

G.L. to 4.0m Black ash and gravel
4.0m-4.0m Light brown clay and black ash
Groundwater not encountered

Trial Pit 77

G.L. to 0.50m Black ash and gravel
0.50m-0.90m Sand
0.90m-2.60m Grey clay with stones
Groundwater not encountered

Trial Pit 78

G.L. to 3.10m Black ash and gravel
3.10m-3.80m Light brown and grey clay
Groundwater not encountered

Trial Pit 79

G.L. to 2.80m Black ash and gravel
2.80m-3.20m Light brown and grey clay
Groundwater not encountered

Trial Pit 80

G.L. to 4.30m Black ash and gravel
4.30m-5.0m Light brown clay
Groundwater not encountered
10 No. 10kg bulk samples taken G.L. 4.30m

SC40SW

✱

✱

Trial Pit 81

G.L. to 0.90m Black ash and gravel
0.90m-1.60m Greyish brown clay
Groundwater not encountered

Trial Pit 82

G.L. to 1.30m Black ash and gravel
1.30m-1.85m Grey clay
Groundwater not encountered

Trial Pit 83

G.L. to 1.60m Black ash and gravel
1.60m-2.45m Greyish brown clay
Groundwater not encountered

Trial Pit 84

G.L. to 1.0m Black ash and gravel
1.0m-2.10m Greyish brown clay
Groundwater not encountered

Trial Pit 85

G.L. to 2.60m Black ash and gravel
2.60m-3.10m Light brown clay
Groundwater not encountered

Trial Pit 86

G.L. to 2.0m Black ash and gravel
2.0m-2.60m Firm light brown clay
Groundwater not encountered

Trial Pit 87

G.L. to 1.30m Black ash and gravel
1.30m-2.0m Light brown clay
Groundwater not encountered

Trial Pit 88

G.L. to 1.30m Black ash and gravel
1.30m-2.20m Grey and light brown clay
Groundwater not encountered

Trial Pit 89

G.L. to 1.80m Black ash and gravel
1.80m-2.50m Greyish brown clay
Groundwater not encountered

Trial Pit 90

G.L. to 1.10m Black ash and gravel
1.10m-1.85m Firm light brown clay
Groundwater not encountered

SC40SW

✱

SE408W

*

Trial Pit 91

G.L. to 3.0m Black ash and gravel
 3.0m-3.30m Light brown clay
 Groundwater not encountered

339 42770 01861

Trial Pit 92

G.L. to 1.70m Black ash and gravel
 1.70m-2.20m Light brown clay
 Groundwater not encountered

340 42748 01815

Trial Pit 93

G.L. to 3.20m Black ash and gravel
 3.20m-3.60m Grey clay and stones
 Groundwater not encountered

341 42728 01770

Trial Pit 94

G.L. to 2.20m Black ash and gravel
 2.20m-2.70m Grey clay
 Groundwater not encountered

342 42708 01725

Trial Pit 95

G.L. to 2.0m Black ash and gravel
 2.0m-2.80m Firm light brown clay
 Groundwater not encountered

343 42686 01679

Trial Pit 96

G.L. to 0.80m Black ash and gravel
 0.80m-1.65m Firm light brown clay
 Groundwater not encountered

344 42665 01633

Trial Pit 97

G.L. to 2.30m Black ash and gravel
 2.30m-2.70m Light brown clay
 Groundwater not encountered

345 42724 01881

Trial Pit 98

G.L. to 0.90m Black ash and gravel
 0.90m-1.35m Light brown clay
 Groundwater not encountered

346 42763 01836

Trial Pit 99

G.L. to 1.50m Black ash and gravel
 1.50m-1.90m Light brown clay
 Water seepage at 1.50m

347 42661 01746

Trial Pit 100

G.L. to 2.0m Black ash and gravel
 2.0m-2.60m Firm light brown clay
 Groundwater not encountered
 10 no. 10 kg. bulk samples taken GL to 2.0m

348 42641 01700

SE408W

*

Trial Pit 101

G.L. to 1.30m Black ash and gravel
 1.30m-1.70m Light brown clay
 Groundwater not encountered

349 42620 01655

Trial Pit 102

G.L. to 1.70m Black ash and gravel
 1.70m-2.10m Light brown clay
 Groundwater not encountered
 10 no. 10 kg. bulk samples taken GL to 1.70m

350 42678 01903

Trial Pit 103

G.L. to 1.25m Black ash and gravel
 1.25m-1.55m Firm light brown clay
 Groundwater not encountered

351 42657 01858

Trial Pit 104

G.L. to 2.90m Black ash and gravel
 2.90m-3.30m Grey clay and stones
 Groundwater not encountered

352 42636 01812

Trial Pit 105

G.L. to 1.40m Black ash and gravel
 1.40m-1.90m Grey clay
 Groundwater not encountered
 10 no. 10 kg. samples taken GL to 1.40m

353 4265 01767

Trial Pit 106

G.L. to 1.40m Black ash and gravel
 1.40m-2.30m Soft light brown clay
 Groundwater not encountered

354 42595 01721

Trial Pit 107

G.L. to 0.40m Black ash and gravel
 0.40m-1.60m Light brown clay
 Groundwater not encountered

355 42574 01676

Trial Pit 108

G.L. to 1.80m Black ash and gravel
 1.80m to 2.30m Light brown clay
 Groundwater not encountered

356 42633 01923

Trial Pit 109

G.L. to 0.90m Black ash and gravel
 0.90m-1.40m Greyish brown clay
 Groundwater not encountered

357 42612 01878

Trial Pit 110

G.L. to 1.85m Black ash and gravel
 1.85m-2.55m Greyish brown clay
 Groundwater not encountered

358 42590 01833

Trial Pit 111

G.L. to 1.30m Black ash and gravel 359 42570 01788
 1.30m-2.20m Firm light brown clay
 Groundwater not encountered

Trial Pit 112

G.L. to 1.70m Black ash and gravel 360 42549 01742
 1.70m-2.40m Firm light brown clay
 Groundwater not encountered

Trial Pit 113

G.L. to 1.20m Black ash and gravel 361 42528 01697
 1.20m-1.65m Light brown clay
 Groundwater not encountered

Trial Pit 114

G.L. to 2.55m Black ash and gravel 362 42587 01944
 2.55m-3.15m Light brown clay
 Water seepage at 3.15m

Trial Pit 115

G.L. to 0.95m Black ash and gravel 363 42566 01900
 0.95m-1.70m Light brown clay and yellow sandstone
 Groundwater not encountered

Trial Pit 116

G.L. to 1.50m Black ash and gravel 364 42545 01854
 1.50m-1.90m Grey and brown clay
 Groundwater not encountered

Trial Pit 117

G.L. to 1.30m Black ash and gravel 365 42524 01809
 1.30m-2.40m Greyish brown clay
 Groundwater not encountered
 10 no. 10 kg. bulk samples taken GL to 1.30m

Trial Pit 118

G.L. to 1.30m Black ash and gravel 366 42504 01763
 1.30m-1.75m Light brown clay
 Groundwater not encountered

Trial Pit 119

G.L. to 0.40m Topsoil 367 42482 01718
 0.40m-1.90m Yellow sandstone
 Groundwater not encountered

Trial Pit 120

G.L. to 2.55m Black ash and gravel 368 42542 01963
 2.55m-3.10m Light brown clay
 Groundwater not encountered
 10 no. 10 kg. bulk samples taken G.L. to 2.55m

Trial Pit 121

G.L. to 1.15m Black ash and gravel 369 42521 01918
 1.15m-1.85m Brown clay
 Groundwater not encountered

Trial Pit 122

G.L. to 1.0m Black ash and gravel 370 42500 01874
 1.0m-1.60m Grey clay and gravel
 Groundwater not encountered
 10 no. 10 kg. bulk samples taken GL to 1.60m

Trial Pit 123

G.L. to 1.10m Black ash and gravel 371 42458 01785
 1.10m-1.75m Light brown clay
 Groundwater not encountered

Trial Pit 124

G.L. to 2.0m Sandstone 372 42431 01740
 2.0m-2.65m Light brown clay
 Groundwater not encountered

Trial Pit 125

G.L. to 2.50m Black ash and gravel 373 42496 01984
 2.50m-3.10m Grey clay
 Groundwater not encountered

Trial Pit 126

G.L. to 1.10m Black ash and gravel 374 42476 01940
 1.10m-1.75m Greyish brown clay
 Groundwater not encountered

Trial Pit 127

G.L. to 1.20m Black ash and gravel 375 42455 01896
 1.20m-1.70m Greyish brown clay
 Groundwater not encountered

Trial Pit 128

G.L. to 3.05m Black ash and gravel 376 42434 01852
 3.05m-4.50m Light brown and grey clay
 Water seepage at 3.05m

Trial Pit 129

G.L. to 1.30m Black ash and gravel 377 42414 01806
 1.30m-2.35m Light brown clay
 Groundwater not encountered

Trial Pit 130

G.L. to 1.30m Black topsoil 378 42392 01761
 1.30m-2.45m Firm light brown clay
 Groundwater not encountered

Trial Pit 131

G.L. to 2.30m Black ash and gravel
2.30m-2.65m Light brown clay
Groundwater not encountered

Trial Pit 132

G.L. to 1.0m Black ash and gravel
1.0m-1.95m Grey and light brown clay
Groundwater not encountered

Trial Pit 133

G.L. to 1.65m Black ash and gravel
1.65m-2.20m Greyish brown clay
Groundwater not encountered

Trial Pit 134

G.L. to 2.75m Black ash and gravel
2.75m-3.35m Firm grey clay
Water seepage at 2.75m

Trial Pit 135

G.L. to 1.35m Black ash and gravel
1.35m-2.0m Greyish brown clay
Groundwater not encountered

Trial Pit 136

G.L. to 2.40m Black ash and gravel
2.40m-2.70m Light brown clay
Groundwater not encountered

Trial Pit 137

G.L. to 0.85m Black ash and gravel
0.85m-1.70m Brown clay
Groundwater not encountered

Trial Pit 138

G.L. to 1.60m Black ash and gravel
1.60m-2.10m Grey clay and yellow sandstone
Groundwater not encountered

Trial Pit 139

G.L. to 2.30m Black ash and gravel
2.30m-3.10m Soft grey clay
Water seepage at 2.80m
10 no. 10 kg. bulk samples taken GL to 2.30m

Trial Pit 140

G.L. to 1.10m Black ash and gravel
1.10m-1.85m Greyish brown clay
Groundwater not encountered

Trial Pit 141

G.L. to 2.10m Black ash and gravel
2.10m-2.65m Light brown clay
Groundwater not encountered
10 no. 10 kg. bulk samples taken GL to 2.10m

Trial Pit 142

G.L. to 0.80m Black ash and gravel
0.80m-1.90m Firm light brown clay
Groundwater not encountered

Trial Pit 143

G.L. to 0.45m Brown topsoil
0.45m-1.50m Firm light brown clay
Groundwater not encountered

Trial Pit 145

G.L. to 2.20m Black ash and gravel
2.20m-2.55m Light brown clay
Groundwater not encountered

Trial Pit 146

G.L. to 0.90m Black ash and gravel
0.90-1.60 Light brown clay
Groundwater not encountered

Trial Pit 147

G.L. to 1.10m Black ash and gravel
1.10m-1.70m Firm grey clay
Groundwater not encountered

Trial Pit 150

G.L. to 2.10m Black ash and gravel
2.10m-2.45m Firm greyish brown clay
Groundwater not encountered

Trial Pit 151

G.L. to 1.20m Black ash and gravel
1.20m-2.0m Grey and light brown clay
Groundwater not encountered

Trial Pit 152

G.L. to 0.70m Black ash and gravel
0.70m-1.40m Soft grey and light brown clay
Groundwater not encountered

Trial Pit 153

G.L. to 1.85m Black ash and gravel
1.85m-2.20m Greyish brown clay
Groundwater not encountered

Trial Pit 141

G.L. to 2.10m Black ash and gravel
2.10m-2.65m Light brown clay
Groundwater not encountered
10 no. 10 kg. bulk samples taken GL to 2.10m

Trial Pit 142

G.L. to 0.80m Black ash and gravel
0.80m-1.90m Firm light brown clay
Groundwater not encountered

Trial Pit 143

G.L. to 0.45m Brown topsoil
0.45m-1.50m Firm light brown clay
Groundwater not encountered

Trial Pit 145

G.L. to 2.20m Black ash and gravel
2.20m-2.55m Light brown clay
Groundwater not encountered

Trial Pit 146

G.L. to 0.90m Black ash and gravel
0.90-1.60 Light brown clay
Groundwater not encountered

Trial Pit 147

G.L. to 1.10m Black ash and gravel
1.10m-1.70m Firm grey clay
Groundwater not encountered

Trial Pit 150

G.L. to 2.10m Black ash and gravel
2.10m-2.45m Firm greyish brown clay
Groundwater not encountered

Trial Pit 151

G.L. to 1.20m Black ash and gravel
1.20m-2.0m Grey and light brown clay
Groundwater not encountered

Trial Pit 152

G.L. to 0.70m Black ash and gravel
0.70m-1.40m Soft grey and light brown clay
Groundwater not encountered

Trial Pit 153

G.L. to 1.85m Black ash and gravel
1.85m-2.20m Greyish brown clay
Groundwater not encountered

Trial Pit 154

G.L. to 1.90m Black ash and gravel
1.90m-2.40m Light brown clay
Groundwater not encountered
10 no. 10 kg. samples taken, GL to 1.90m

Trial Pit 156

G.L. to 1.90m Black ash and gravel
1.90m-2.40m Grayish brown clay and yellow sandstone
Groundwater not encountered

Trial Pit 158

G.L. to 1.85m Black ash and gravel
1.85m-2.55m Light brown and grey clay and yellow sandstone
Groundwater not encountered

Trial Pit 159

G.L. to 1.90m Black ash and gravel
1.90m-2.40m Firm light brown clay
Groundwater not encountered

Trial Pit 161

G.L. to 1.55m Black ash and gravel
1.55m-1.80m Yellow sandstone
1.80m-2.20m Soft grey silty clay
Groundwater not encountered

Trial Pit 162

G.L. to 0.65m Black ash and gravel
0.65m-1.55m Firm light brown clay
Groundwater not encountered

Trial Pit 164

G.L. to 1.45m Black ash and gravel
1.45m-1.70m Yellow sandstone
1.70m-2.20m Grey clay
Groundwater not encountered

Trial Pit 166

G.L. to 0.80m Stone ballast
0.80m-1.35m Black ash and gravel
1.35m-1.60m Yellow sandstone
1.60m-2.25m Firm grey clay
Groundwater not encountered

SE40SW

399 42207 62065

400 42182 62132

401 42138 62153

402 42117 62107

403 42093 62174

404 42073 62128

405 42048 62194

406 42003 62215

SE40SW 225

BOREHOLE No. AND LOCATION	DEPTH		SOIL DESCRIPTION 4201, 0256	SAMPLES	
	From	To		Depth	Test and Result
Borehole 10 23.6.73.	0	0.15	Grass and topsoil with some fill.		
	0.15	0.4	Brown clayey sand.	0.4- 0.65	m LL 27 43 PL 30 DD 1500 CBRR 8
	0.4	0.6	Firm to stiff light grey and brown mottled silty sandy clay with occasional fragments of mudstone.	0.75- 1.1	m 30
	0.6	0.75	Iron and carbon stained heavily weathered and broken grey shaly sandy mudstone.	1.15- 1.3	m LL 24 37 FL 22
	0.75	1.25	Firm to stiff light grey and brown silty clay.	1.3- 1.75	m 18 LL 23 PL 23 DD 1890 CU 30 SU 18
	1.25	2.0	Firm but soft in places light grey silty clay with abundant fragments of mudstone and coal, sand below 1.6m.	2.25- 2.7	m 15 N 13
				2.6- 3.0	m 16 P14 100 P2 61 P7 31 P36 9 P200 4
				3.0- 3.45	m 15 N 16
	2.0	4.6	Dark brown clayey alluvial medium and coarse grained sand with fine subrounded gravel and fragments of sandstone and mudstone. Very clayey band at 3.8m.	3.8- 4.8	m 15
				4.5- 4.95	m 15 N 20
	4.6	4.8	Firm dark brown very sandy clay with some gravel.	4.5- 4.8	m 15
	4.8	5.75	Stiff dark grey silty sandy clay with fragments of sandstone and mudstone and some gravel.	5.1- 5.5	m 15 LL 49 FL 28
				5.5- 5.85	m 23 LL 25 PL 23 DD 1700 CU 108 SU 6

C Appendix C – Geotechnical Risk Register

Table C-1 – Geotechnical Risk Matrix

Probability (P)		x	Impact (I)		=	Risk (R)	
Very likely	5		Very high	5		Severe	20-25
Likely	4		High	4		Substantial	15-19
Plausible	3		Medium	3		Moderate	10-14
Unlikely	2		Low	2		Minor	5-9
Very Unlikely	1		Very low	1		Negligible	1-4

Table C-2 – Geotechnical Risk Register

Item	Ground Conditions	Hazard	Prior to Control			Consequence	Control Measure	After Control		
			P	I	R			P	I	R
Contaminated Land	Dismantled railway/offsite colliery spoil	Leachates entering the site from contaminated areas.	3	4	12	Construction delays. Additional costs. Damage to habitat.	Ground Investigation to provide samples for environmental laboratory testing to identify soil and water contamination. Adopt remedial strategy in line with BS requirements.	1	4	4
Contamination of land	Offsite agricultural land	Works have an adverse effect on the habitat	3	4	12	Construction delays. Additional costs. Damage to habitat.	Onsite operations to be undertaken in such a manner to prevent/ reduce the likelihood of any onsite contamination during the proposed works. Risk Assessments and Methods Statements to be followed throughout works.	1	4	4
Flooding and drainage	Overtopping of the existing flood embankment	Flooding during works. Inducing failure in the embankment	3	5	15	Increased costs and delays. Damage to infrastructure.	Lead Local Flood Authority and Environment Agency to be consulted and works to be carried out in accordance with local county council requirements.	1	5	5
Ground conditions	Unrecorded underground services.	Damage during works posing risk of injury to construction workers and public.	3	5	15	Increased cost and delay. Unplanned diversions, protection or repair. Health of construction workers.	Ensure provision of up to date service drawings and study area is scanned before works commence. Risk Assessments and Methods Statements to be followed throughout works.	1	5	5
	Soft wet Ground	Poor access to site, damaging habitat Settlement or bearing capacity failure of proposed infrastructure.	5	4	20	Construction delays. Additional costs. Damage to habitat. Injury to construction workers or end users.	Risk Assessments and Methods Statements to be followed throughout works. Efforts to mitigate damage to ground during proposed works.	3	3	9
	Shallow groundwater	Inundation of excavation Instability of slopes	4	3	12	Increased cost and delays. Damage to infrastructure and equipment.	Ground Investigation to identify groundwater tables within the shallow granular deposits beneath the study area and determine risk to construction. Control measures to be enforced following GI recommendations.	1	3	3
	Damage to structure	Embankment instability	4	5	20	Failure of the embankment, mass movement and flooding. Damage to infrastructure.	Ground Investigation to identify weaker strata and provide samples for geotechnical testing. Geotechnical recommendations to be incorporated into the design.	1	5	5
Proposed Islands	Compressible strata	Settlement of proposed islands	4	5	20	Construction delays. Additional costs. Damage to habitat.	Ground Investigation to perform in-situ testing and provide samples for geotechnical testing. Geotechnical recommendations to be incorporated into the design.	1	4	4
	Low ground bearing capacity	Bearing capacity failure	3	5	15	Flooding and culvert instability. Damage to infrastructure. Loss of life.	Ground Investigation to perform in-situ testing and provide samples for geotechnical testing. Geotechnical recommendations to be incorporated into the design.	1	5	5

References

1. BGS, 2008, 1:50,000 geological map Sheet 87 "Barnsley".
2. BGS, 2018, GeoIndex (<http://mapapps2.bgs.ac.uk/geoindex/home.html>)
3. BGS, 2002, Mineral Resource map for South Yorkshire.
4. Construction Industry Research and Information Association (CIRIA), 2001, Contaminated Land Risk Assessment. A Guide to Good Practice. C552.
5. Cranfield Soil and AgriFood Institute, 2018, Soilscales Map (<http://www.landis.org.uk/soilscales>).
6. Department for Environment Food and Rural Affairs (Defra), 2011, Defra Circular 01/2006: Contaminated Land.
7. Defra, 2011, Guidelines for Environmental Risk Assessment and Management. Green Leaves III.
8. Envirocheck. 2018, Historical Maps, reference no. 188125101_1.
9. Environment Agency, 2018, Catchment Data Explorer (<https://environment.data.gov.uk/catchment-planning/>).
10. JBA, 2018, Old Moor Site Layout (North and South), drawing reference: 2018s0929-101, dated 10 October 2018).
11. National Library of Scotland, 2018 (<https://maps.nls.uk>)
12. Public Health England (PHE), 2018, Interactive Radon map viewer (<https://www.ukradon.org/information/ukmaps>).
13. RSPB, 2018, Updated HLF Presentation_1020.ppt.
14. RSPB, 2018, Works Methodology - HLF project at RSPB Old Moor.
15. The Coal Authority, 2018, Interactive Map Viewer (<http://mapapps2.bgs.ac.uk/coalauthority/home.html>)
16. UK Government, 2018, MAGiC Map (<https://magic.defra.gov.uk/MagicMap.aspx>)
17. UK Government, 2018, Flood Planning Data (<https://flood-map-for-planning.service.gov.uk>)
18. Zetica, 2018, UXO Risk Map (<https://zeticauxo.com/downloads-and-resources/risk-maps/>)

Offices at:

Coleshill
Doncaster
Dublin
Edinburgh
Exeter
Glasgow
Haywards Heath
Isle of Man
Limerick
Newcastle upon Tyne
Newport
Peterborough
Saltaire
Skipton
Tadcaster
Thirsk
Wallingford
Warrington

Registered Office

South Barn
Broughton Hall
SKIPTON
North Yorkshire
BD23 3AE
United Kingdom

+44(0)1756 799919

info@JBA -
consulting.com

www.JBA -
consulting

Follow us:  

Jeremy Benn
Associates Limited

Registered in England
3246693

JBA - Group Ltd is
certified to:
ISO 9001:2015
ISO 14001:2015
OHSAS 18001:2007

