## Southampton to London Pipeline Project

## Volume 6

Environmental Statement (Volume D) Appendix 9.2: Geophysical Survey (2 of 2)

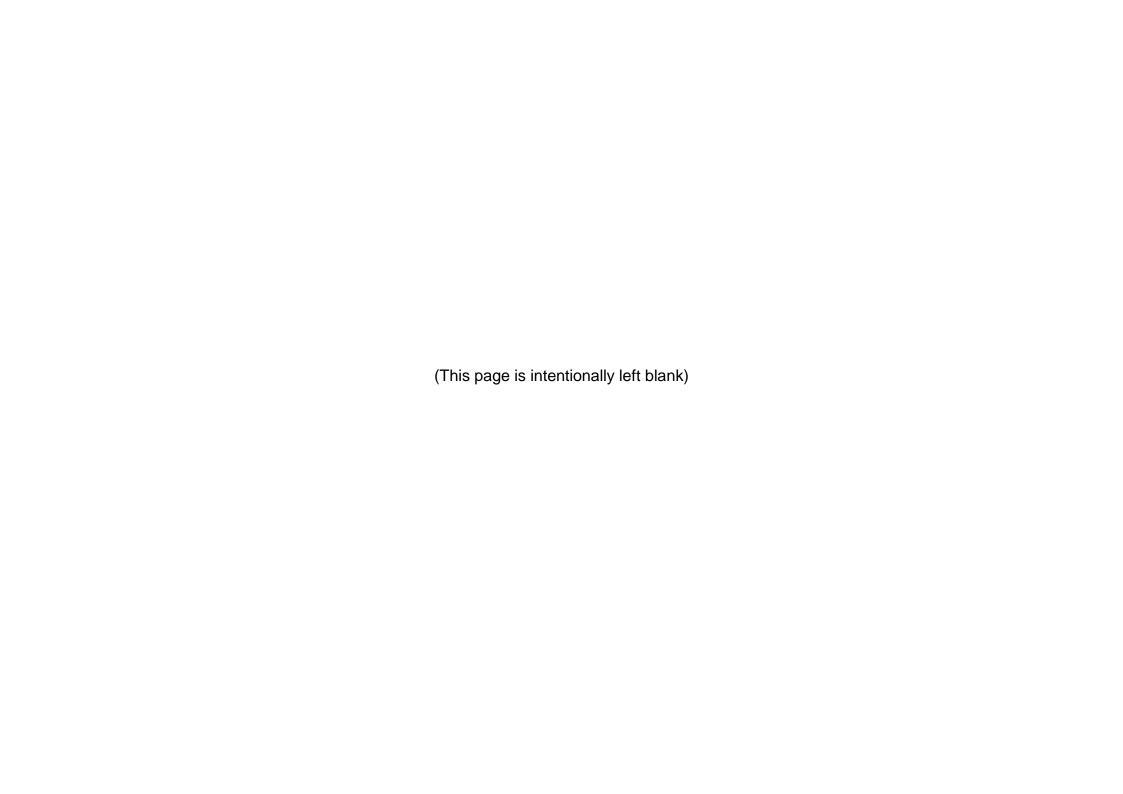
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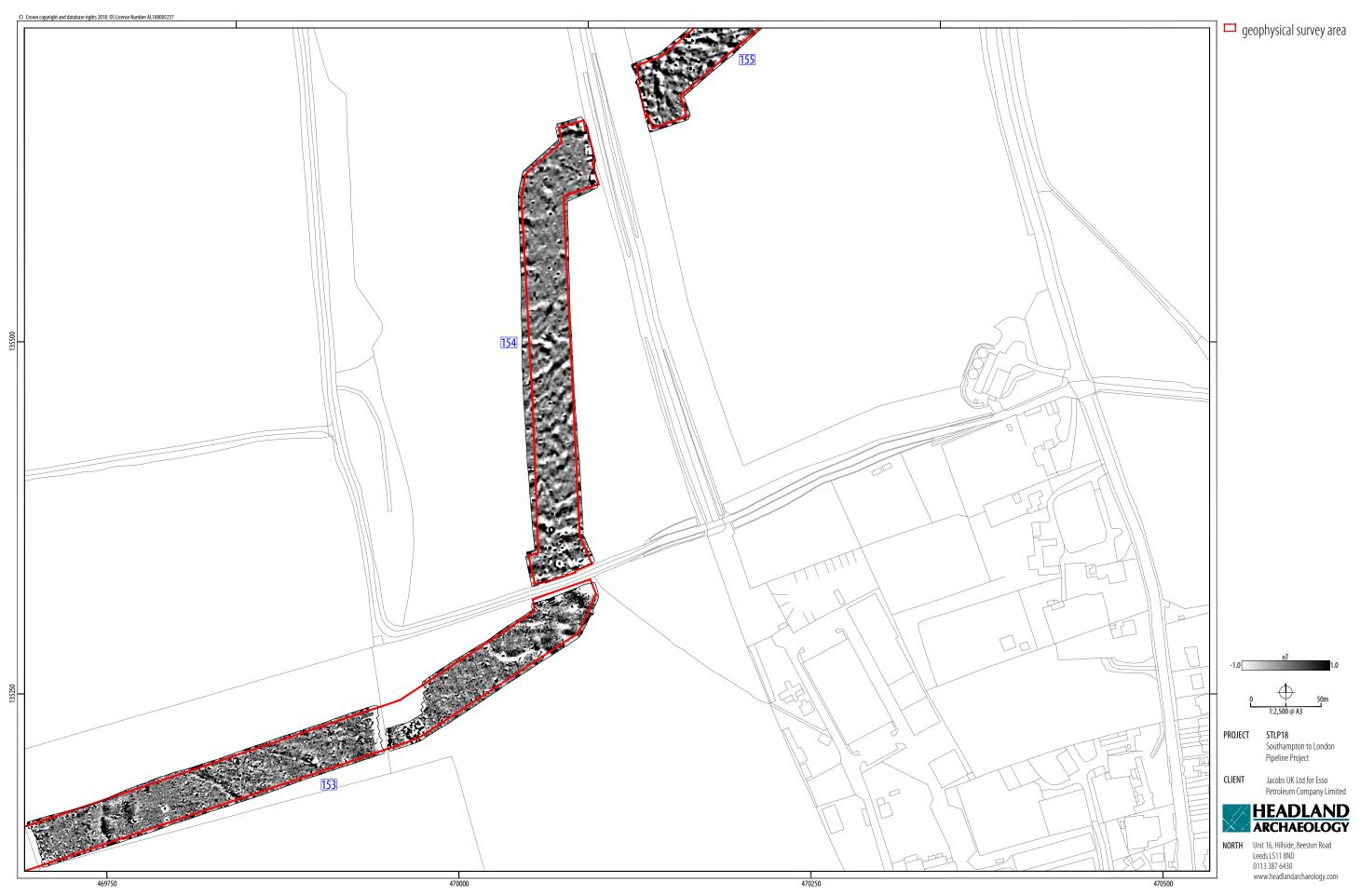
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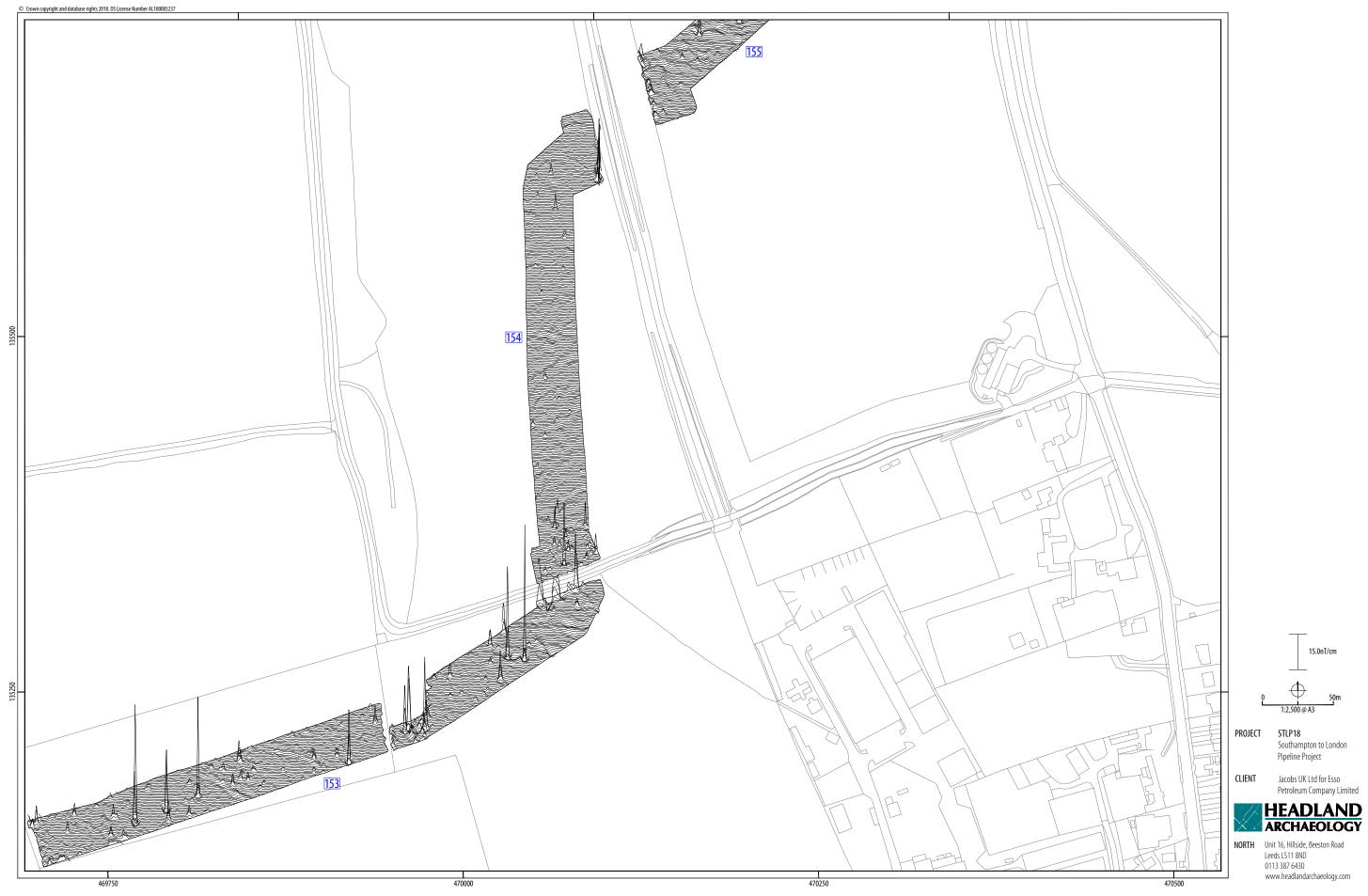
APFP Regulation No. 5(2)(a)

Revision No. 1.0

May 2019

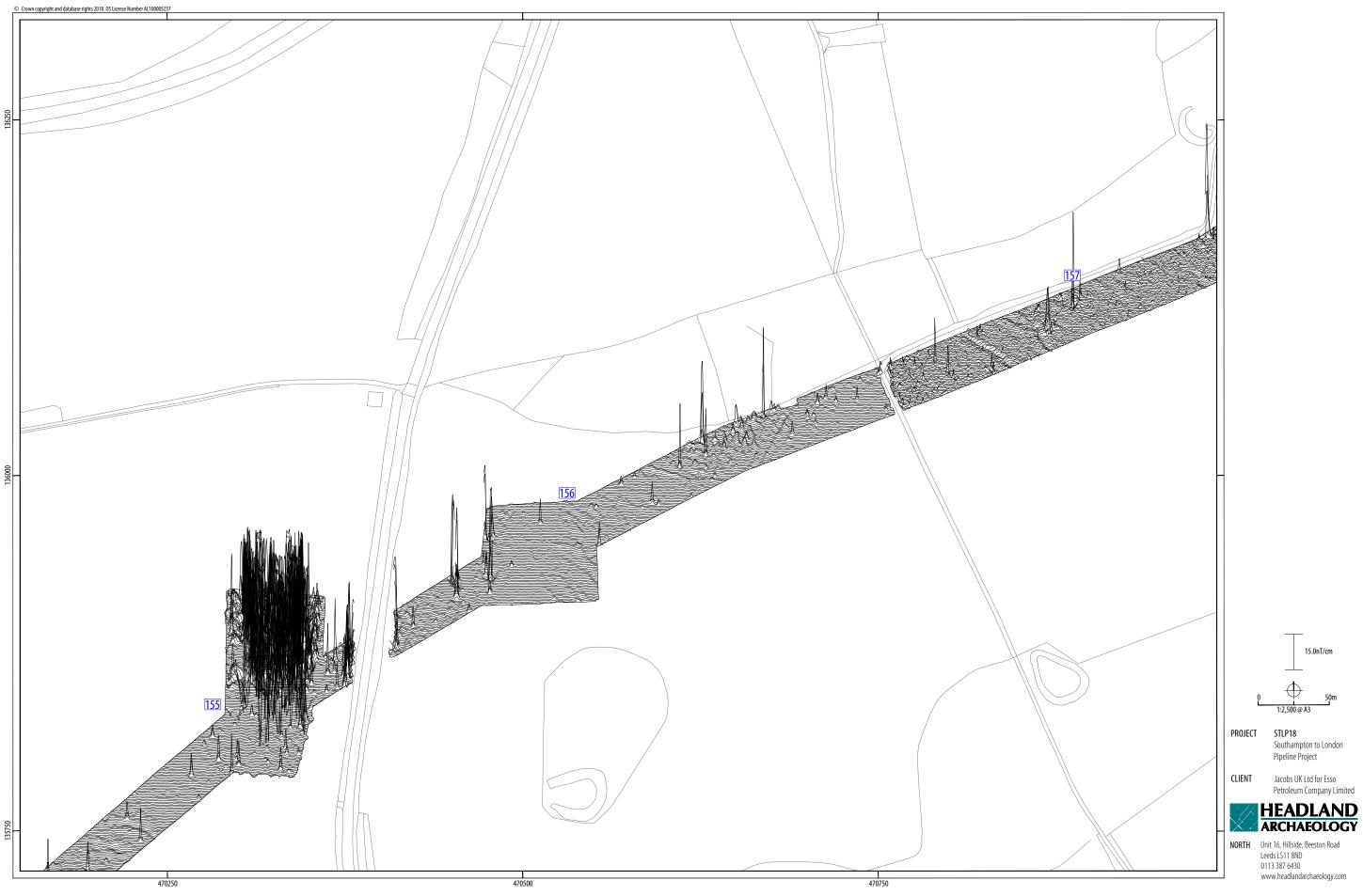




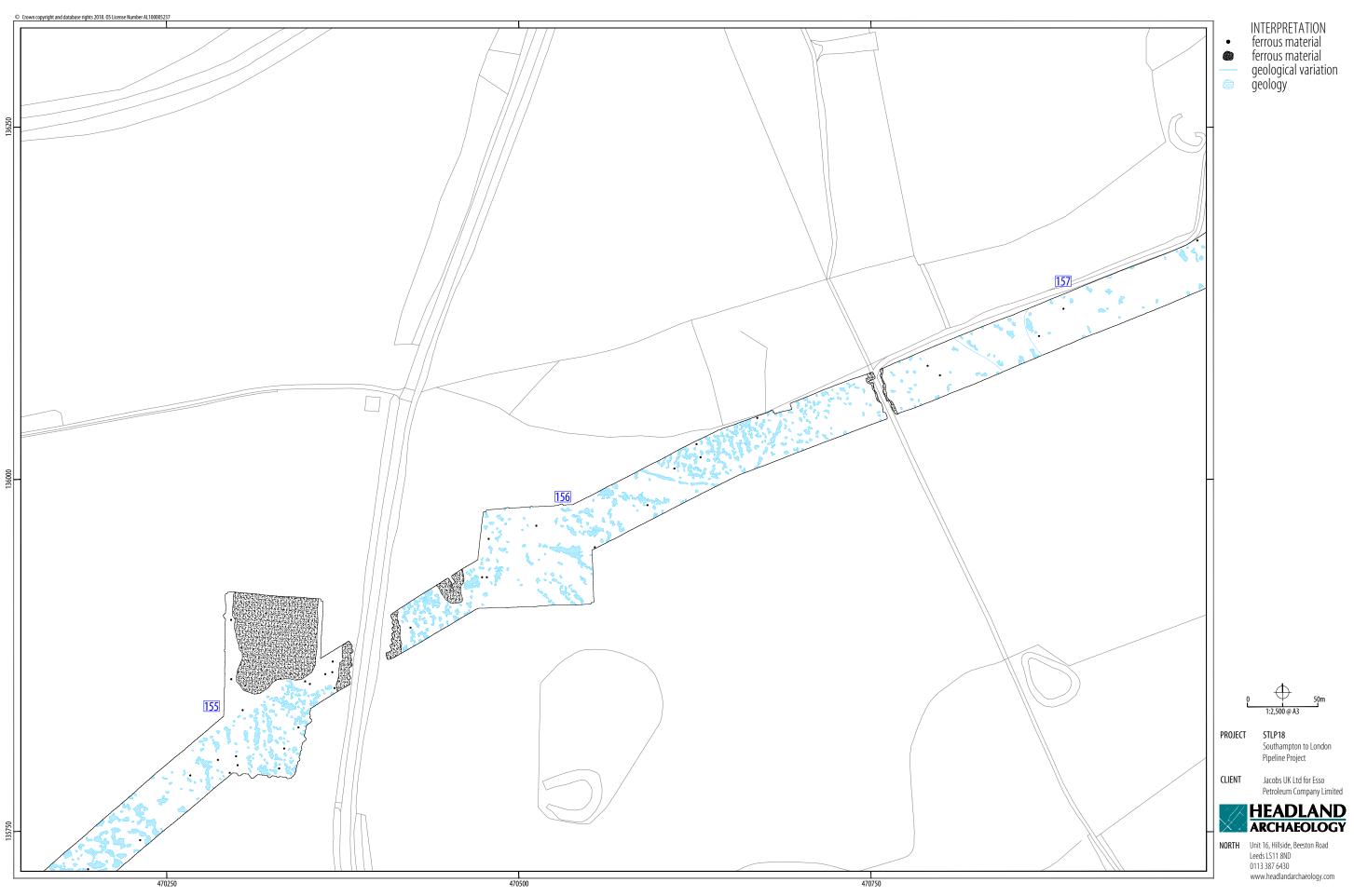






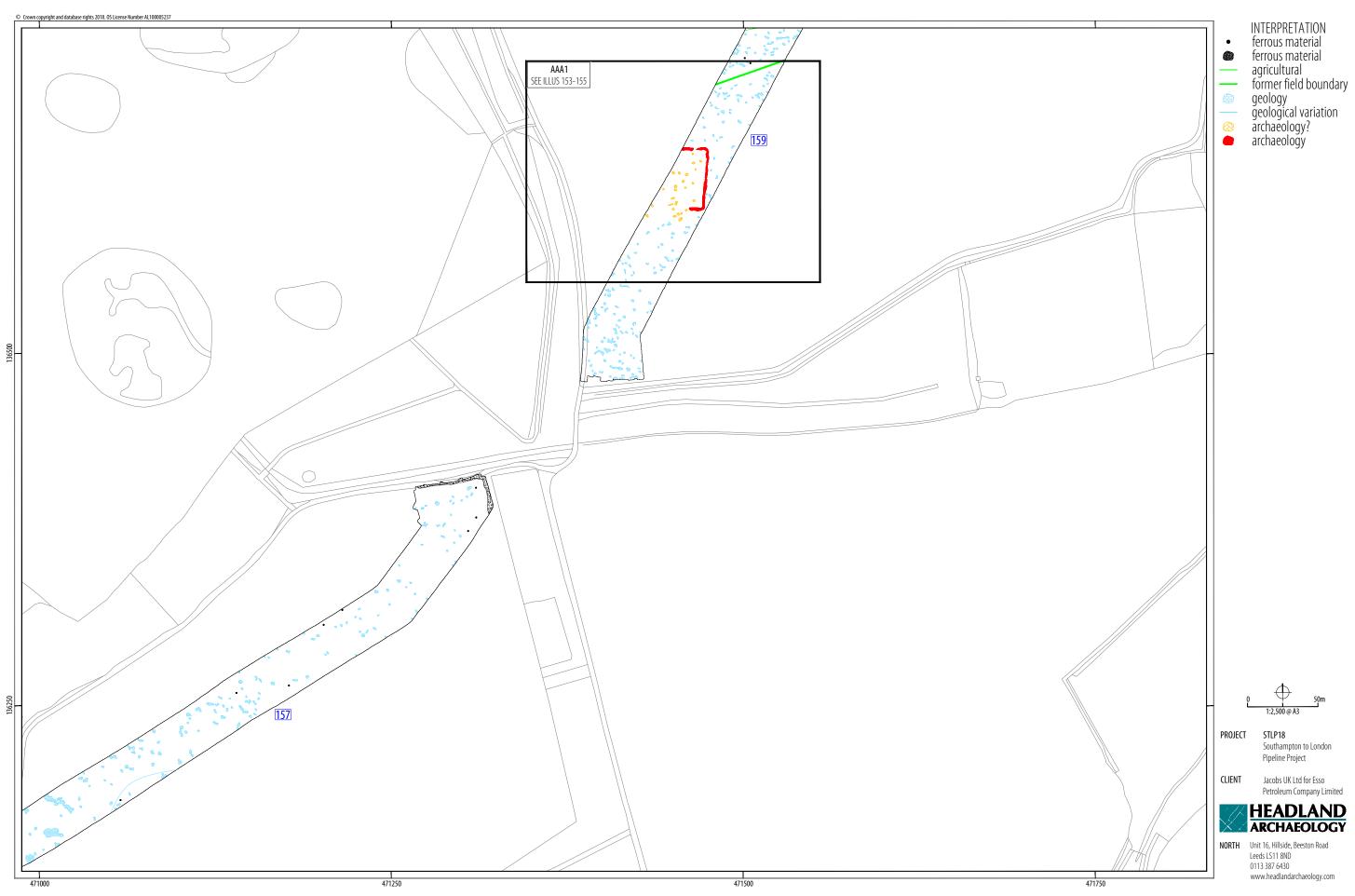


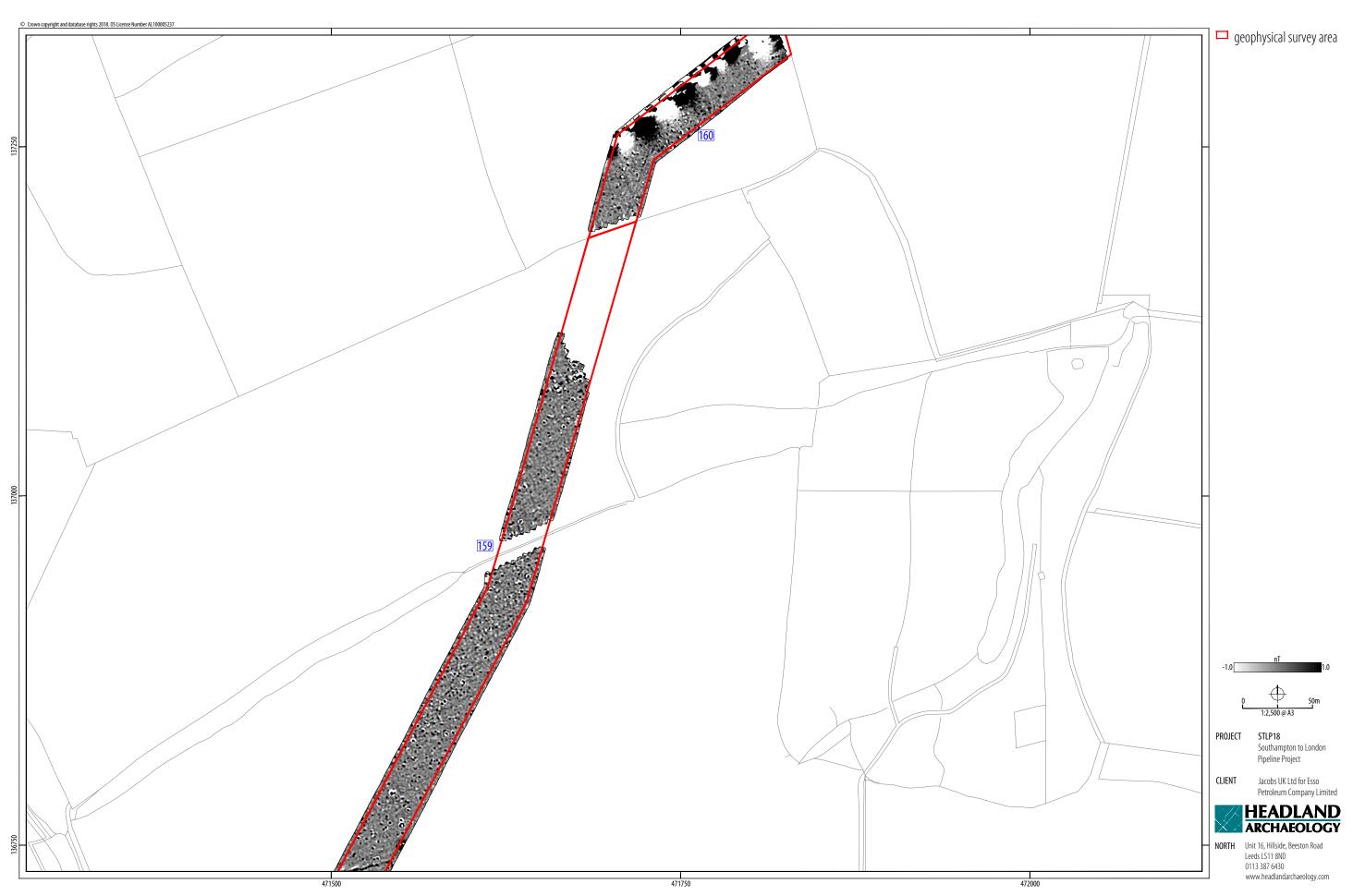
**ILLUS 82** XY trace plot of minimally processed magnetometer data; GSA155, GSA156 & GSA157

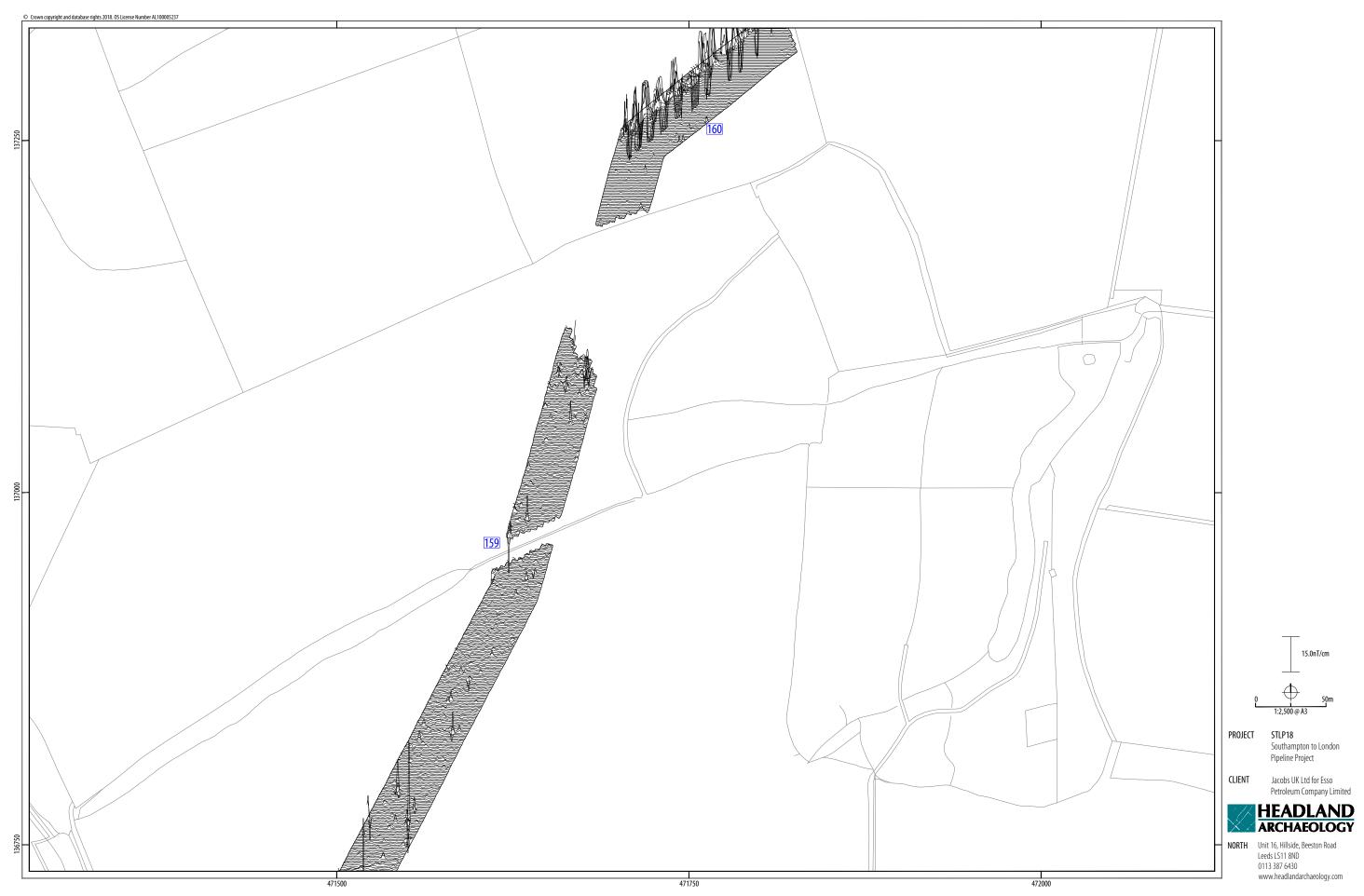












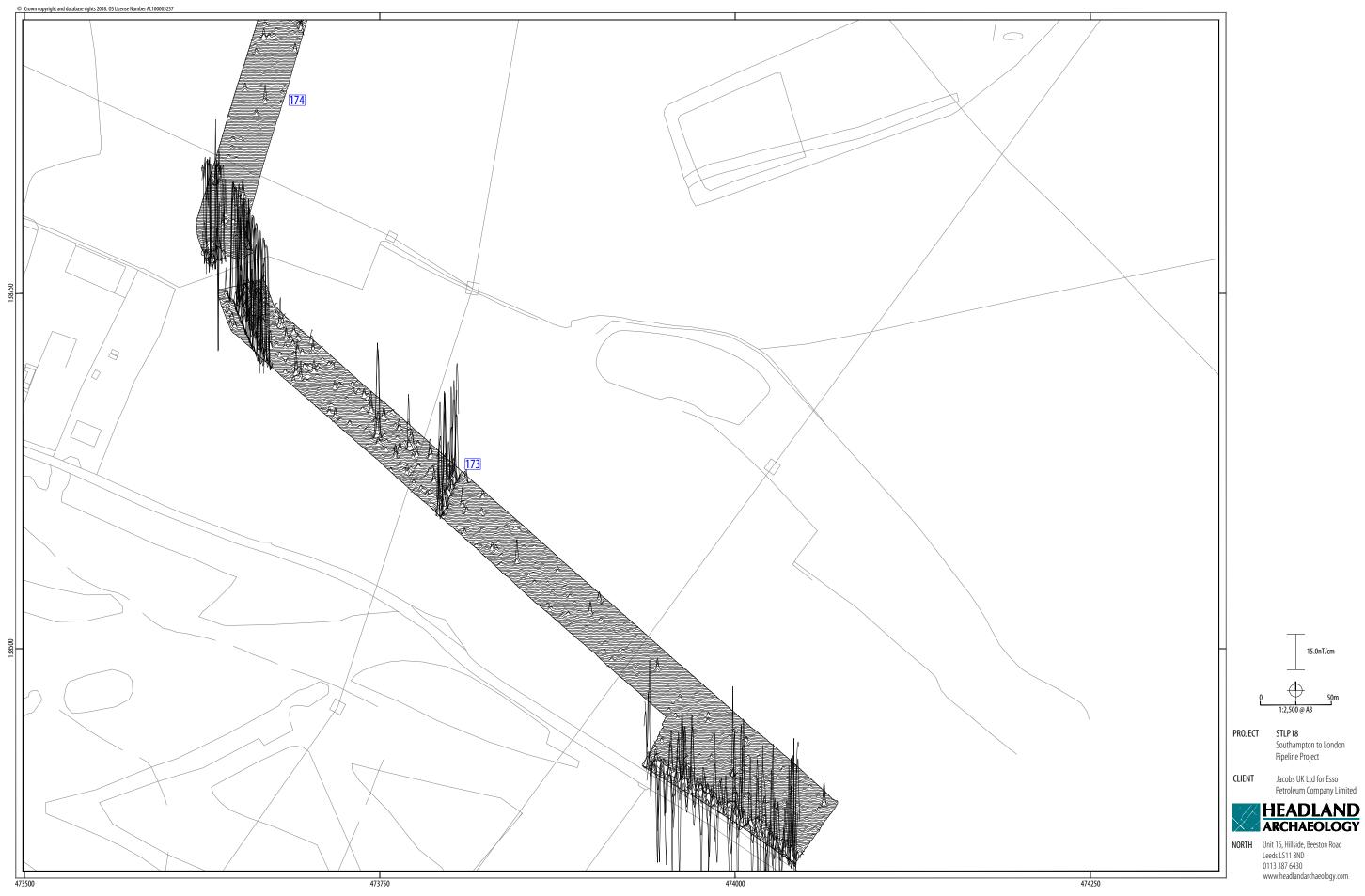






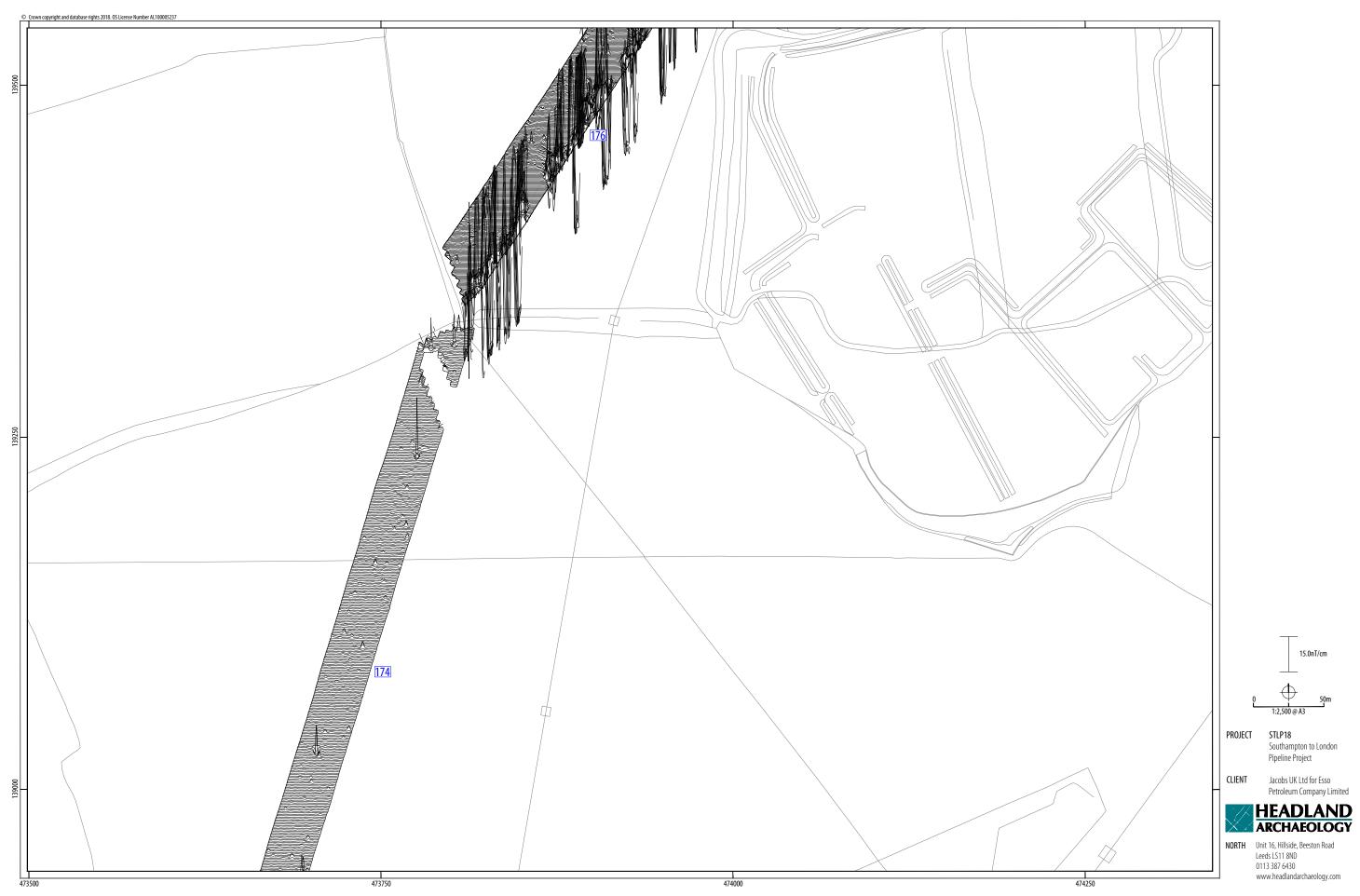


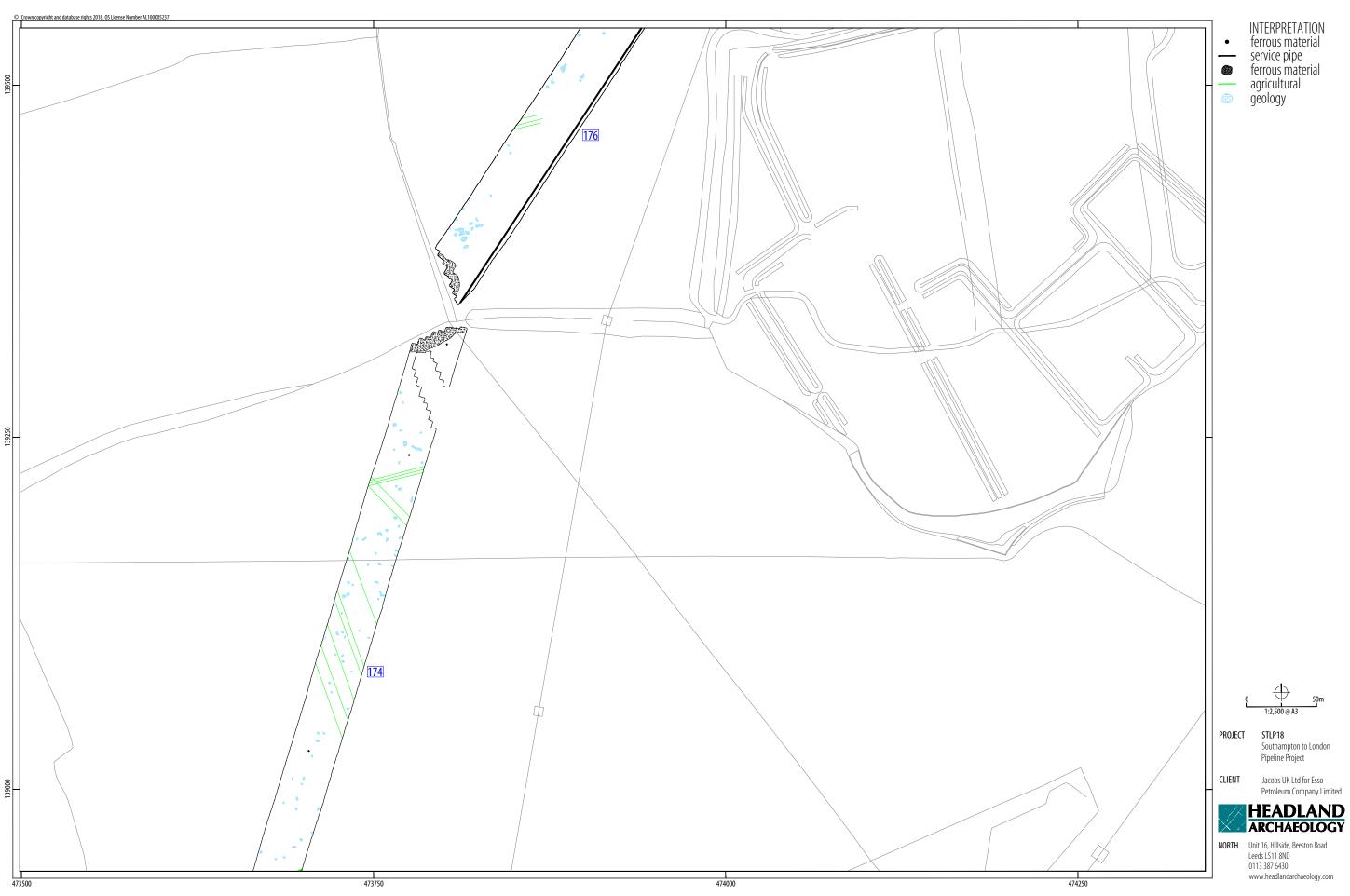


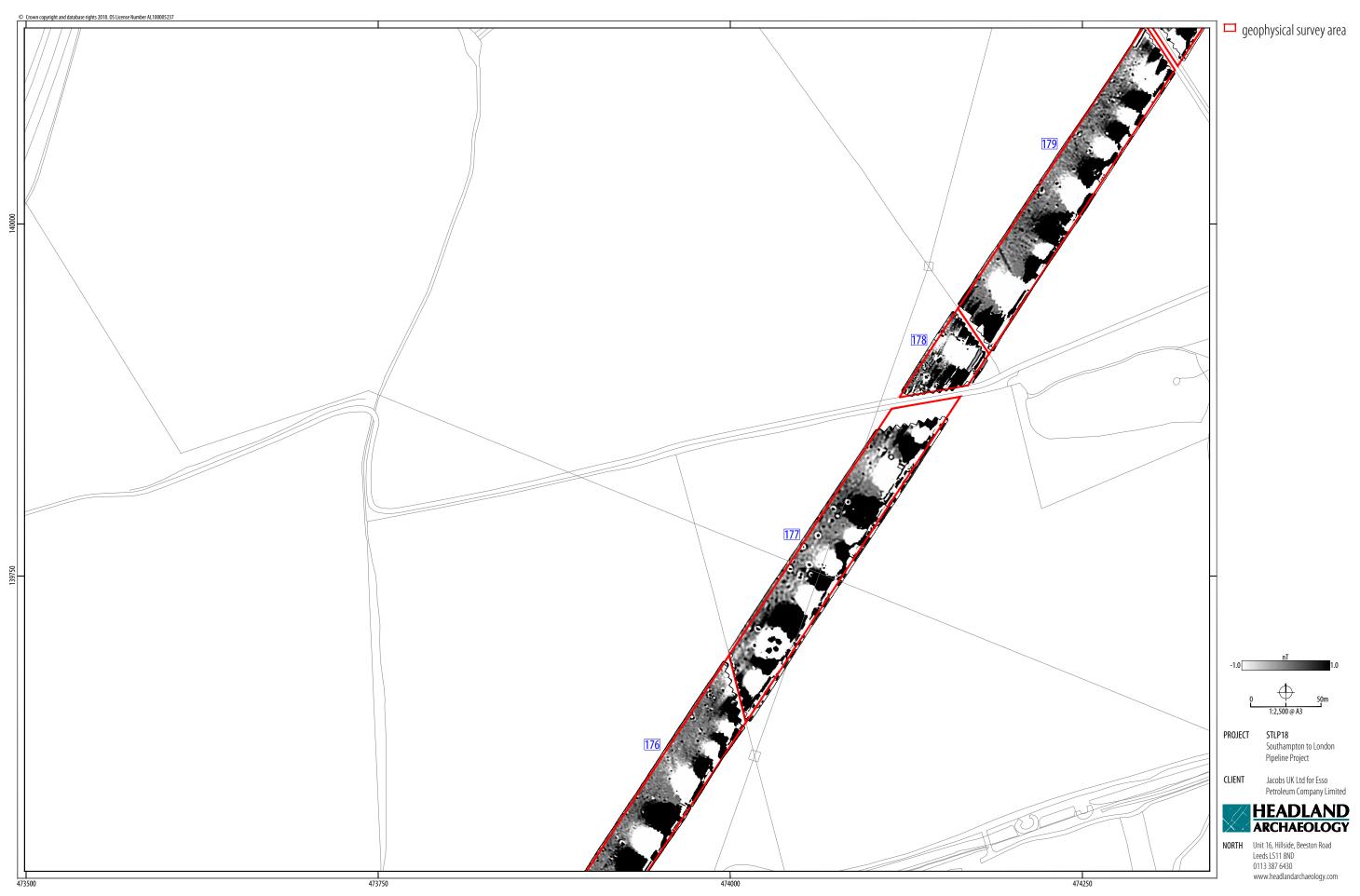


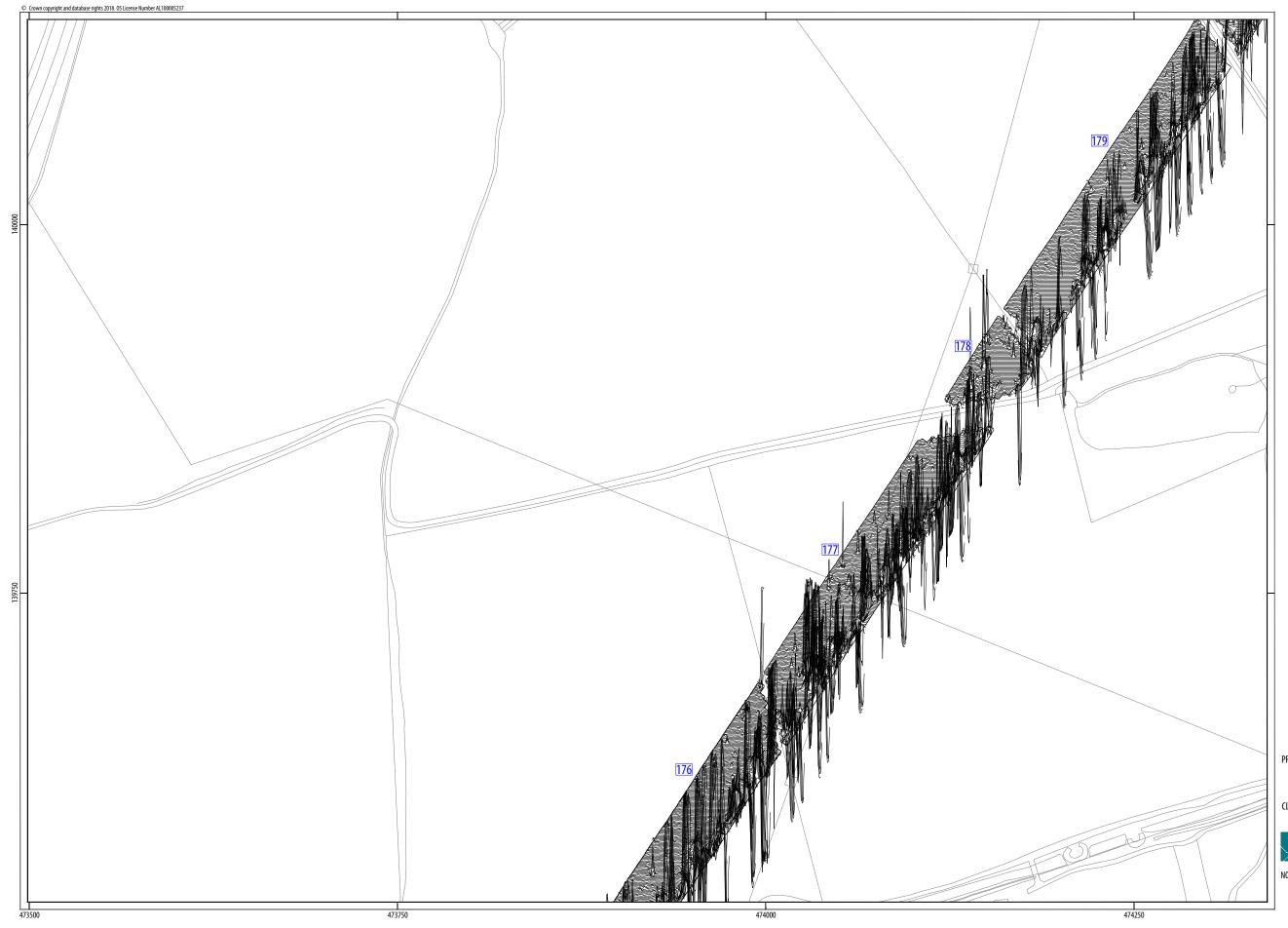














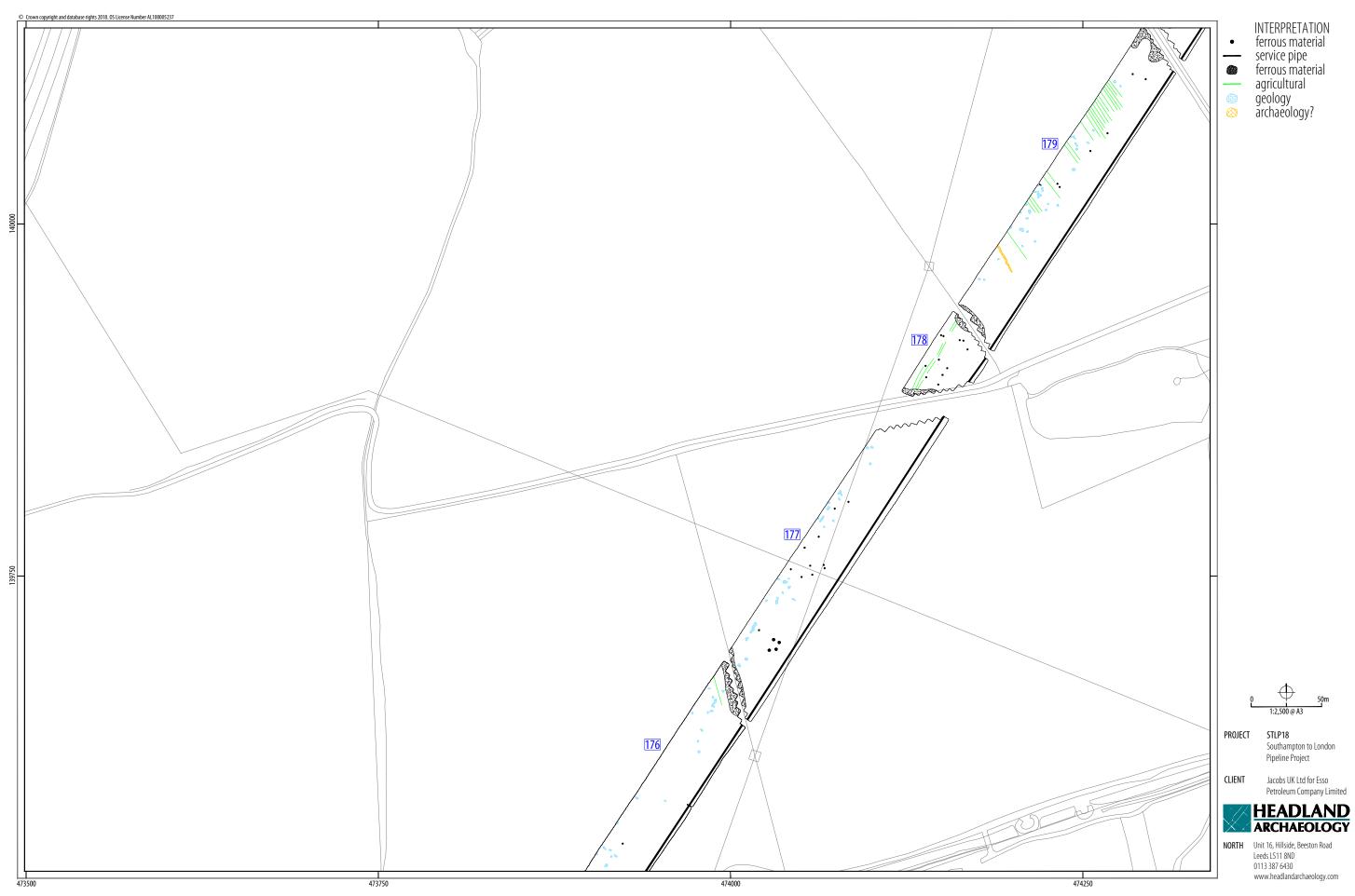
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Southampton to London Pipeline Project

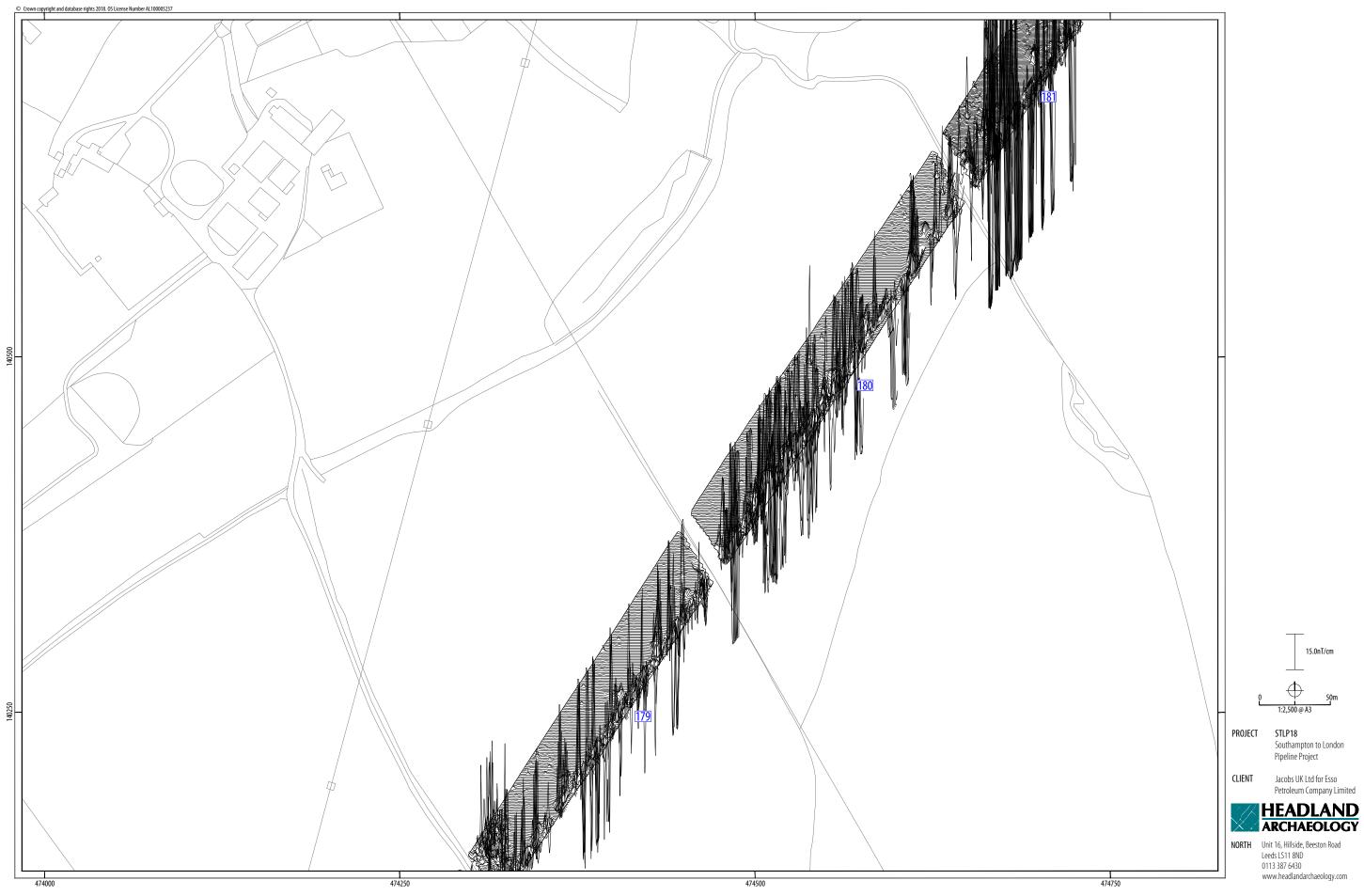
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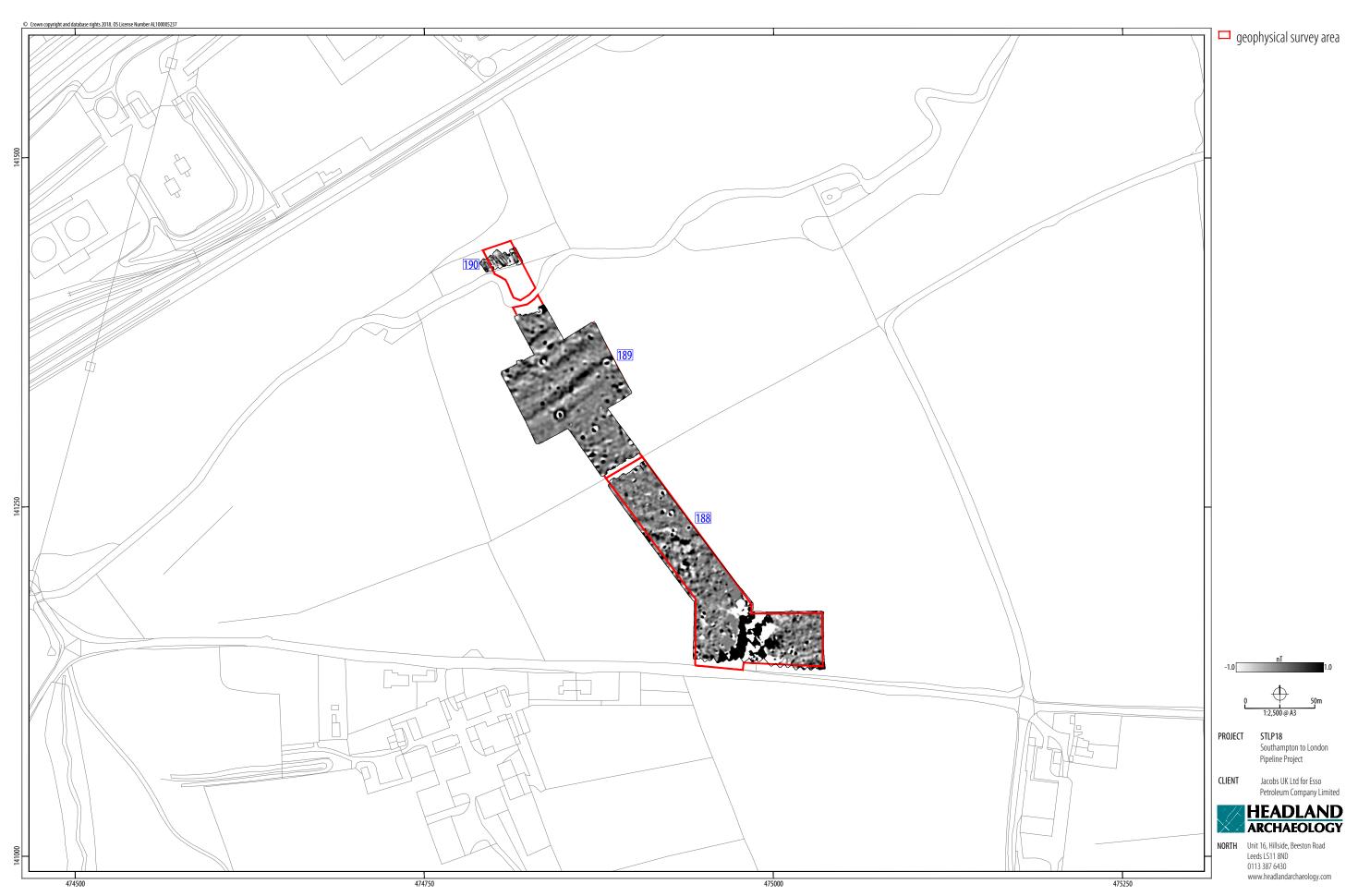
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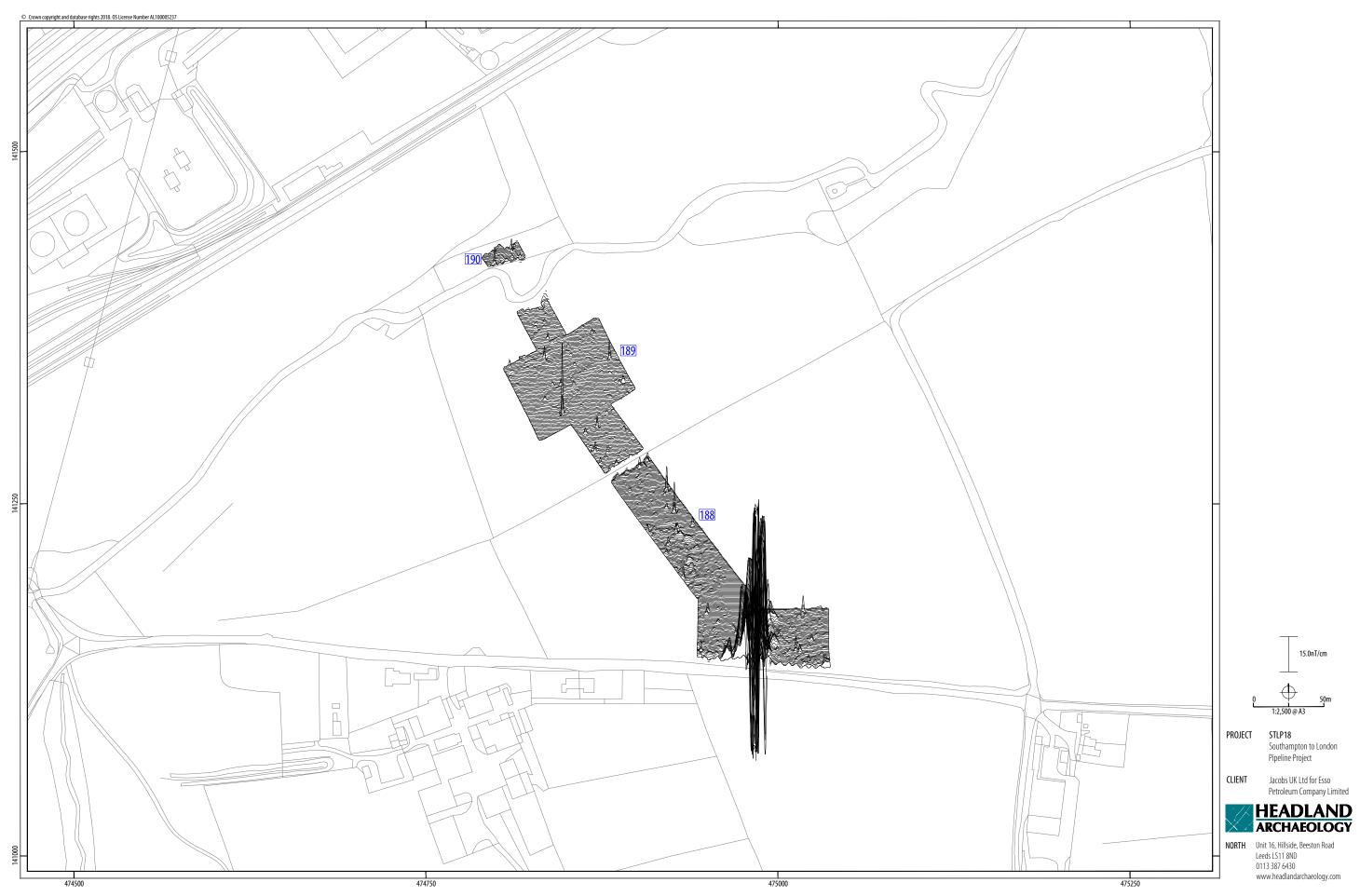




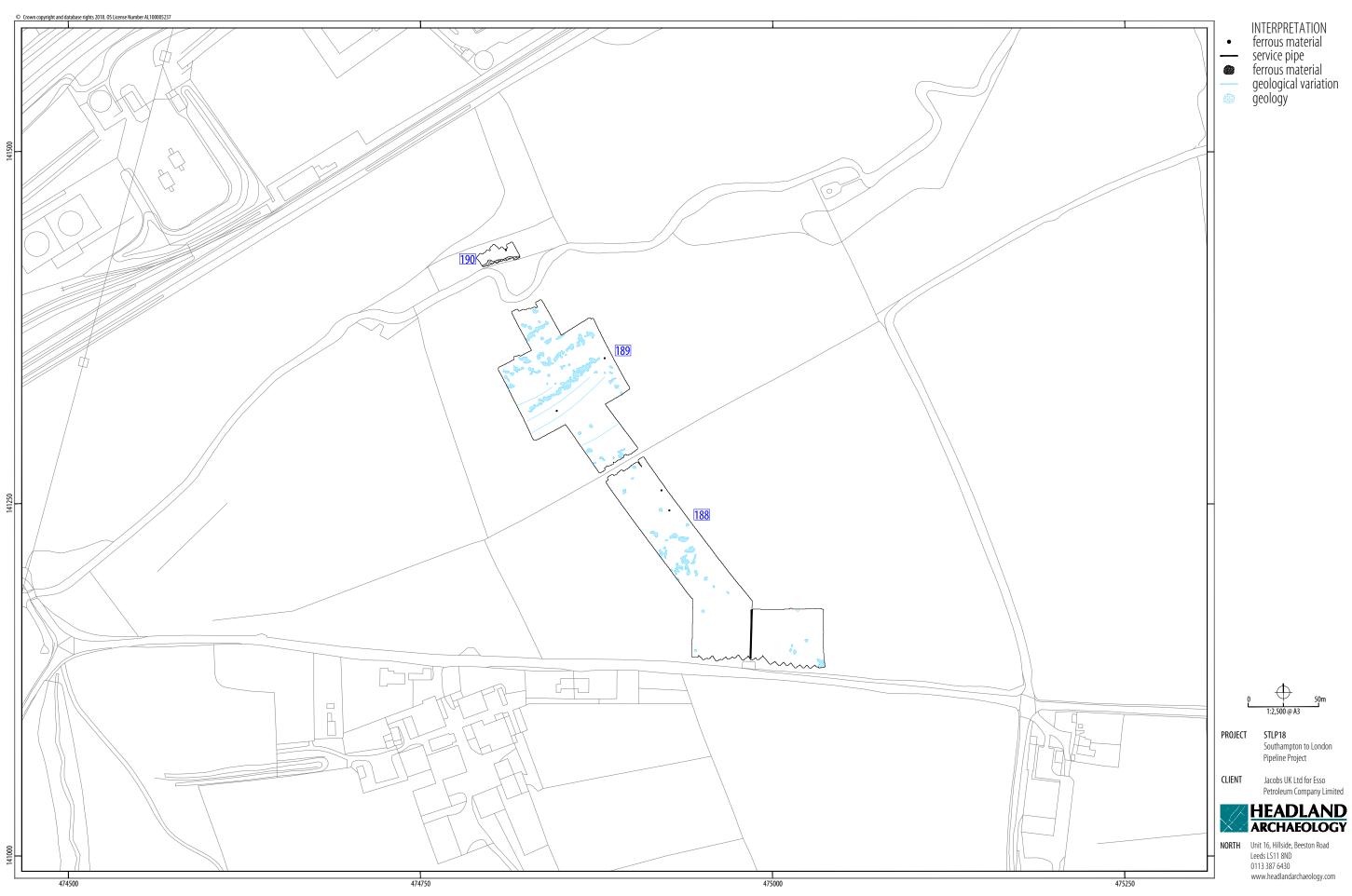




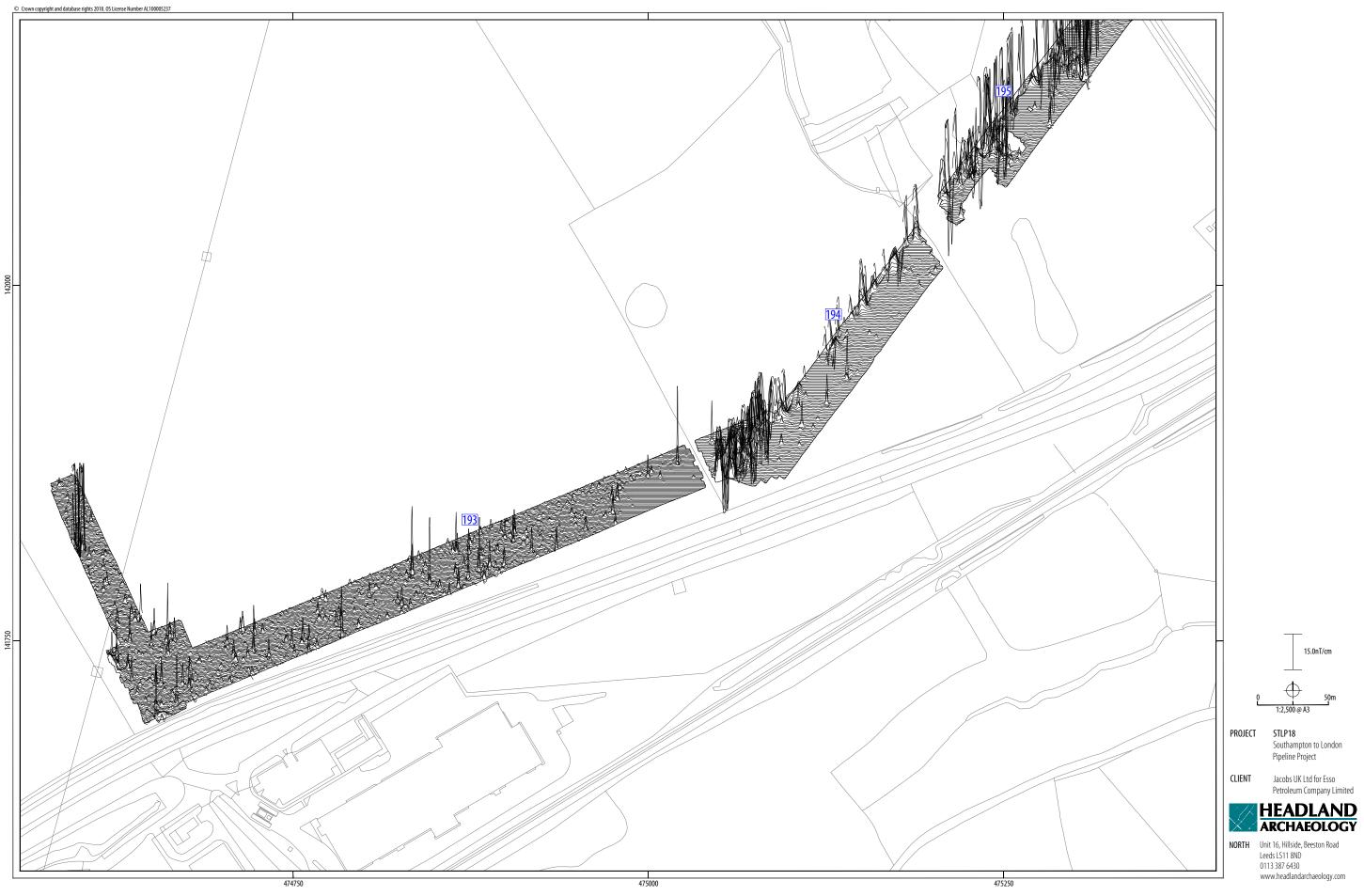


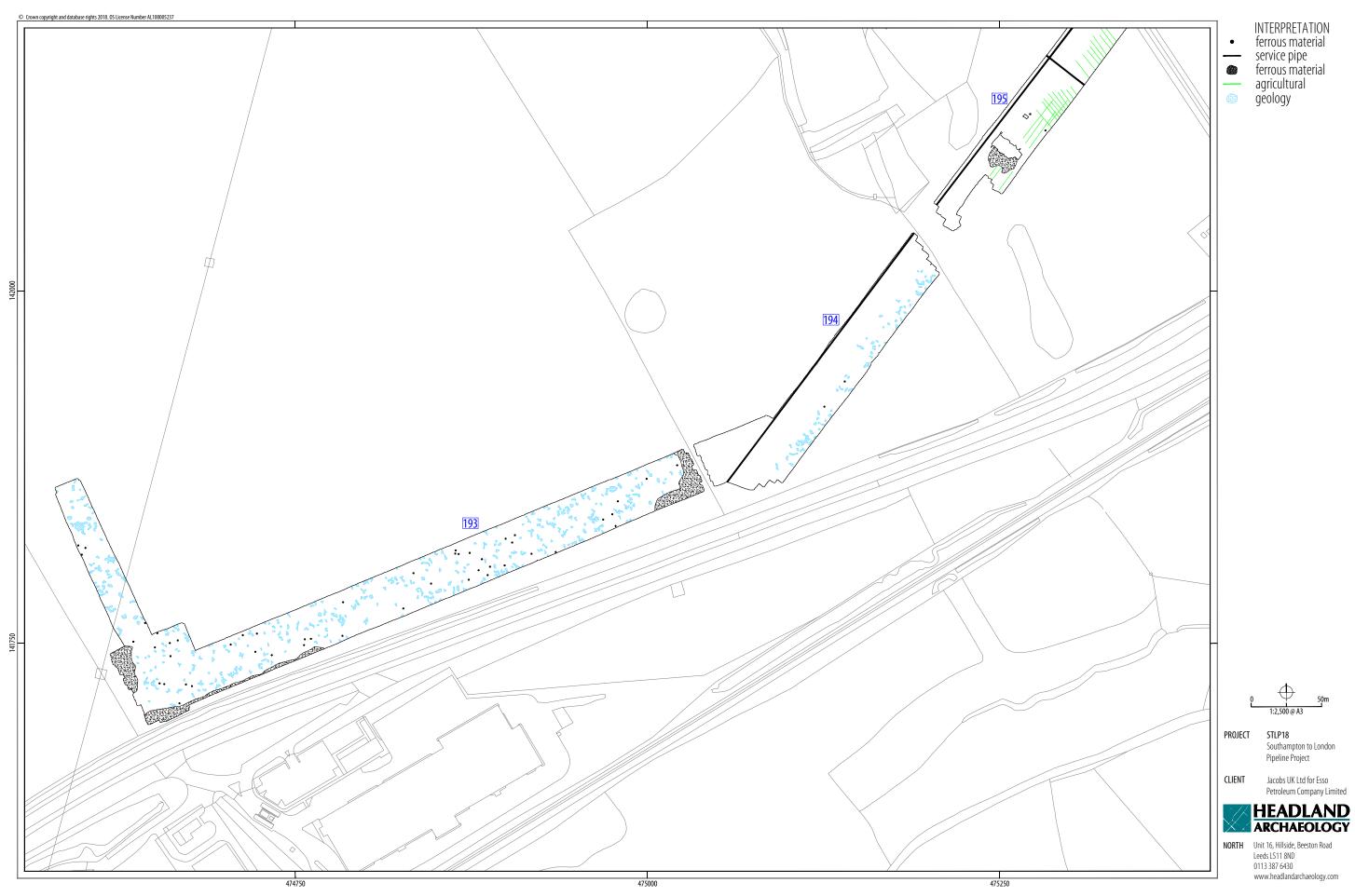


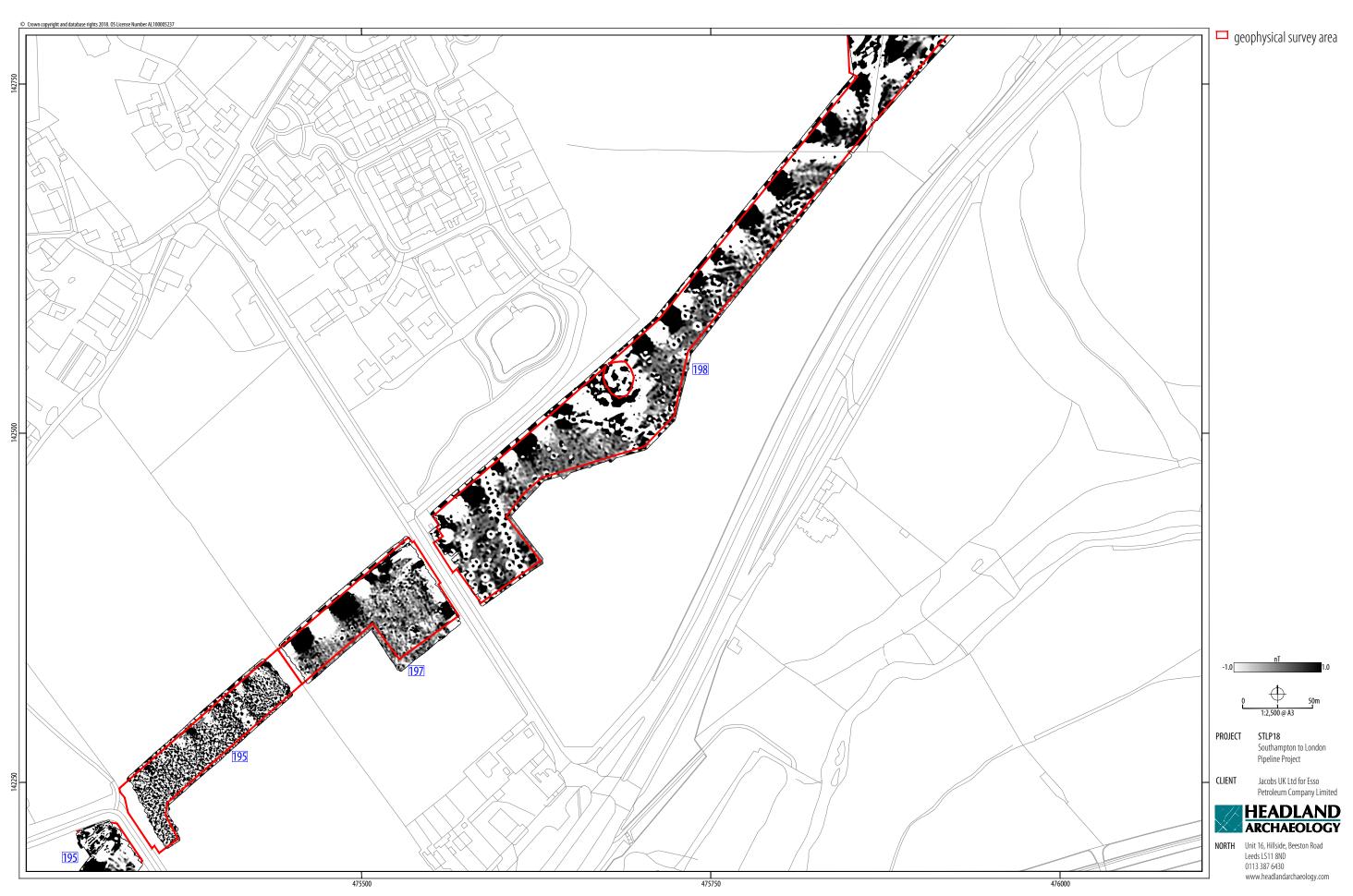
**ILLUS 106** XY trace plot of minimally processed magnetometer data; GSA188, GSA189 & GSA190

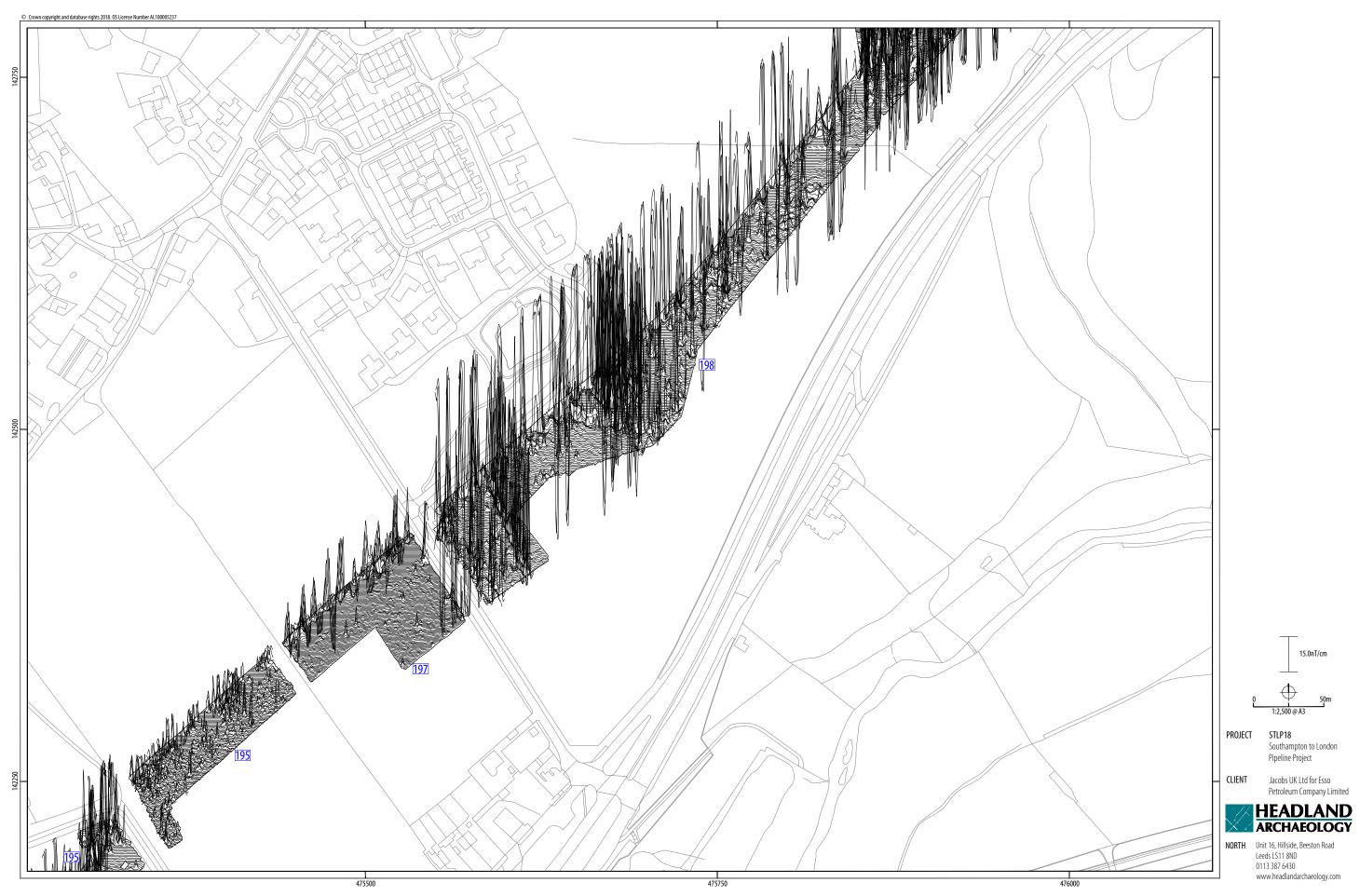


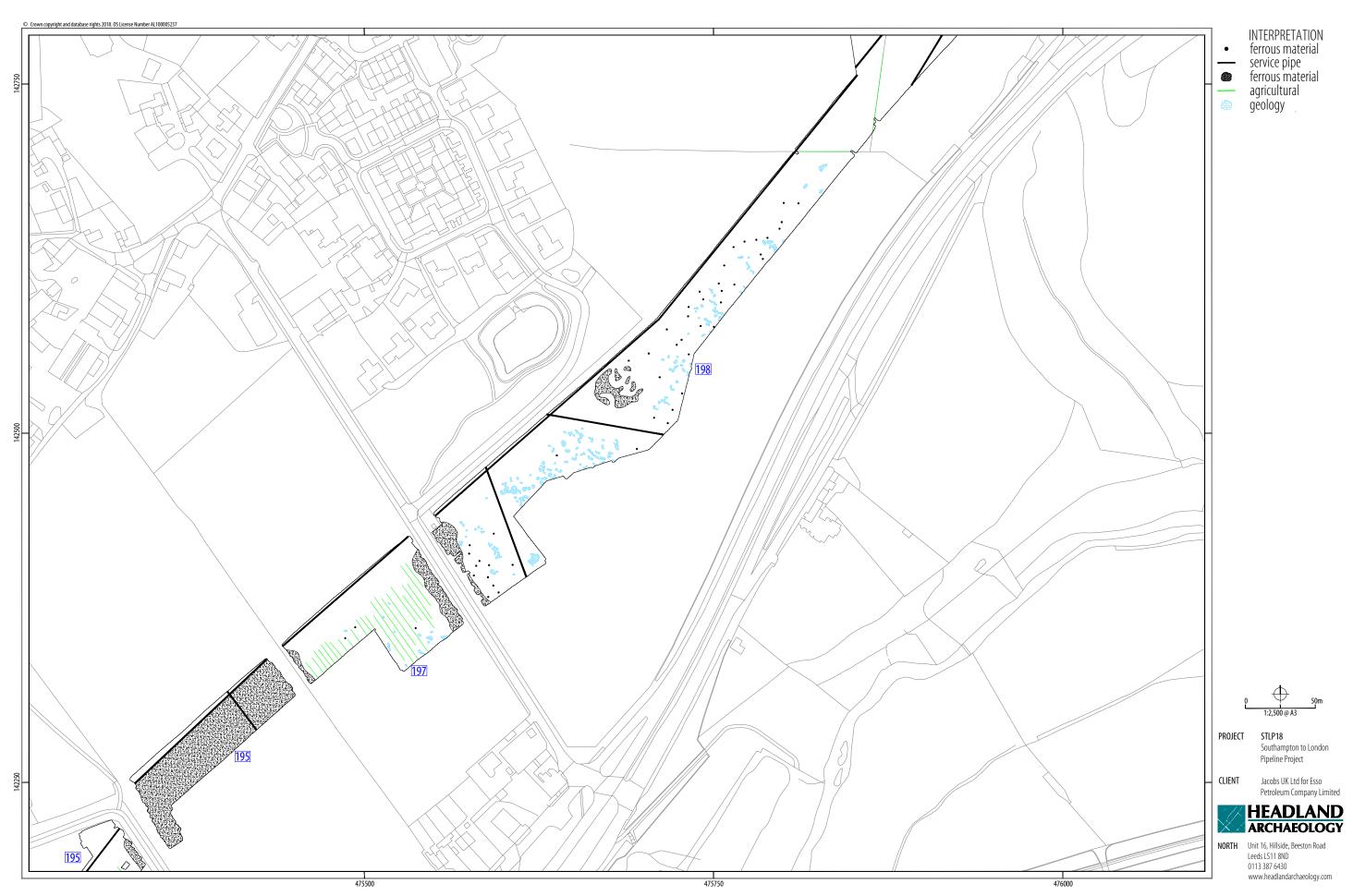




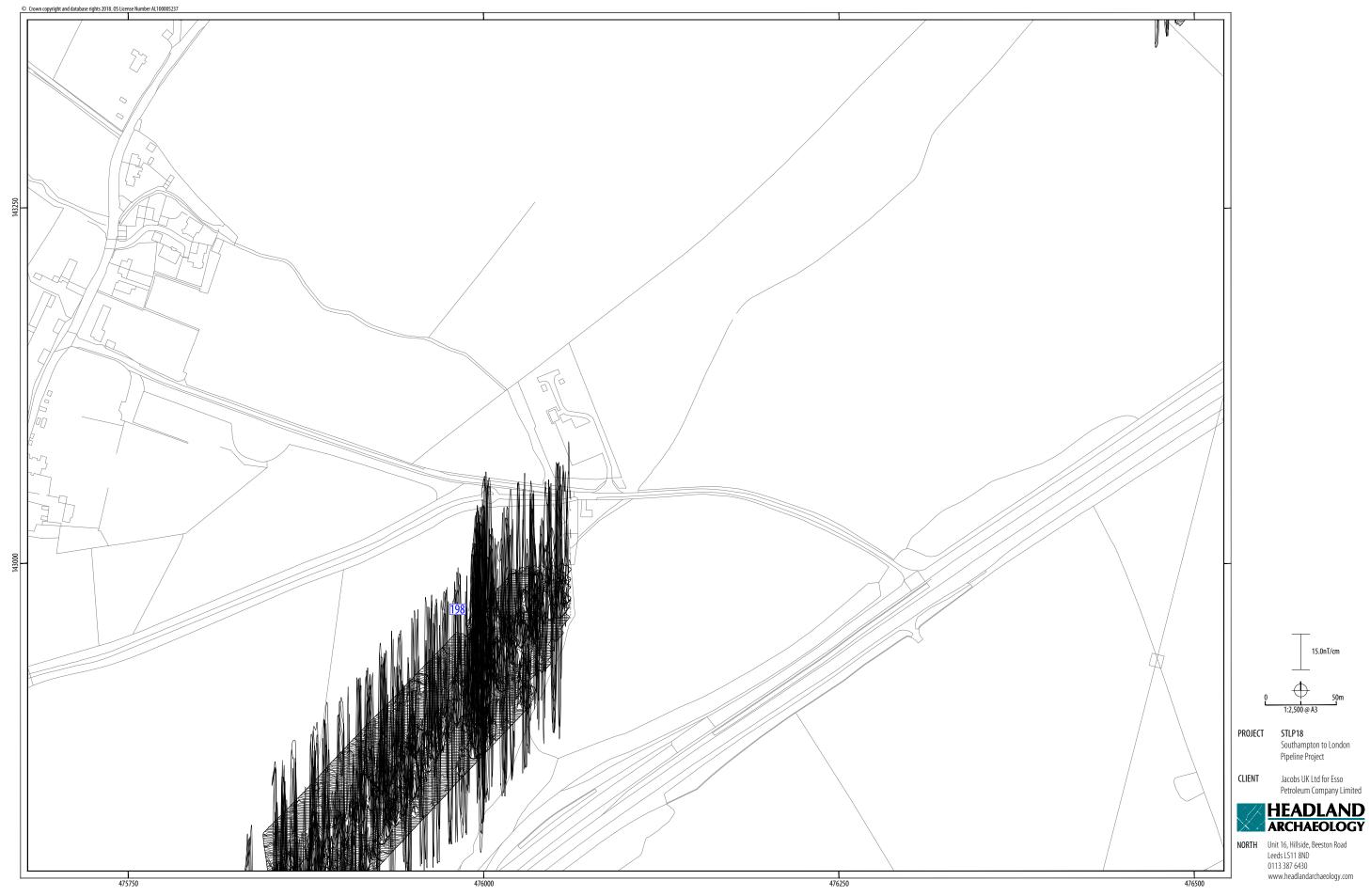






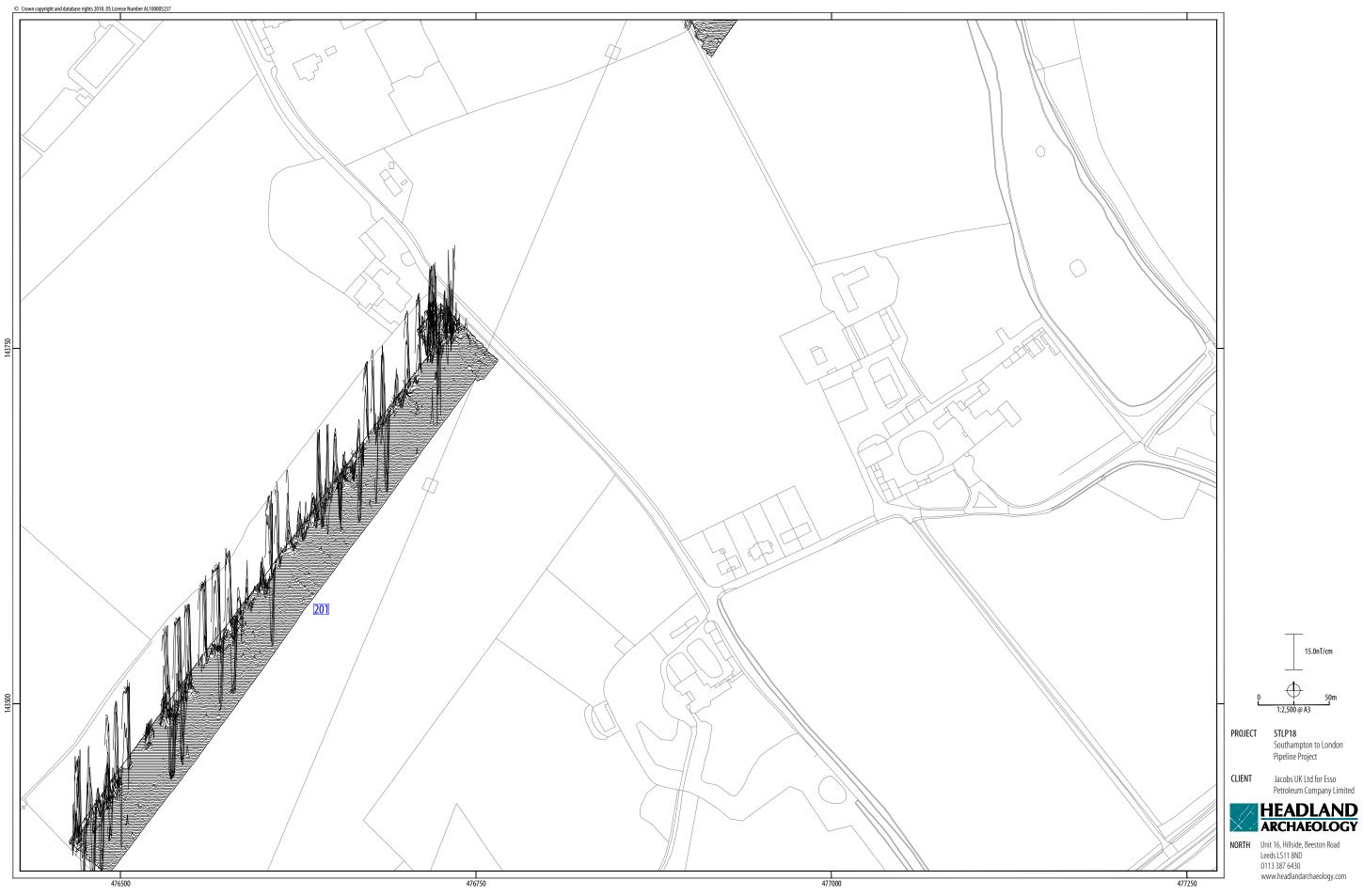




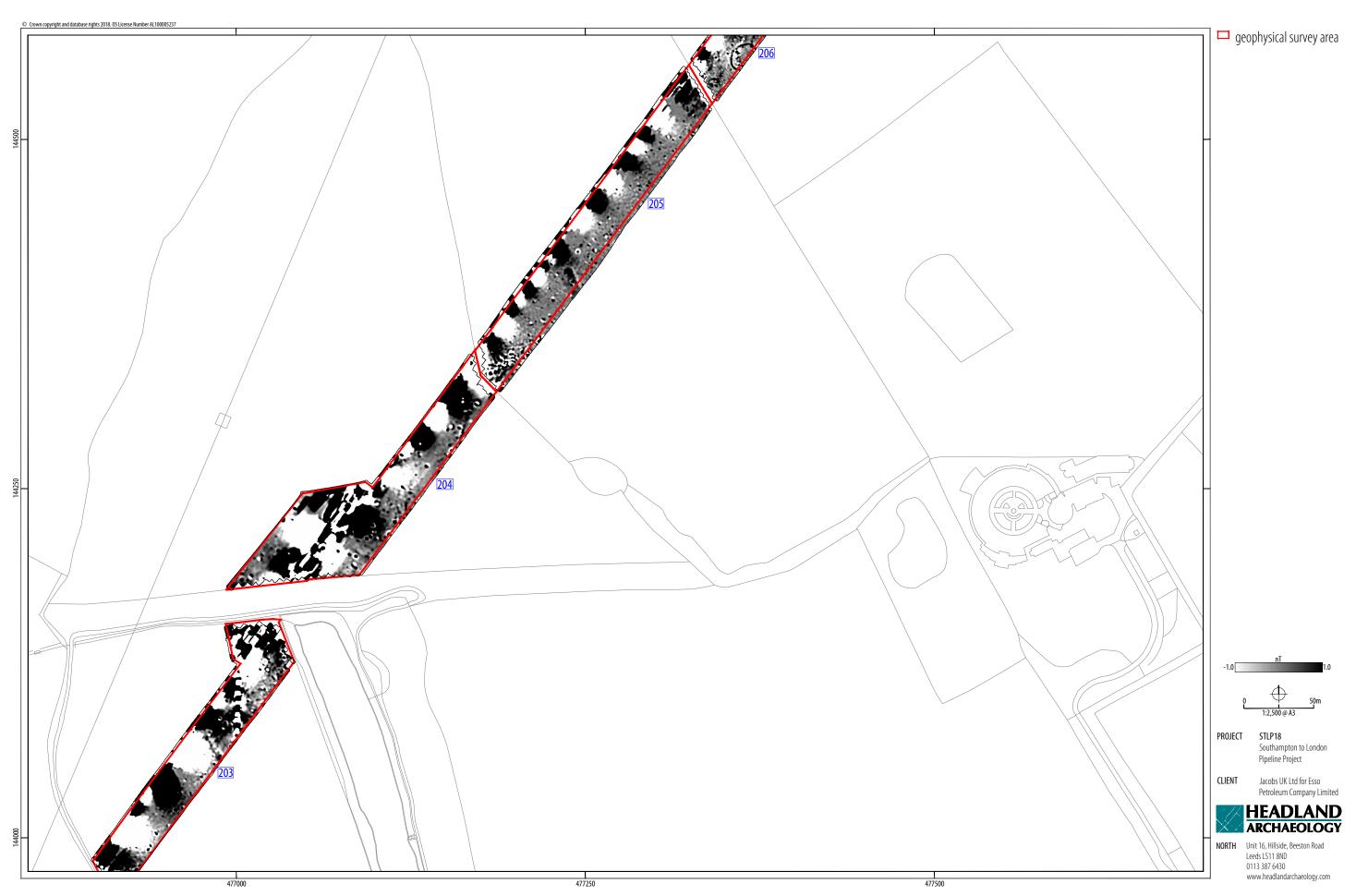


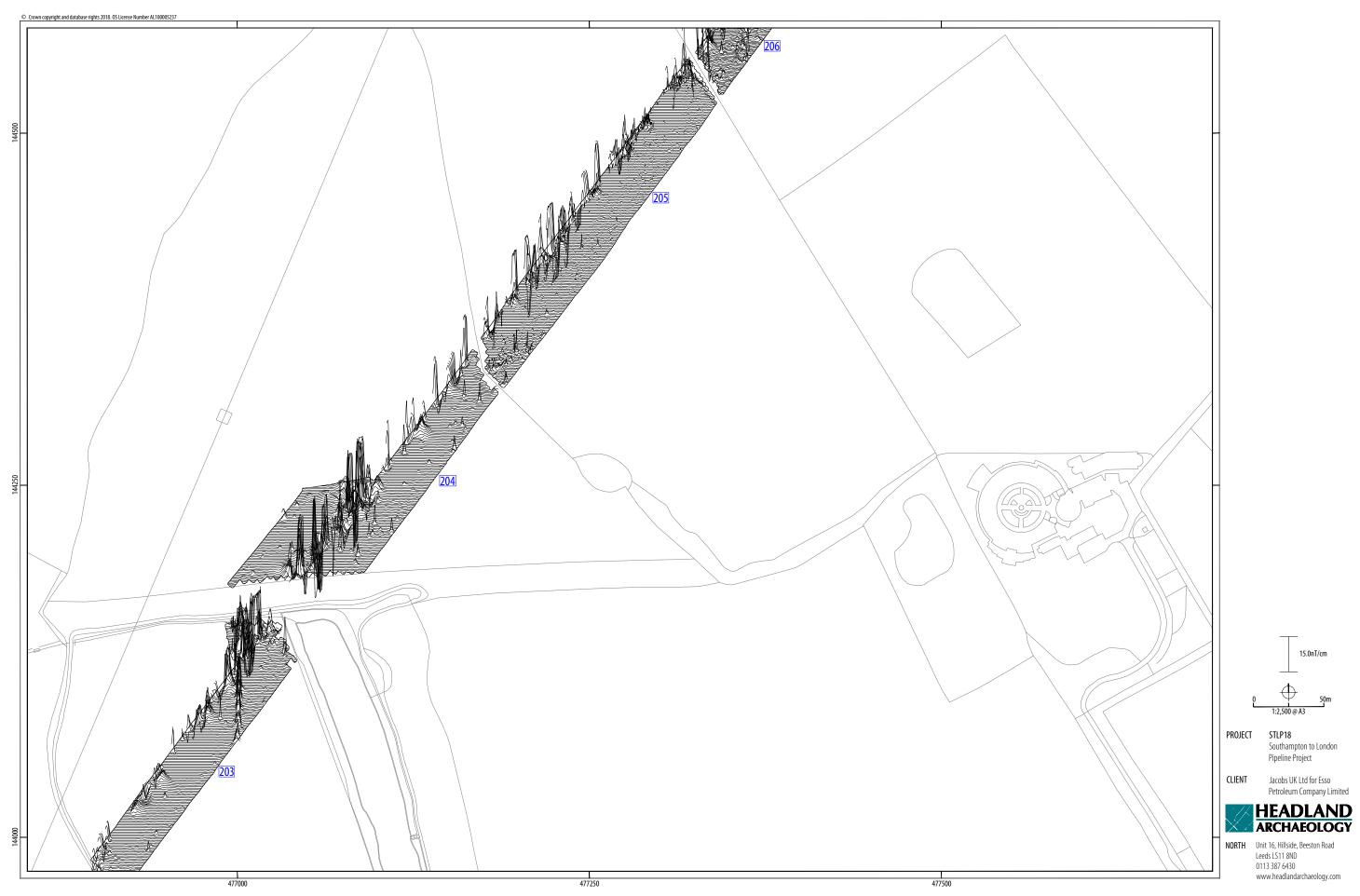




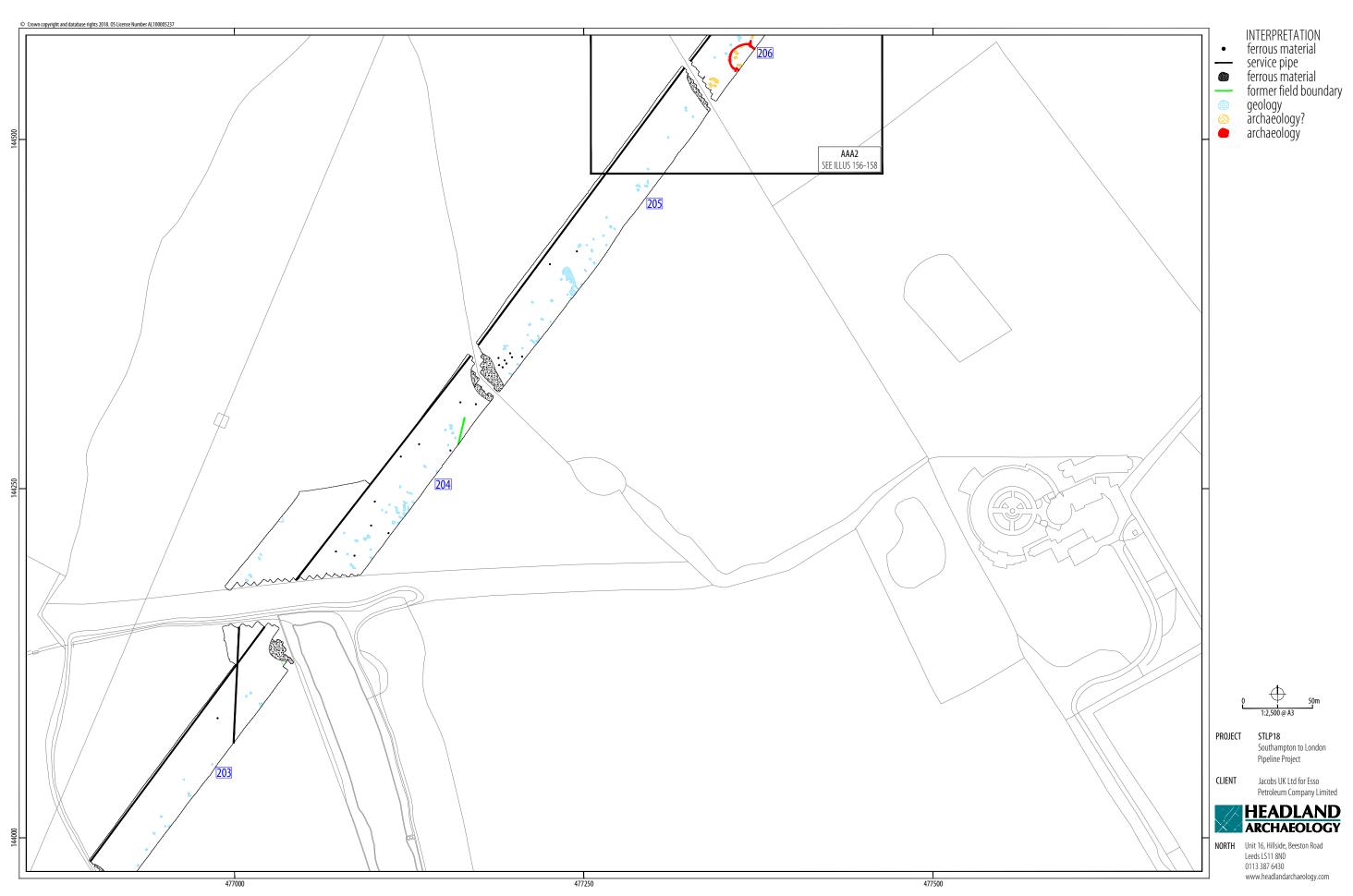


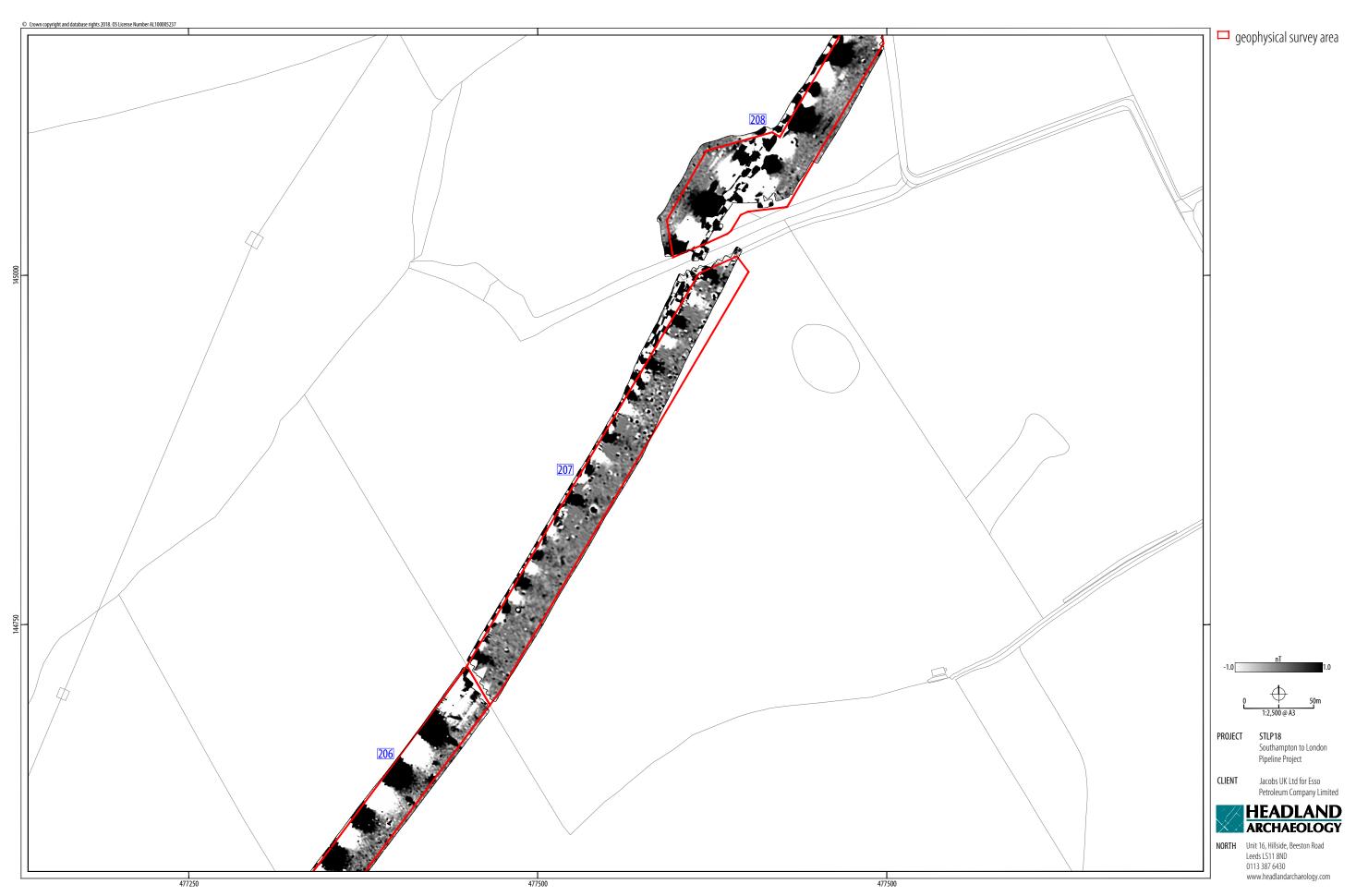


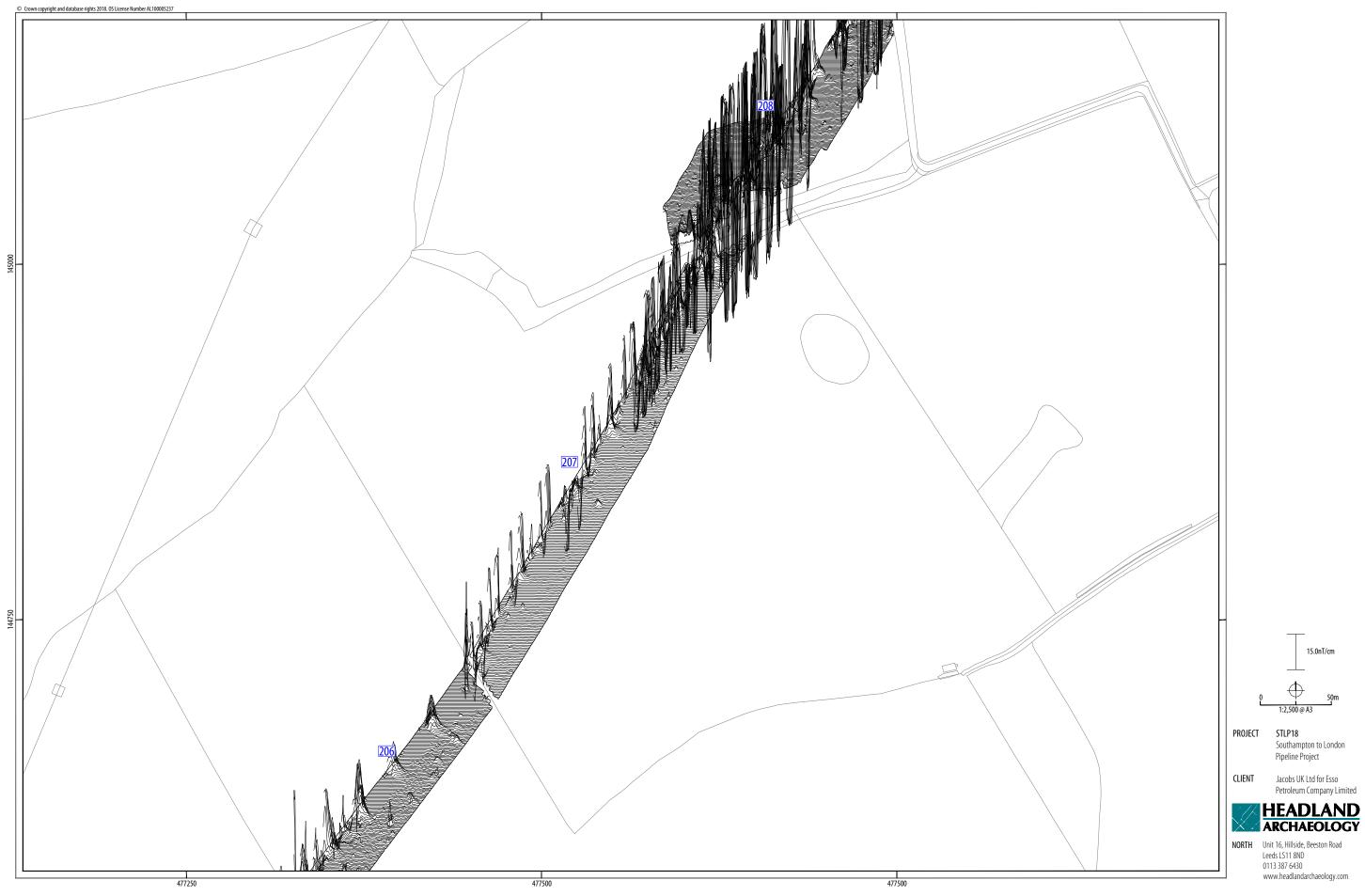




**ILLUS 121** XY trace plot of minimally processed magnetometer data; GSA203, GSA204, GSA205 & GSA206

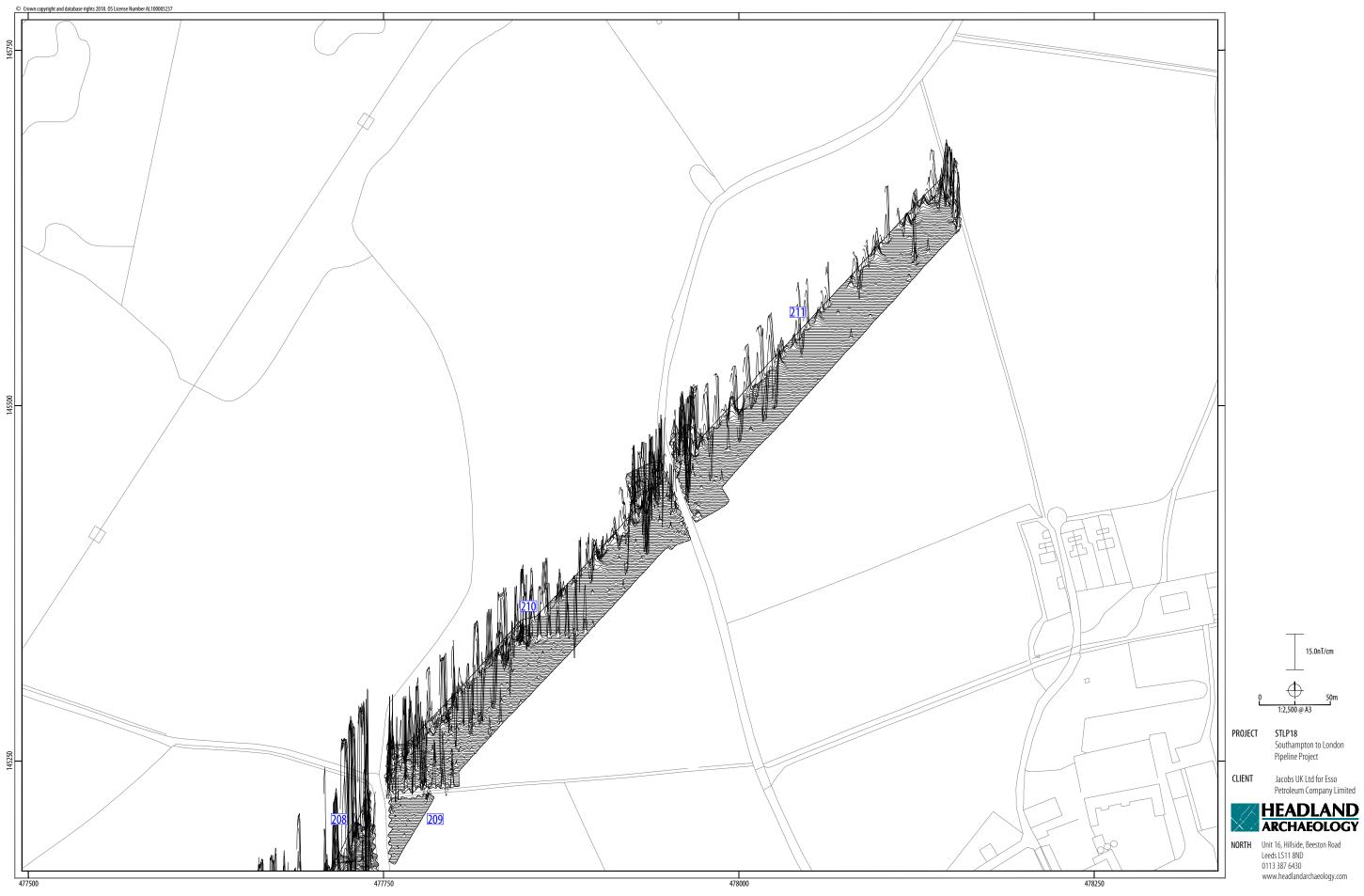


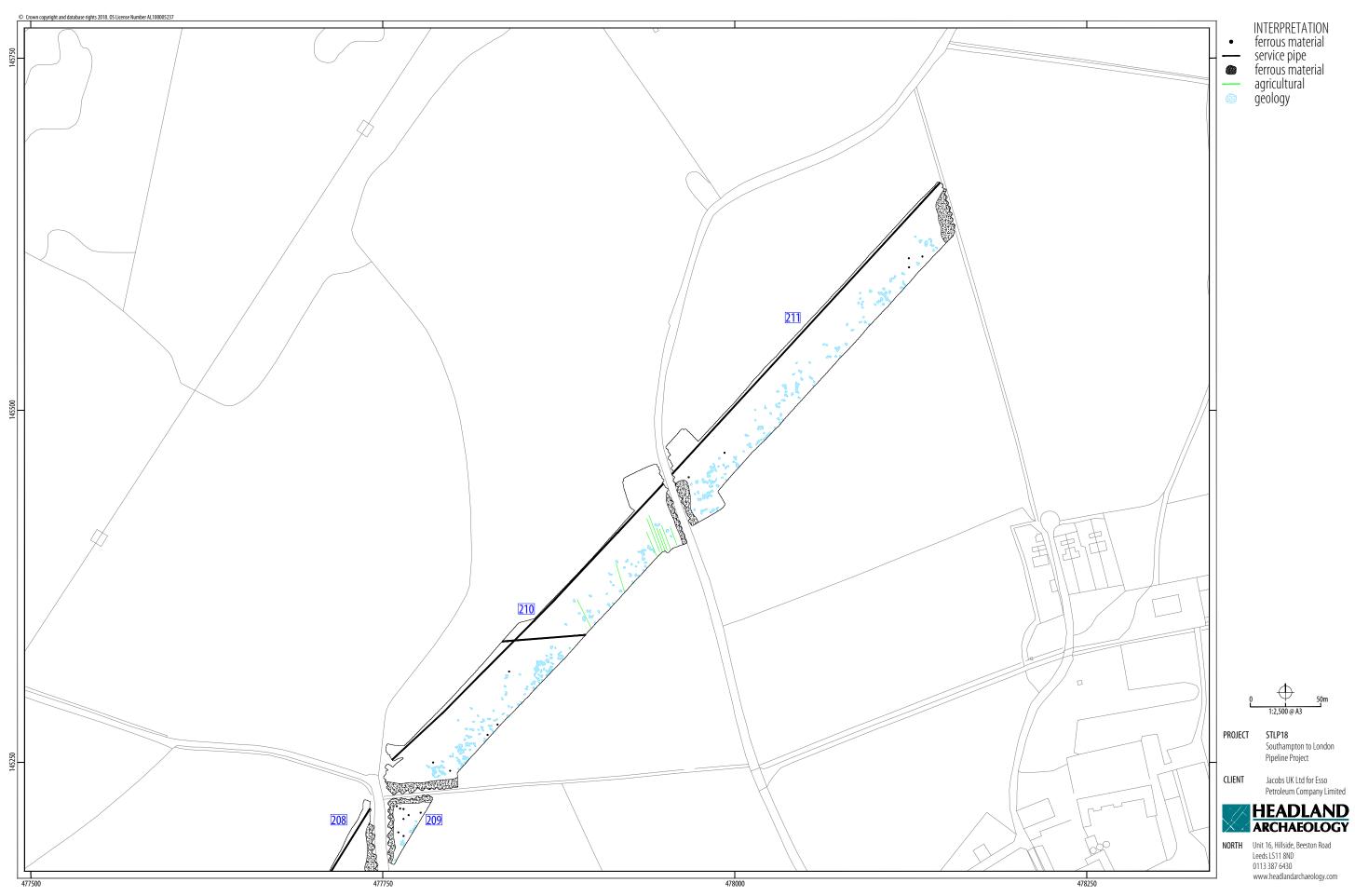


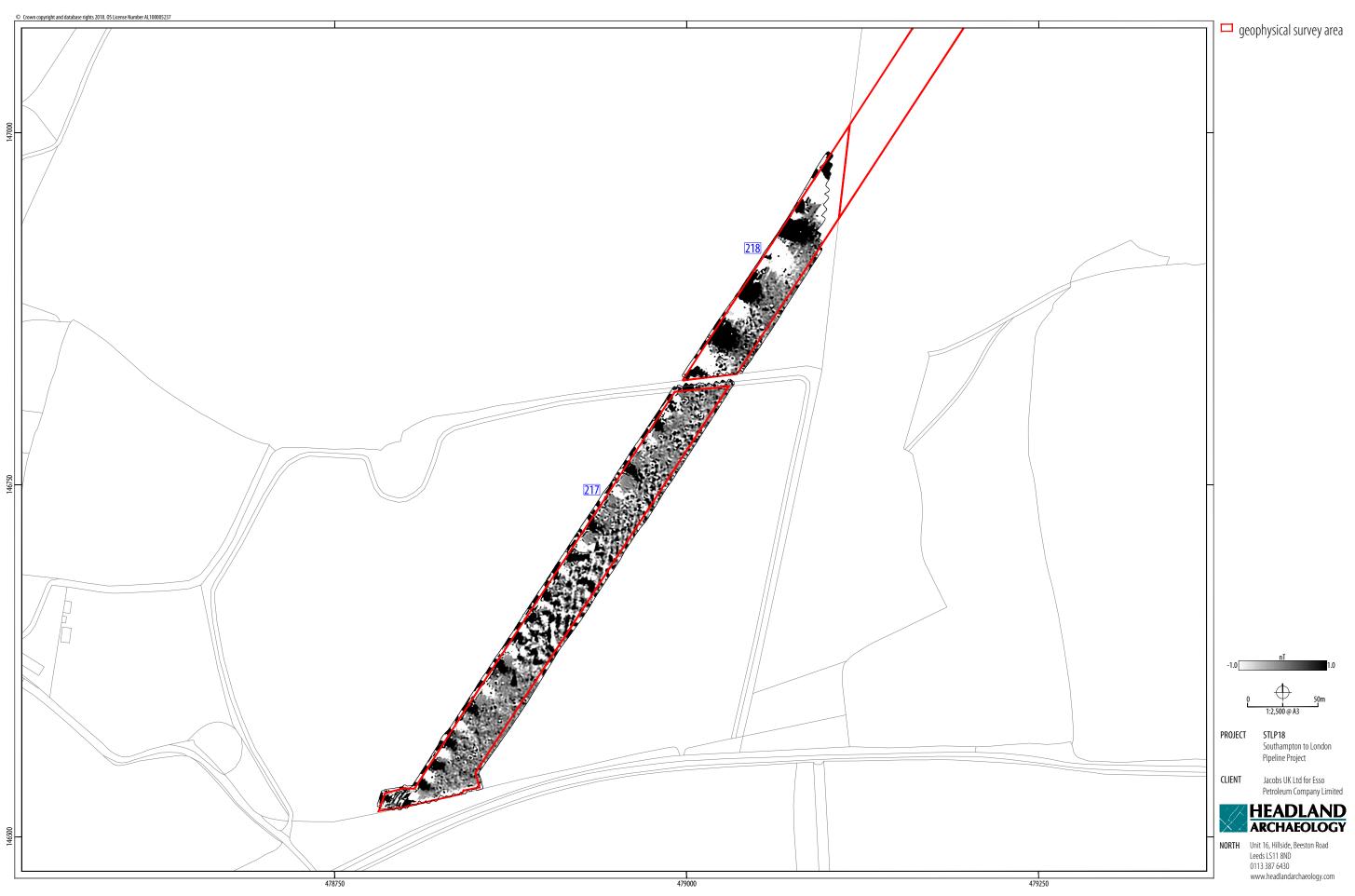


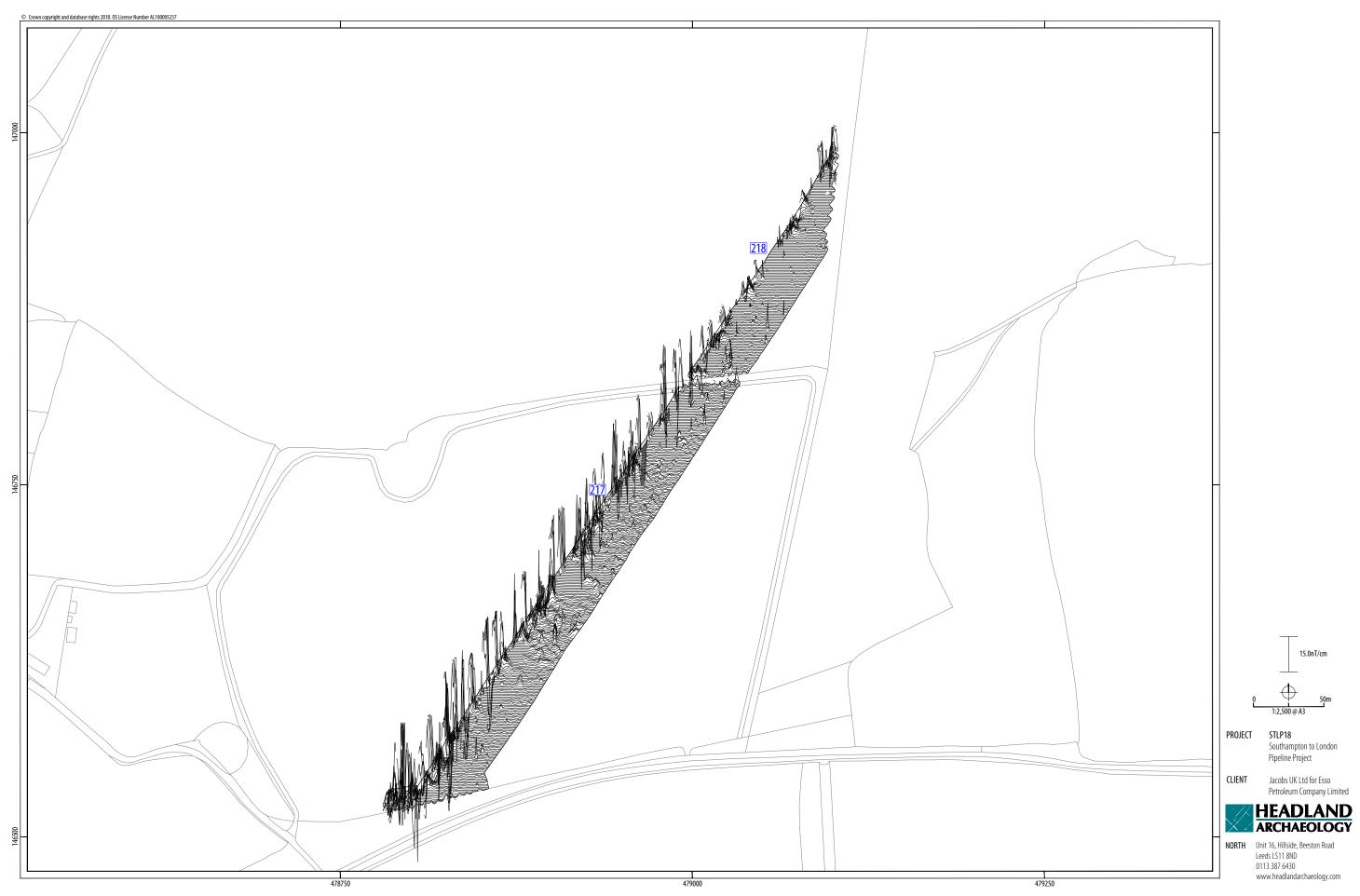














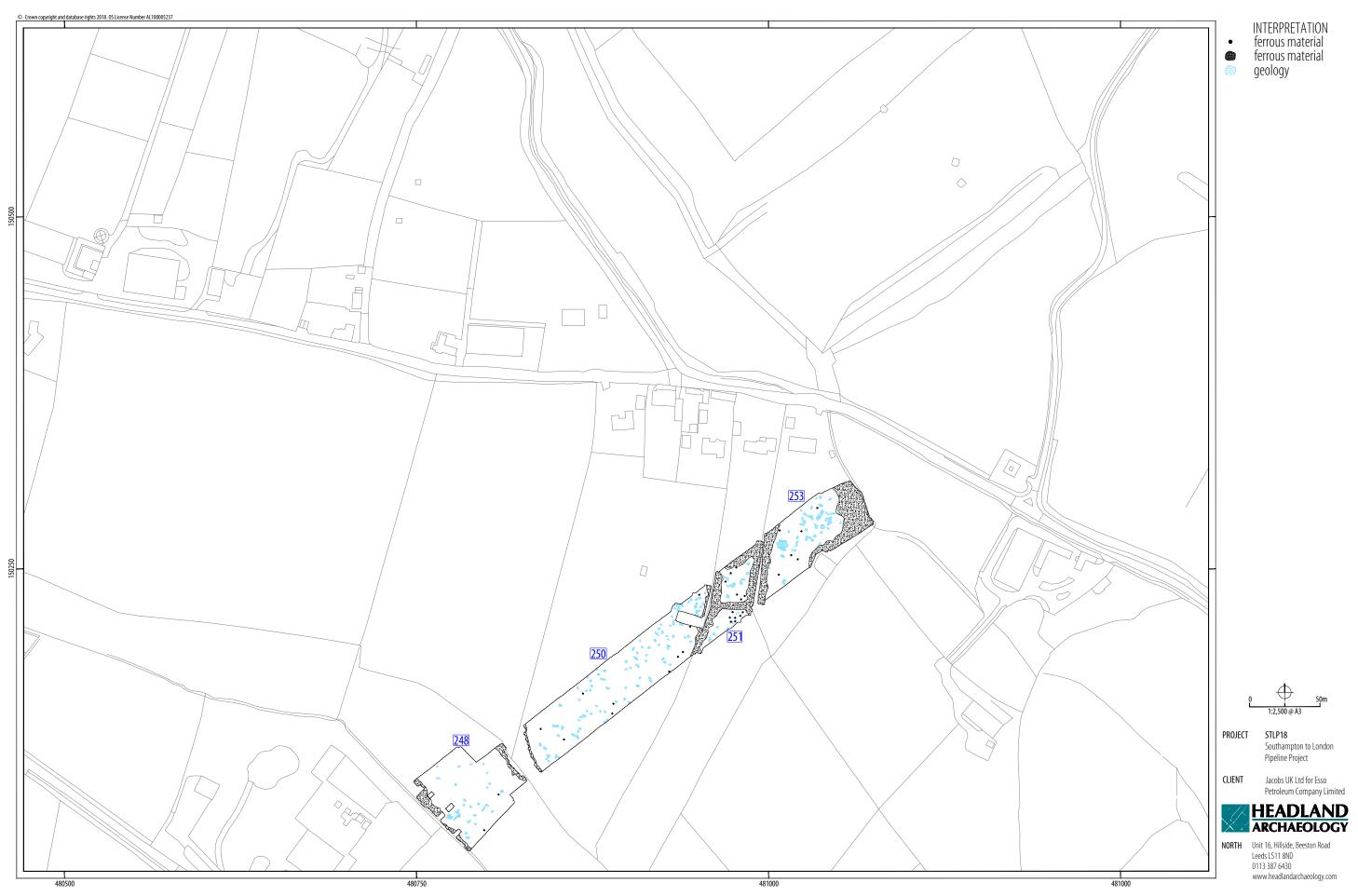




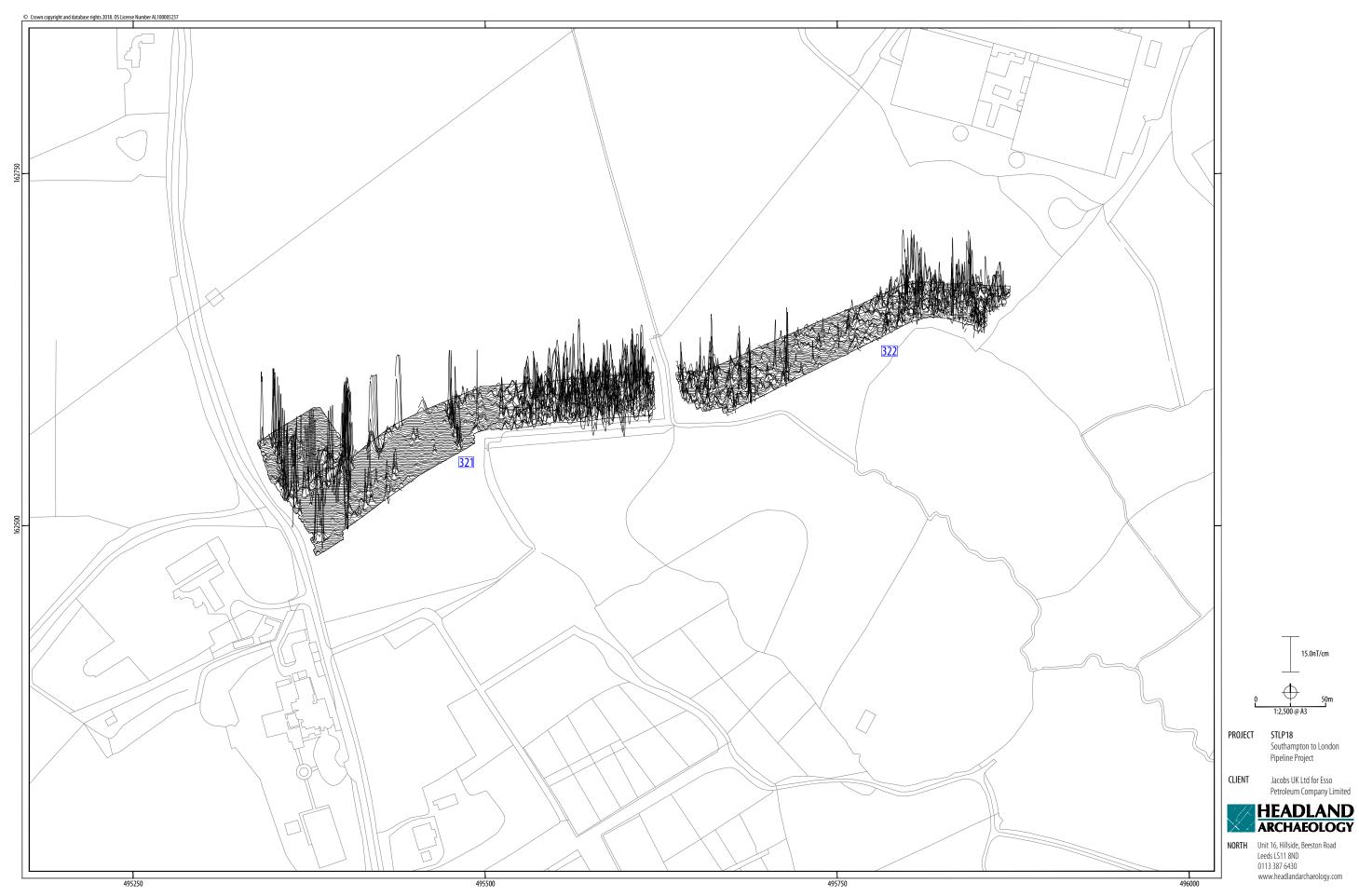








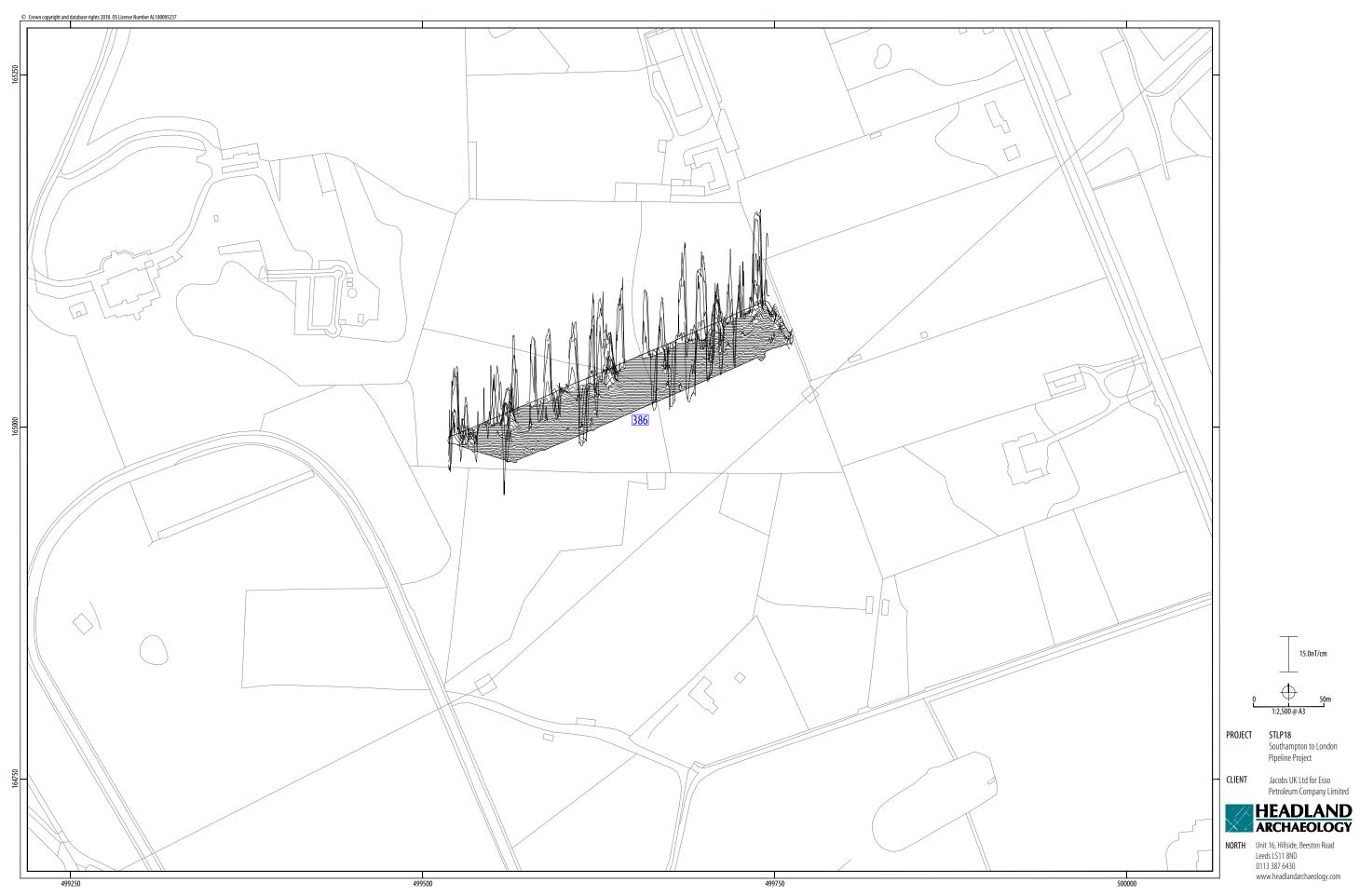








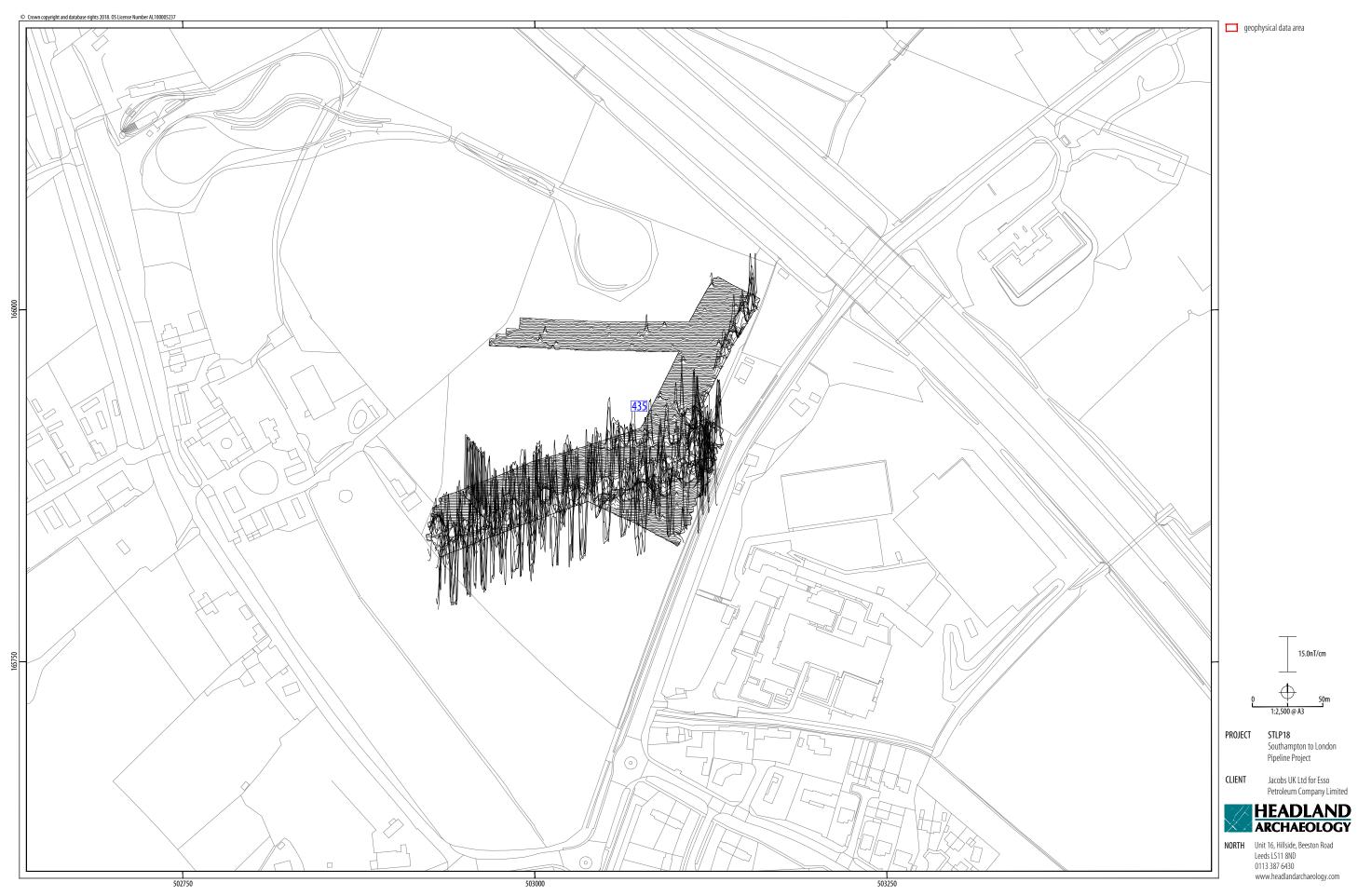
ILLUS 141 Processed greyscale magnetometer data; GSA386

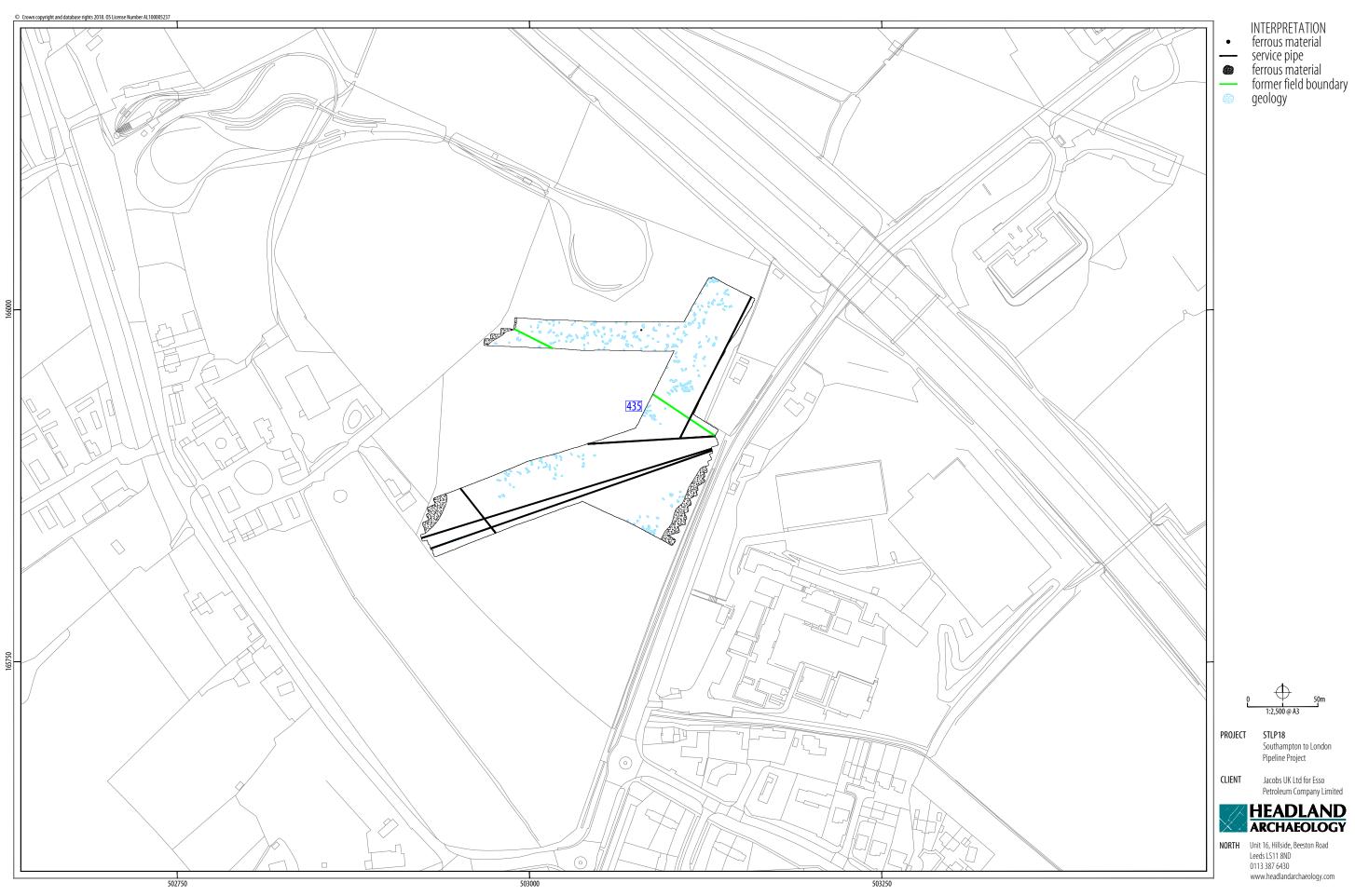


ILLUS 142 XY trace plot of minimally processed magnetometer data; GSA386

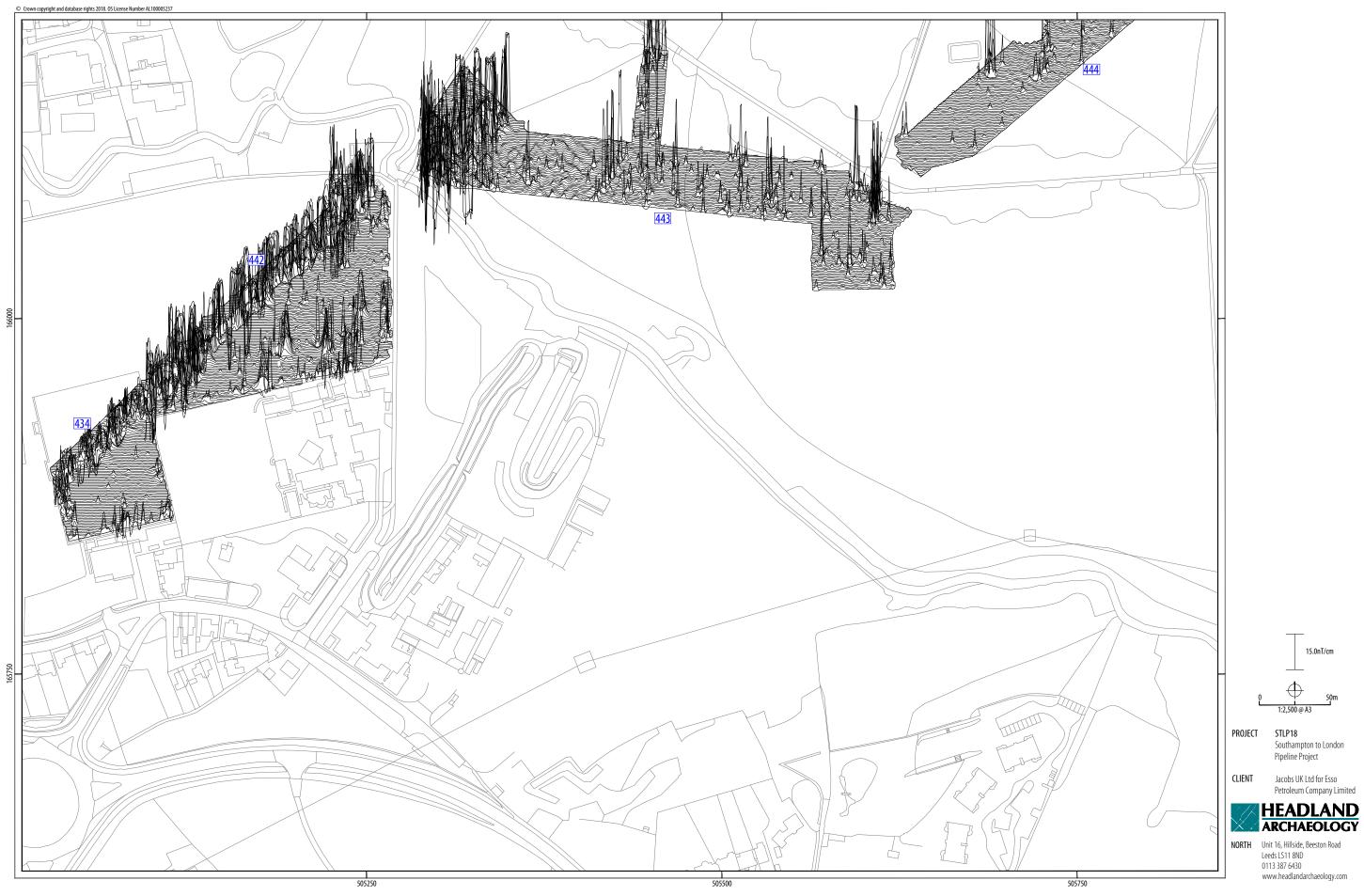


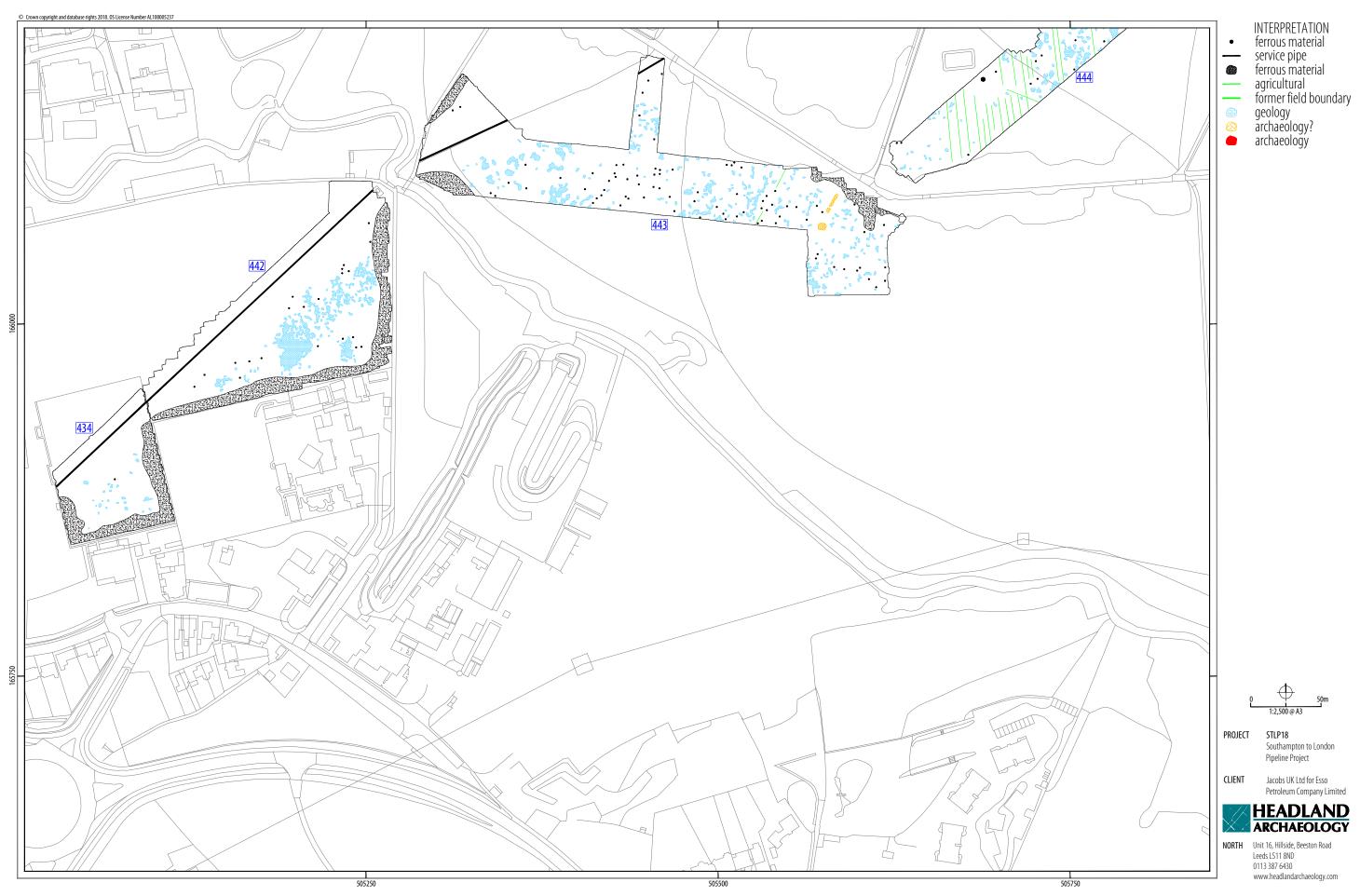




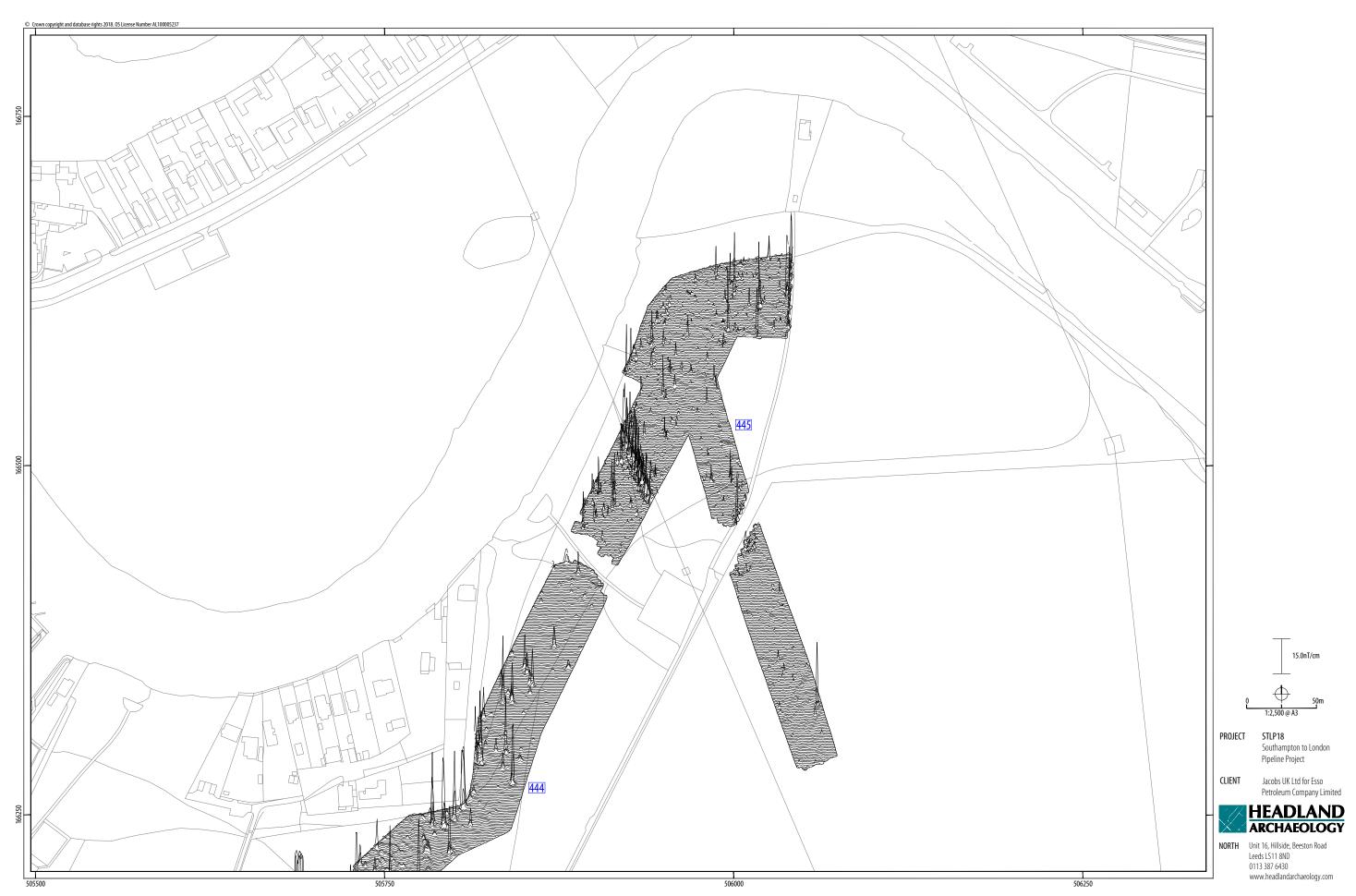




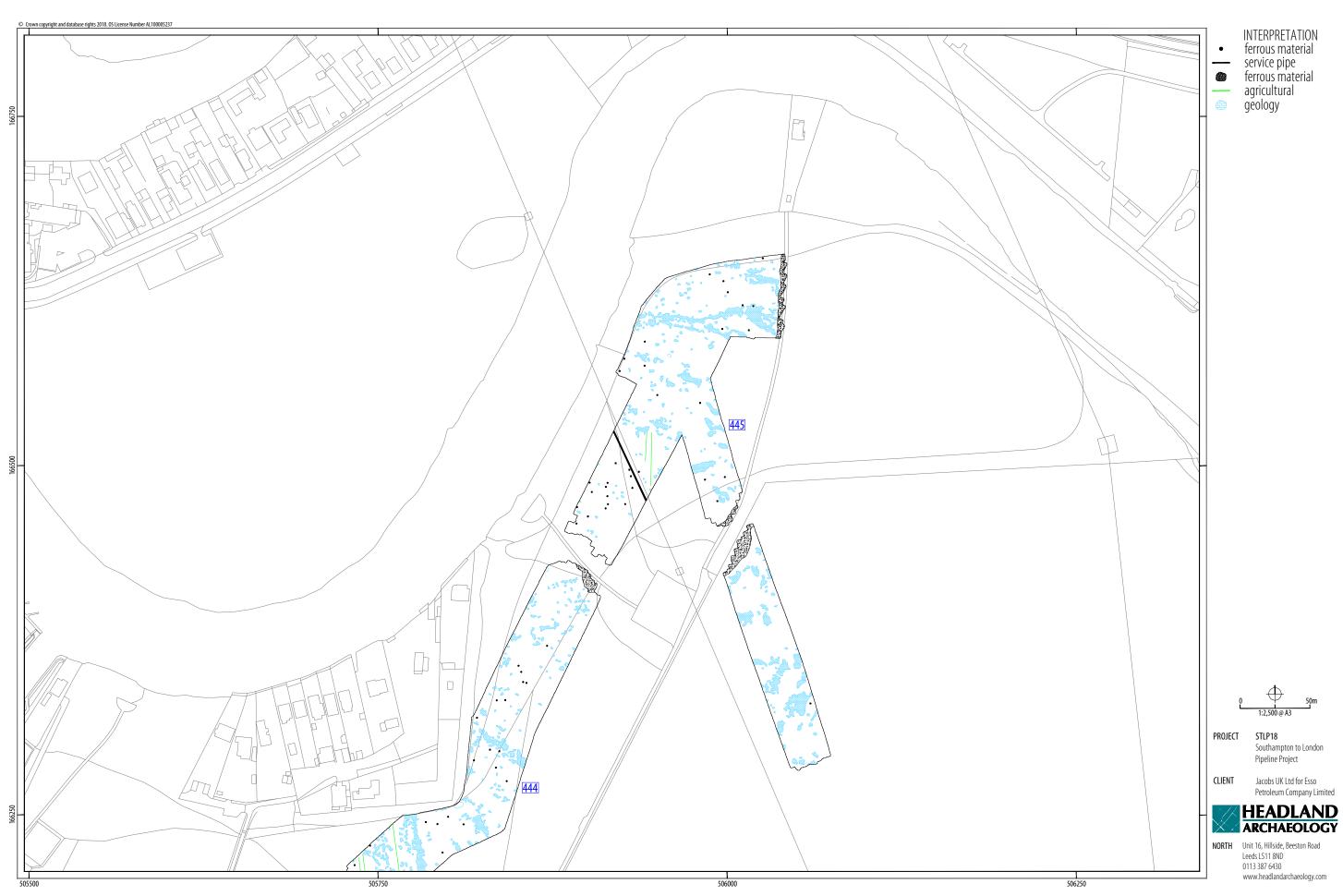


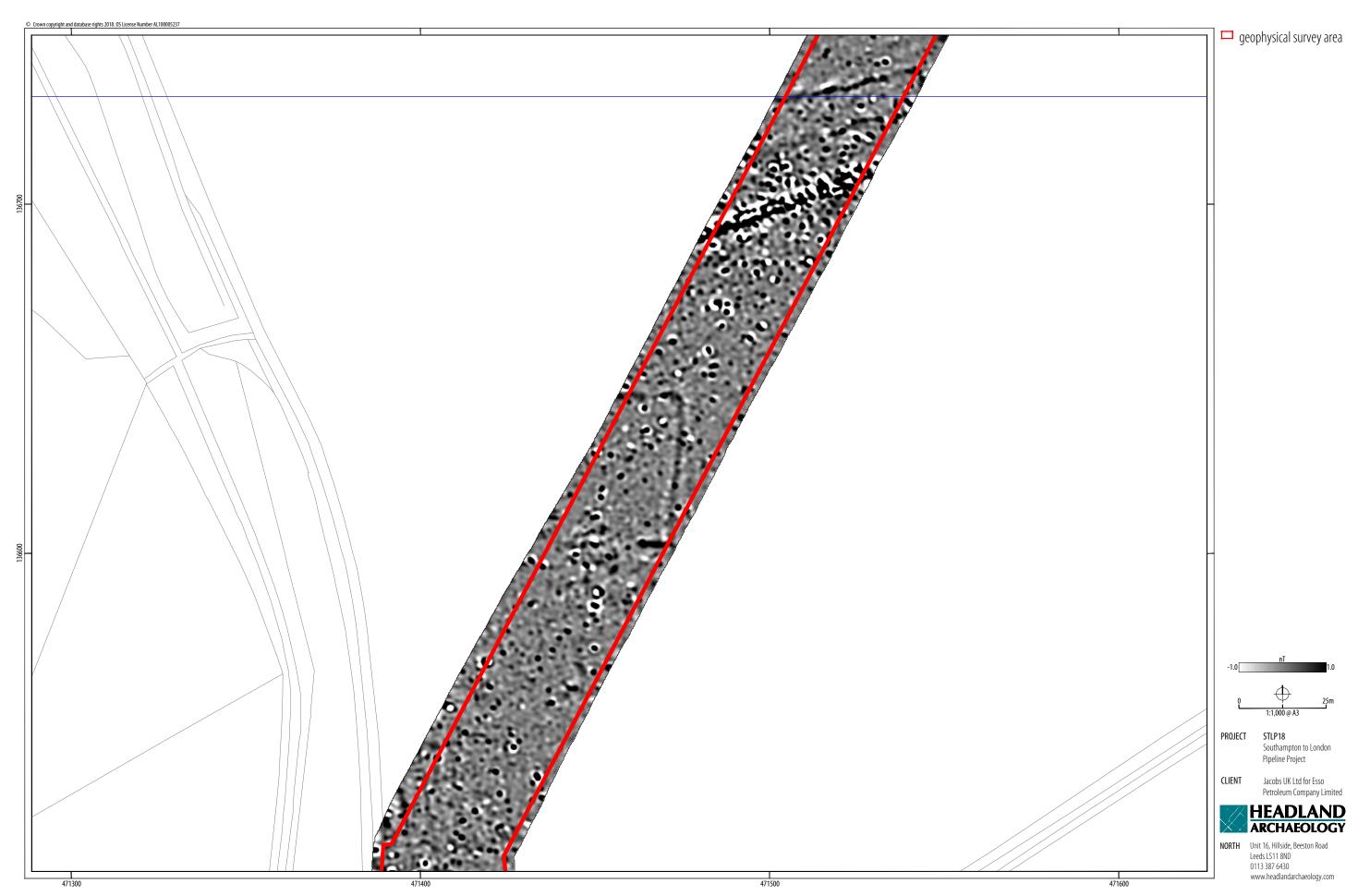


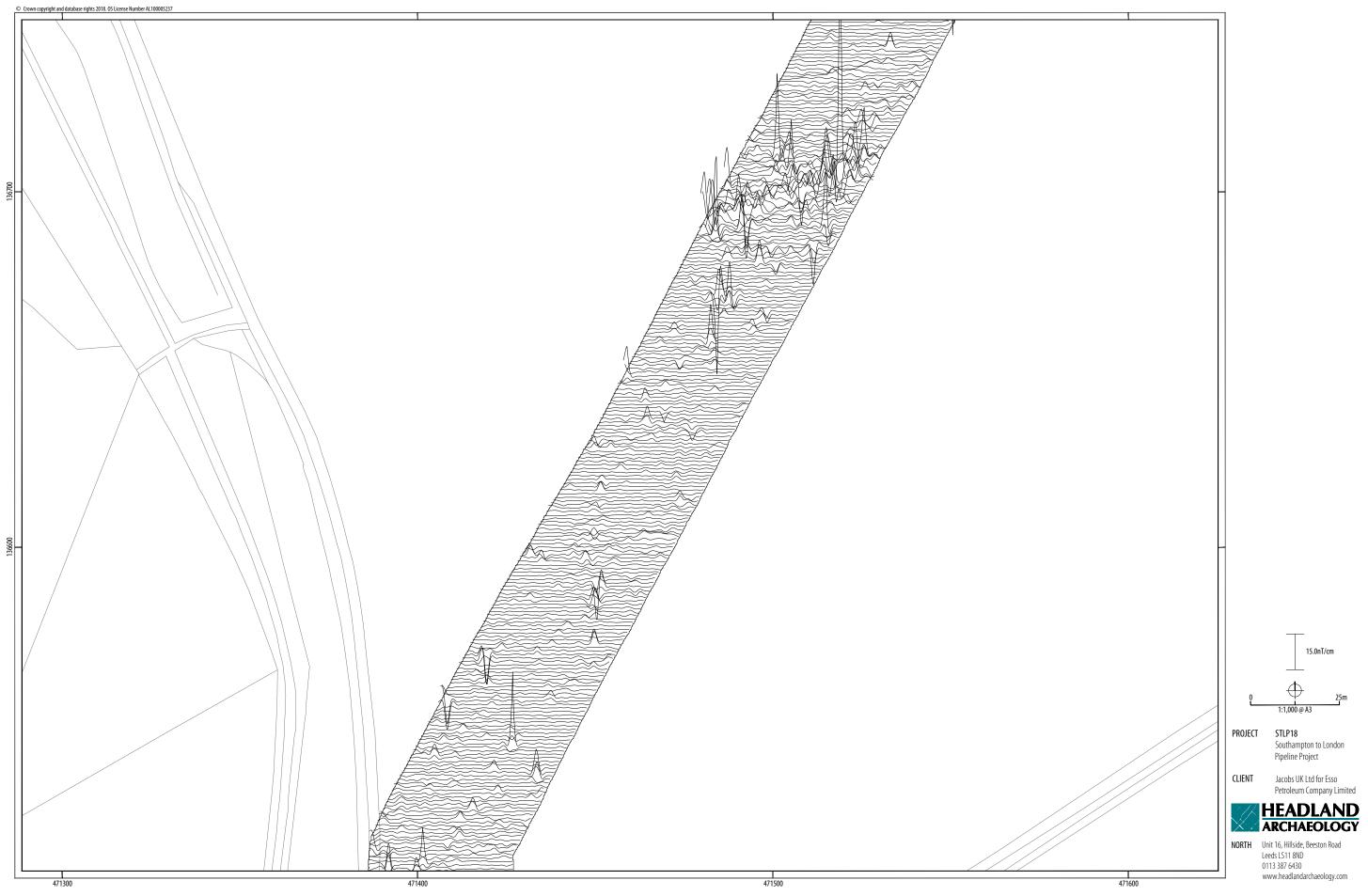




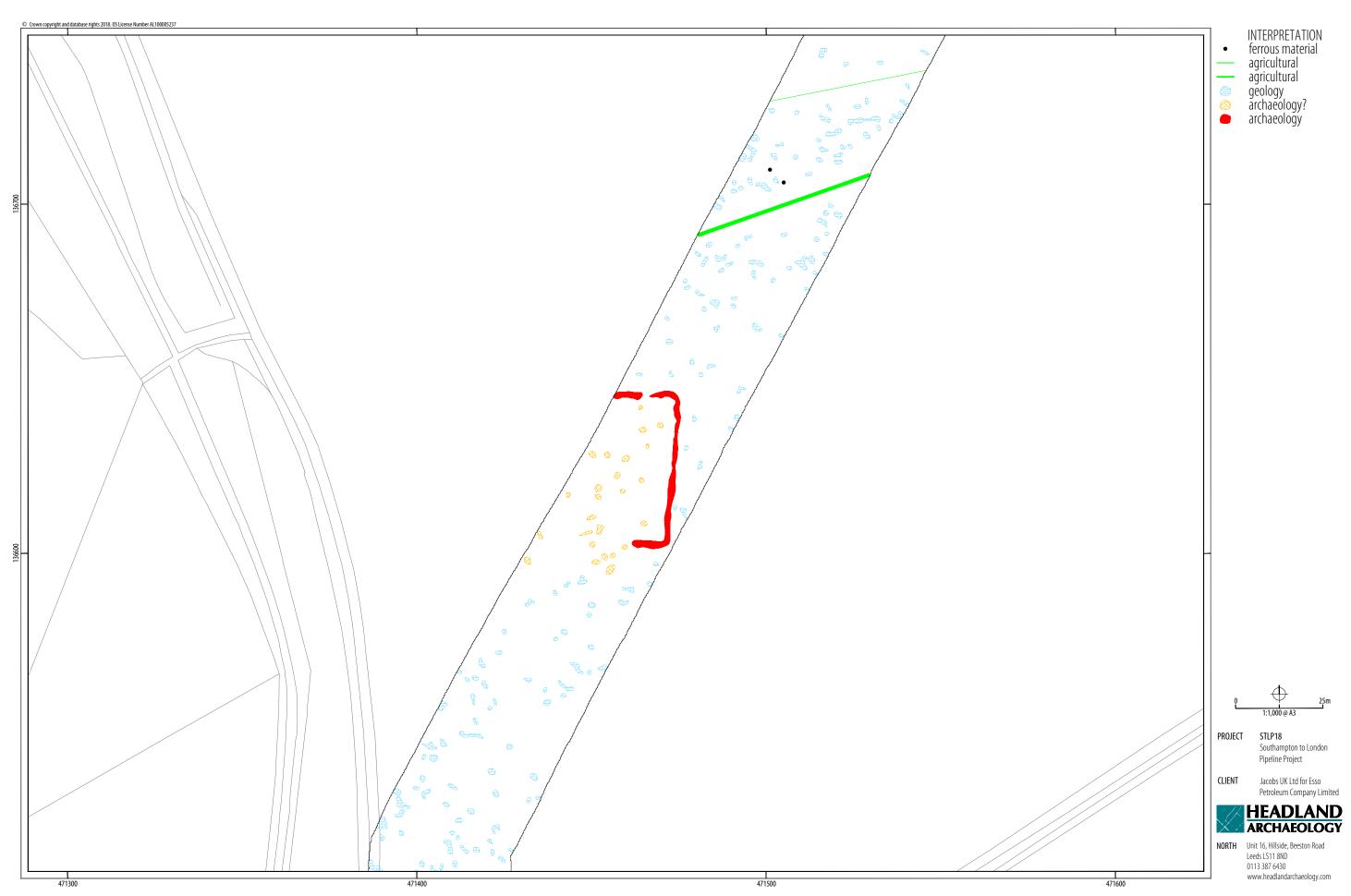
ILLUS 151 XY trace plot of minimally processed magnetometer data; GSA444 & GSA445

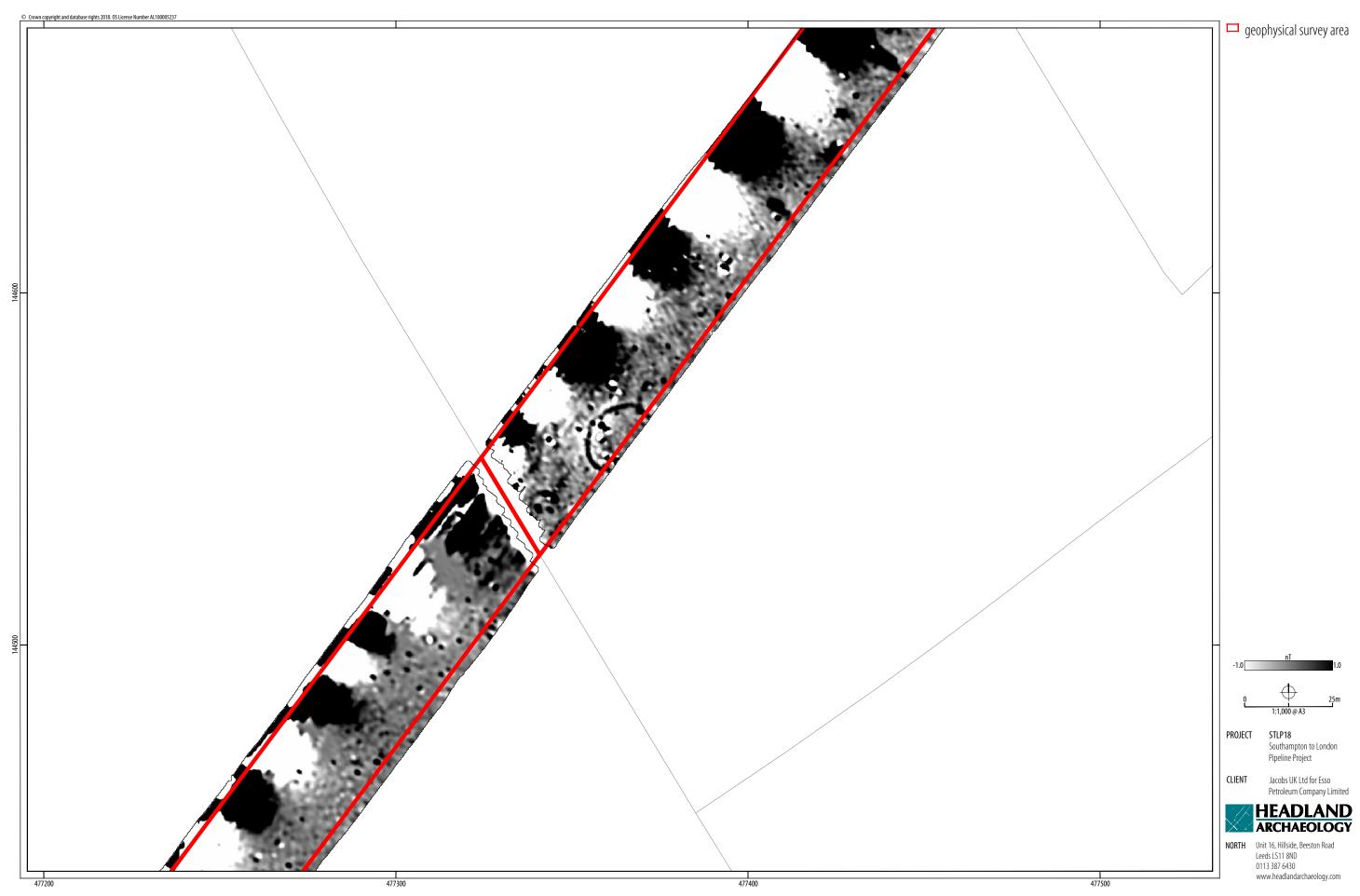


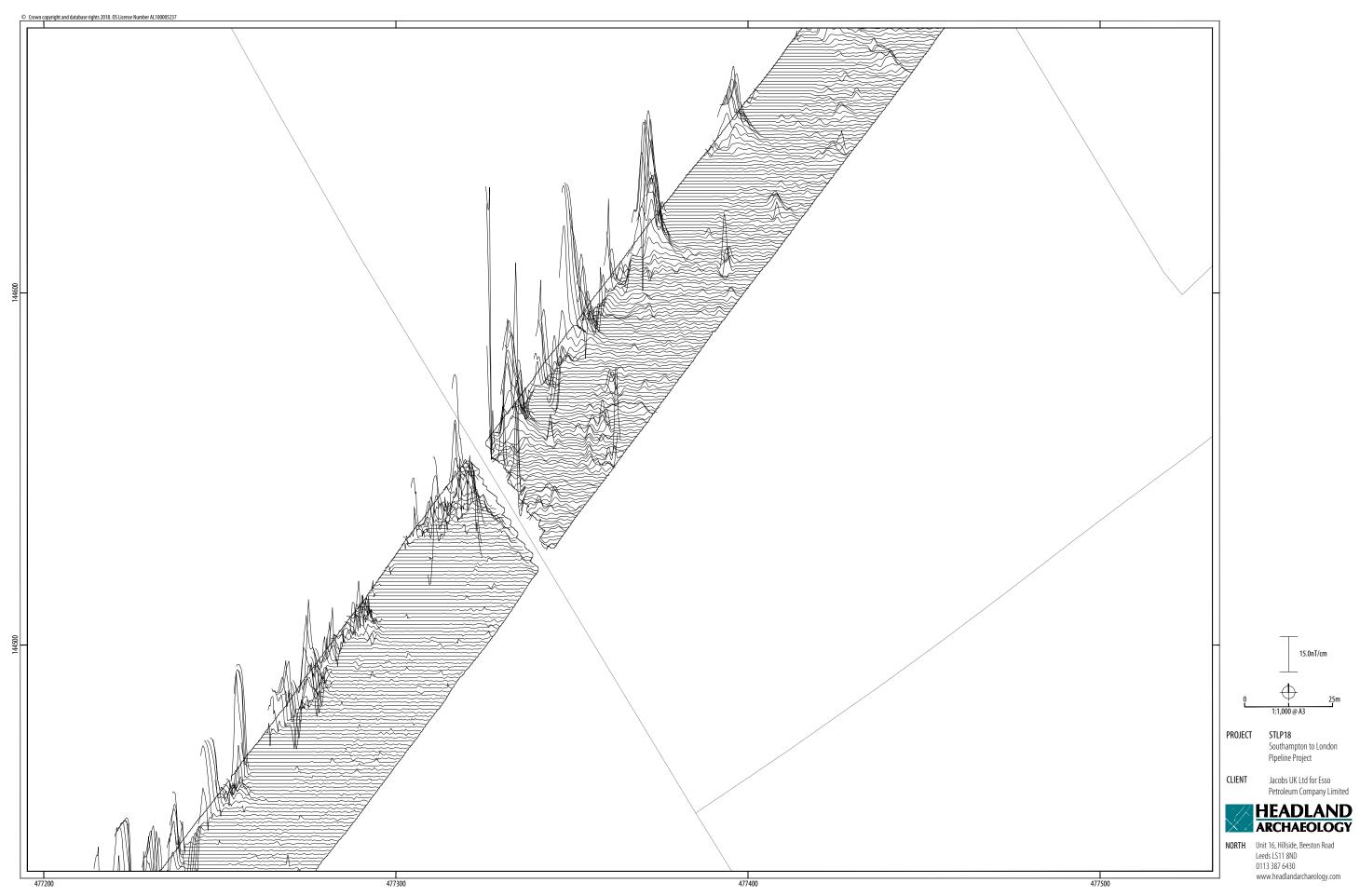


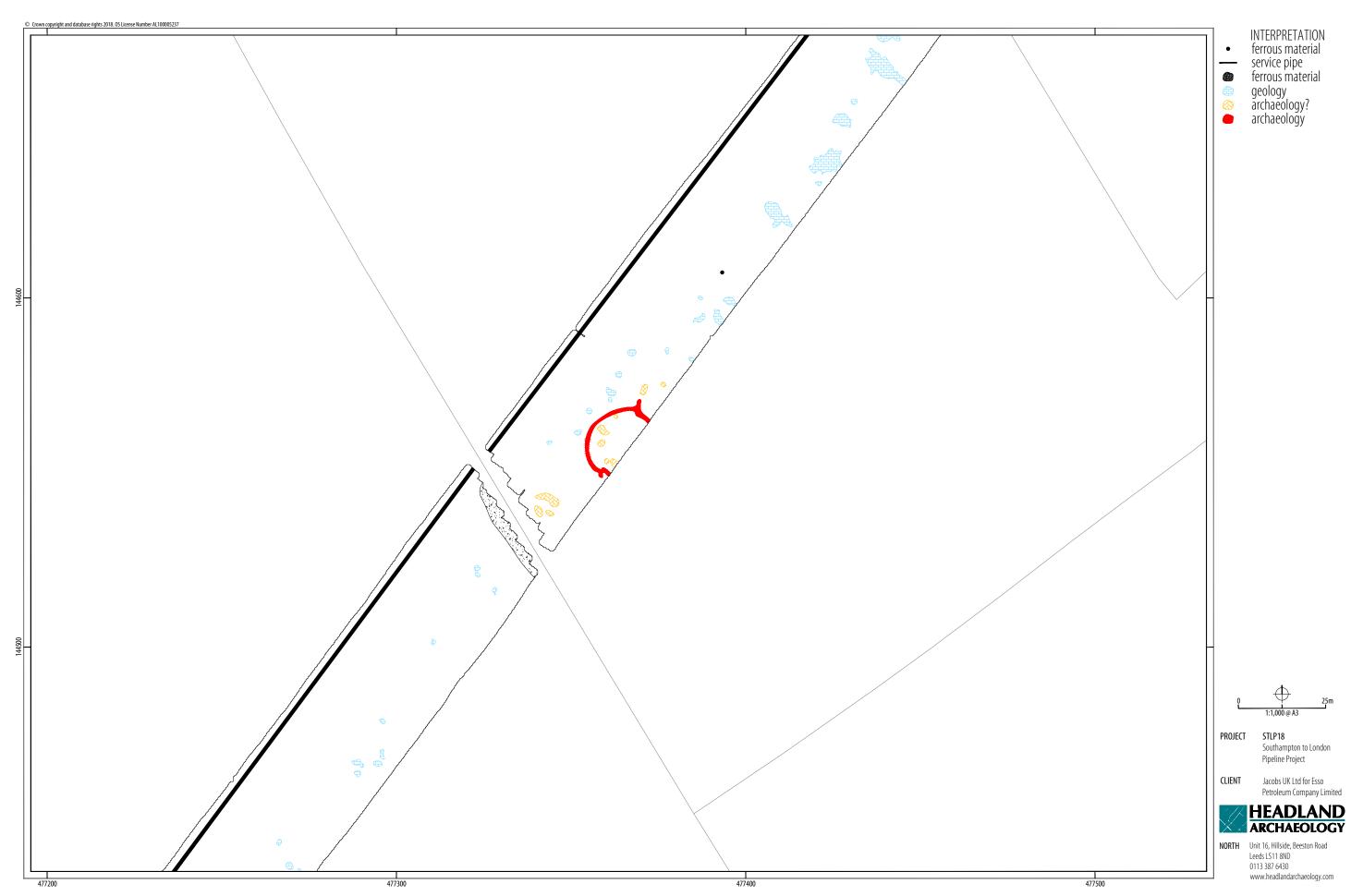


ILLUS 154 XY trace plot of minimally processed magnetometer data; AAA1









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# 7 APPENDICES

# APPENDIX 1 PRIORITY GSAS AND SUMMARY INTERPRETATIONS

SURVEY AREA	M2	GEOLOGY	REASON FOR SURVEY	SUMMARY INTERPRETATION OF GEOPHYSICAL ANOMALIES	
6	5022	Superficial: n/a	Prehistoric flint tools and pot	No anomalies of definite archaeological potential. Broad anomaly	
		Bedrock: Wittering Formation - Clay, Silt and Sand	recovered during pipe line construction WB	interpreted as possibly archaeological in origin. North/south pipe in west of GSA. North/south ploughing trends.	
7	698	Superficial: River Terrace Deposits, 3 - Sand and Gravel	Med agricultural (farmstead, mill, barn) remains adjacent to proposed	No anomalies of any archaeological potential. East/west pipe in south of GSA. Southwest corner dominated by modern magnetic	
		Bedrock: Wittering Formation - Clay, Silt and Sand	works	disturbance.	
8	11608	Superficial: River Terrace Deposits, 3 - Sand and Gravel	Med agricultural (farmstead, mill, barn) remains adjacent to proposed	No anomalies of any archaeological potential. Data dominated by magnetic disturbance from alluvial deposits. Ploughing trends in	
		Bedrock: Wittering Formation - Clay, Silt and Sand	works	southwest	
30	13722	Superficial: n/a	Med/post-med field systems	No anomalies of any archaeological potential. Northwestern half of	
		Bedrock: London Clay Formation - clay, silt and sand	recorded by NMP from aerials adjacent to red line of proposed works	survey corridor dominated by magnetic interference from adjacent pipe.	
31	5599	Superficial: n/a	Med/post-med field systems	No anomalies of any archaeological potential. Northwestern half of	
		Bedrock: London Clay Formation - clay, silt and sand	recorded by NMP from aerials adjacent to red line of proposed works	survey corridor dominated by magnetic interference from adjacent pipe.	
32	6017	Superficial: n/a	Med/post-med field systems	No anomalies of any archaeological potential. Northwestern half of	
		Bedrock: London Clay Formation - clay, silt and sand	recorded by NMP from aerials adjacent to red line of proposed works	survey corridor dominated by magnetic interference from adjacent pipe.	
45	6149	Superficial: n/a	Celtic field systems recorded by	No anomalies of any archaeological potential. GSA dominated by	
		Bedrock: Tarrant Chalk Member - Chalk	NMP from aerials adjacent to red line of proposed works	magnetic interference from existing pipe and surrounding field boundaries.	
46	3957	Superficial: n/a	Celtic field systems recorded by	No anomalies of any archaeological potential. GSA dominated by	
		Bedrock: Tarrant Chalk Member - Chalk	NMP from aerials adjacent to red line of proposed works	magnetic interference from existing pipe and surrounding field boundaries.	
55	8077	Superficial: n/a	Celtic field systems recorded by NMP from aerials within red line of	No anomalies of any archaeological potential. Former field boundar	
		Bedrock: Newhaven Chalk Formation - Chalk	proposed works	and two buried pipes in south of GSA.	
57	3394	Superficial: n/a	Celtic field systems recorded by NMP from aerials within red line of	No anomalies of any archaeological potential. Modern ploughing	
		Bedrock: Seaford Chalk Formation - Chalk	proposed works	trends throughout.	
58	12306	Superficial: n/a	Celtic field systems recorded by NMP from aerials within red line of	No anomalies of definite archaeological potential. Several linear and curvilinear anomalies identified as of possible archaeological	
		Bedrock: Seaford Chalk Formation - Chalk	proposed works	potential. Modern ploughing trends throughout	
61	7182	Superficial: n/a Bedrock: Seaford Chalk Formation - Chalk	Celtic field systems recorded by NMP from aerials within red line of proposed works	No anomalies of any archaeological potential. Modern ploughing trends throughout.	
67	20168	Superficial: n/a	Celtic field systems recorded by	No anomalies of any archaeological potential. Broad sinuous	
		Bedrock: Seaford Chalk Formation - Chalk	NMP from aerials within red line of proposed works	anomalies thought to be due to superficial deposits.	
68	24548	Superficial: Head – Diamicton	Lynchets recorded by NMP from	No anomalies of any archaeological potential. Data dominated by magnetic interference from existing pipe. Curvilinear anomaly northwest of pipe caused by extant field boundary.	
		Bedrock: Lewes Nodular Chalk Formation - Chalk	aerials are adjacent to proposed works		

SURVEY AREA	M2	GEOLOGY	REASON FOR SURVEY	SUMMARY INTERPRETATION OF GEOPHYSICAL ANOMALIES
69	15390	Superficial: Head – Diamicton Bedrock: Lewes Nodular Chalk Formation - Chalk	Med/post-med field boundaries recorded by NMP from aerials, and adjacent to scheduled monument: Lomer, deserted medieval settlement 1001797	No anomalies of any archaeological potential. Data dominated by magnetic interference from existing pipe.
70	7127	Superficial: Head – Diamicton Bedrock: Lewes Nodular Chalk Formation - Chalk	Not currently prioritised but located in an area of med/post-med field boundaries recorded by NMP from aerials, and adjacent to scheduled monument: Lomer, deserted medieval settlement 1001798	No anomalies of any archaeological potential. Data dominated by magnetic interference from existing pipe and extant field boundaries.
71	8653	Superficial: n/a Bedrock: Seaford Chalk Formation - Chalk	Not currently prioritised but located in an area of med/post-med field systems recorded by NMP from aerials, and adjacent to scheduled monument: Lomer, deserted medieval settlement 1001798	No anomalies of definite archaeological potential. Linear and rectilinear anomalies, oblique to extant and historical field boundaries, are identified as of possible archaeological potential, possibly being due to infilled ditches. Other anomalies include magnetic disturbance from the existing pipe and modern ploughing trends throughout.
72	7541	Superficial: n/a Bedrock: Seaford Chalk Formation - Chalk	Not currently prioritised but located in an area of med/post-med field systems recorded by NMP from aerials, and adjacent to scheduled monument: Lomer, deserted medieval settlement 1001799	No anomalies of definite archaeological potential. Curvilinear anomaly interpreted as of possible archaeological potential. Other anomalies include magnetic disturbance from the existing pipe and surrounding field boundaries.
73	25450	Superficial: n/a Bedrock: Seaford Chalk Formation - Chalk	Post-med field boundaries recorded by NMP from aerials within red line of proposed works	No anomalies of definite archaeological potential. Isolated discrete pit-type anomaly in southwest. Data dominated by magnetic interference from existing pipe. Modern ploughing trends throughout.
74	20844	Superficial: Head – Diamicton Bedrock: Seaford Chalk Formation - Chalk	Unknown age field boundaries recorded by NMP from aerials within red line of proposed works	No anomalies of definite archaeological potential. Isolated fragmented curvilinear trend interpreted as of possible archaeological potential. Data dominated by magnetic interference from existing pipe. Modern ploughing trends throughout.
75	8061	Superficial: Clay-With-Flints Formation – Diamicton Bedrock: Newhaven Chalk Formation - Chalk	Unknown age field boundaries recorded by NMP from aerials within red line of proposed works	No anomalies of any archaeological potential.
76	12384	Superficial: Clay-With-Flints Formation – Diamicton Bedrock: Newhaven Chalk Formation - Chalk	Unknown age field boundaries recorded by NMP from aerials within red line of proposed works	No anomalies of any archaeological potential.
78	12576	Superficial: Clay-With-Flints Formation – Diamicton Bedrock: Newhaven Chalk Formation - Chalk	Post-med circular pits recorded by NMP from aerials adjacent to red line of proposed works	No anomalies of definite archaeological potential. Three large circular pit-type anomalies identified as of possible archaeological potential. Modern ploughing trends throughout.
79	10141	Superficial: Clay-With-Flints Formation – Diamicton Bedrock: Newhaven Chalk Formation - Chalk	Post-med circular pits recorded by NMP from aerials adjacent to red line of proposed works	No anomalies of definite archaeological potential. Four large circular pit-type anomalies and a possible infilled ditch identified as of possible archaeological potential. Modern ploughing trends throughout.
80	13600	Superficial: Clay-With-Flints Formation – Diamicton Bedrock: Newhaven Chalk Formation - Chalk	Post-med circular pits recorded by NMP from aerials adjacent to red line of proposed works	No anomalies of definite archaeological potential. Three large circular pit-type anomalies identified as of possible archaeological potential. Modern ploughing trends throughout.
81	12134	Superficial: n/a Bedrock: Newhaven Chalk Formation - Chalk	Bronze age field system of Brockwood Park recorded by WCC	No anomalies of any archaeological potential against a variable magnetic background. Numerous anomalies thought to be geological in origin.

SURVEY AREA	M2	GEOLOGY	REASON FOR SURVEY	SUMMARY INTERPRETATION OF GEOPHYSICAL ANOMALIES	
82	2097	Superficial: Head – Diamicton	Bronze age field system of	No anomalies of any archaeological potential.	
		Bedrock: Newhaven Chalk Formation - Chalk	Brockwood Park recorded by WCC		
83	36662	Superficial: Head, 1 – Diamicton	Med/post-med field systems recorded by NMP from aerials	No anomalies of definite archaeological potential. Two large circular pit-type anomalies in southwest identified as of possible	
		Bedrock: Newhaven Chalk Formation - Chalk	within redline of proposed works	archaeological potential. Other anomalies include geological striations and modern ploughing trends.	
84	10178	Superficial: n/a	Med/post-med field systems	No anomalies of any archaeological potential. Linear anomalies	
		Bedrock: Newhaven Chalk Formation - Chalk	recorded by NMP from aerials within redline of proposed works	caused by former field boundaries and ploughing trends.	
87	23574	Superficial: Clay-With-Flints Formation – Diamicton	Med/post-med field systems recorded by NMP from aerials	No anomalies of definite archaeological potential. Two parallel linear anomalies in south interpreted as of possible archaeological	
		Bedrock: Newhaven Chalk Formation - Chalk	within redline of proposed works	potential. Elevated magnetic background throughout, possibly as a result of modern manuring. East/west service pipe towards north.	
88	8458	Superficial: n/a	Med/post-med field systems	No anomalies of any archaeological potential. Existing north/east/	
		Bedrock: Newhaven Chalk Formation - Chalk	recorded by NMP from aerials adjacent to redline of proposed works	south/west pipe in north.	
94	18868	Superficial: head – diamicton	Neolithic gravel pit, Bronze age barrows, post-med field systems, proximity to Bramdean Roman villa 1001880	No anomalies of any archaeological potential. Existing pipe in north	
		Bedrock: Seaford Chalk Formation - Chalk			
95	20365	Superficial: n/a	Neolithic gravel pit, Bronze age barrows, post-med field systems, proximity to Bramdean Roman villa 1001881	No anomalies of any archaeological potential. Existing pipe in north	
		Bedrock: Seaford Chalk Formation - Chalk			
96	2917	Superficial: head – diamicton	Med/post-med field systems	No anomalies of any archaeological potential. Data dominated by	
		Bedrock: Seaford Chalk Formation - Chalk	recorded by NMP from aerials adjacent to redline of proposed works	magnetic disturbance from existing pipe and surrounding field boundaries.	
97	6554	Superficial: head – diamicton	Med/post-med field systems	No anomalies of any archaeological potential. Data dominated by	
		Bedrock: Seaford Chalk Formation - Chalk	recorded by NMP from aerials adjacent to redline of proposed works	magnetic disturbance from existing pipe.	
98	19359	Superficial: head – diamicton	Unknown age field systems	No anomalies of definite archaeological potential. North/south linear	
		Bedrock: Seaford Chalk Formation - Chalk	recorded by NMP from aerials within red line of proposed works	anomaly in southwest interpreted as of possible archaeological potential. Three service pipes within south-west.	
99	1098	Superficial: head – diamicton	Unknown age field systems	No anomalies of any archaeological potential.	
		Bedrock: Seaford Chalk Formation - Chalk	recorded by NMP from aerials within red line of proposed works		
100	13104	Superficial: head, 1 – diamicton	Unknown age field systems	No anomalies of any archaeological potential. Four service pipes and	
		Bedrock: Seaford Chalk Formation - Chalk	recorded by NMP from aerials within red line of proposed works	geological variation throughout.	
101	9539	Superficial: head – diamicton	Post-med circular pits recorded by	No anomalies of any archaeological potential. Infilled pond in southwest. Curvilinear anomalies due to geological and topographical variation.	
		Bedrock: Seaford Chalk Formation - Chalk	NMP from aerials adjacent to red line of proposed works		
104	11828	Superficial: clay-with-flints Formation – diamicton	Unknown age field systems recorded by HCC adjacent to	No anomalies of any archaeological potential. Anomalies due to geological variation throughout.	
		Bedrock: Newhaven Chalk Formation - Chalk	redline of proposed works		

SURVEY AREA	M2	GEOLOGY	REASON FOR SURVEY	SUMMARY INTERPRETATION OF GEOPHYSICAL ANOMALIES	
105	25513	Superficial: clay-with-flints Formation – diamicton	Unknown age field systems recorded by HCC adjacent to	No anomalies of definite archaeological potential. Anomalies probably due to geological variation throughout.	
		Bedrock: Newhaven Chalk Formation - Chalk	redline of proposed works		
106	8135	Superficial: clay-with-flints Formation – diamicton		No anomalies of definite archaeological potential. Anomalies due to geological variation throughout. North/south service in north.	
		Bedrock: Newhaven Chalk Formation - Chalk	to proposed redime world		
107	7723	Superficial: clay-with-flints Formation – diamicton	Med farm - Merryfield Farm recorded by HCC ID41437 adjacent to proposed redline works	No anomalies of archaeological potential. Anomalies probably due to geological variation throughout.	
		Bedrock: Newhaven Chalk Formation - Chalk	to proposed realine world		
114	31331	Superficial: clay-with-flints Formation – diamicton	Rectangular enclosure recorded by HCC adjacent to redline of proposed works	No anomalies of archaeological potential. Extremely variable magnetic background throughout. Existing pipe in north.	
		Bedrock: Newhaven Chalk Formation - Chalk	proposed world		
119	5940	Superficial: clay-with-flints Formation – diamicton	Med farm - Kiteway Farm ID 39220 recorded by HCC adjacent to redline of proposed works	No anomalies of archaeological potential. Dataset dominated by magnetic disturbance from existing pipe.	
		Bedrock: Newhaven Chalk Formation - Chalk	realine of proposed works		
151	12434	Superficial: clay-with-flints Formation – diamicton	Worked and burnt flint findspot recovered as part of 1977 East Hampshire Survey recorded by HCC adjacent to redline of proposed works	No anomalies of archaeological potential. Dataset dominated by magnetic disturbance from existing pipe.	
		Bedrock: new pit Chalk Formation - Chalk			
152	11518	Superficial: clay-with-flints Formation – diamicton	Worked and burnt flint findspot recovered as part of 1977 East	No anomalies of archaeological potential. Pipe in west and broad band of geological variation in the east.	
		Bedrock: new pit Chalk Formation - Chalk	Hampshire Survey recorded by HCC adjacent to redline of proposed works		
153	17040	Superficial: n/a	Worked and burnt flint findspot recovered as part of 1977 East	No anomalies of archaeological potential. Identified anomalies due to geological variation and ferrous contamination of the upper soil	
		Bedrock: Holywell Nodular Chalk Formation - Chalk	Hampshire Survey recorded by HCC adjacent to redline of proposed works		
154	9948	Superficial: Head, 1 - Clay, Silt, Sand and Gravel	Worked and burnt flint findspot recovered as part of 1977 East Hampshire Survey recorded by HCC	No anomalies of archaeological potential. Identified anomalies due to geological variation and ferrous contamination of the upper soil	
		Bedrock: Zig Zag Chalk Formation - Chalk	adjacent to redline of proposed works. Prehistoric, Roman, med and post-med pot also recovered	norizons.	
155	14754	Superficial: Head, 1 - Clay, Silt, Sand and Gravel	Bronze age pot and pit ID 39076 recorded by HCC adjacent to	No anomalies of archaeological potential. Broad area magnetic disturbance in the northeast caused by infilled quarry. Other	
		Bedrock: Zig Zag Chalk Formation - Chalk	redline of proposed works	anomalies due to geological variation and ferrous contamination of the upper soil horizons.	
156	13560	Superficial: Clay-with-flints Formation - Clay, Silt, Sand and Gravel	Trackway ID 62912 recorded by HCC from aerial photographs adjacent to redline of proposed	No anomalies of definite archaeological potential. Isolated curvilinear anomaly identified as of possible archaeological potential but a geological origin equally plausible. Anomalies due to localised	
		Bedrock: Zig Zag Chalk Formation - Chalk	works	geological variation elsewhere.	
157	20141	Superficial: n/a	Unknown age cropmarks recorded by HCC adjacent to redline of	No anomalies of any archaeological potential. Sinuous anomalies in	
		Bedrock: West Melbury Marly Chalk Formation - Chalk	proposed works	the west due to superficial deposits.	

SURVEY AREA	M2	GEOLOGY	REASON FOR SURVEY	SUMMARY INTERPRETATION OF GEOPHYSICAL ANOMALIES	
159	23383	Superficial: n/a	Unknown age cropmarks recorded	AAA1 within south comprising the eastern extent of a sub-	
		Bedrock: West Melbury Marly Chalk Formation - Chalk	by HCC within redline of proposed works	rectangular enclosure.	
160	5894	Superficial: n/a	Not currently prioritised but	No anomalies of any archaeological potential. North of dataset	
		Bedrock: West Melbury Marly Chalk Formation - Chalk	unknown age cropmarks recorded by HCC adjacent to redline of proposed works	dominated by magnetic interference from existing pipe.	
163	11062	Superficial: n/a	Roman pot and rubbish	No anomalies of any archaeological potential. North of dataset	
		Bedrock: West Melbury Marly Chalk Formation - Chalk	pits discovered during pipe construction and as part of the East Hampshire Survey recorded by HCC adjacent and within the redline of proposed works	dominated by magnetic interference from existing pipe.	
165	5161	Superficial: n/a	Roman pot and rubbish	No anomalies of any archaeological potential.	
		Bedrock: West Melbury Marly Chalk Formation - Chalk	pits discovered during pipe construction and as part of the East Hampshire Survey recorded by HCC adjacent and within the redline of proposed works		
166	12074	Superficial: n/a	Roman pot and rubbish	No anomalies of any archaeological potential.	
		Bedrock: West Melbury Marly Chalk Formation - Chalk	pits discovered during pipe construction and as part of the East Hampshire Survey recorded by HCC adjacent and within the redline of proposed works		
173	20830	Superficial: n/a	Unknown age cropmarks recorded	No anomalies of any archaeological potential. Dipolar linear	
		Bedrock: Upper Greensand Formation - Calcareous Sandstone and Siltstone	by HCC within redline of proposed works	anomalies locating buried service pipes.	
174	17541	Superficial: n/a	Unknown age cropmarks recorded	No anomalies of definite archaeological potential. Parallel linear	
		Bedrock: West Melbury Marly Chalk Formation - Chalk	by HCC within redline of proposed works	anomalies in north-east may locate a trackway. Former field boundary identified in the south.	
176	13445	Superficial: n/a	Med Monk Wood manorial complex ID 17108 recorded by HCC	No anomalies of any archaeological potential. Southeast of dataset dominated by magnetic interference from existing pipe.	
		Bedrock: Zig Zag Chalk Formation - Chalk	adjacent to redline of proposed works. Worked and burnt flint also found in the vicinity	accumulated by magnetic memoral recommendating paper.	
177	8783	Superficial: n/a	Med Monk Wood manorial	No anomalies of any archaeological potential. Southeast of dataset	
		Bedrock: Zig Zag Chalk Formation - Chalk	complex ID 17108 recorded by HCC adjacent to redline of proposed works. Worked and burnt flint also found in the vicinity	dominated by magnetic interference from existing pipe.	
178	1851	Superficial: n/a	Med Monk Wood manorial	No anomalies of any archaeological potential. Southeast of dataset	
		Bedrock: Zig Zag Chalk Formation - Chalk	complex ID 17108 recorded by HCC adjacent to redline of proposed works. Worked and burnt flint also found in the vicinity	dominated by magnetic interference from existing pipe.	
179	8621	Superficial: n/a	Scheduled monument Cuckoo's	No anomalies of definite archaeological potential. Northwest/	
		Bedrock: Zig Zag Chalk Formation - Chalk	Corner Roman settlement 1001787 lies to the north of this area	southeast linear anomaly may be archaeological origin. Southeast c dataset dominated by magnetic interference from existing pipe.	
180	21295	Superficial: n/a	Roman road Silchester to	No anomalies of any archaeological potential. Southeast of dataset	
		Bedrock: West Melbury Marly Chalk Formation - Chalk	Chichester recorded by HCC runs through redline of proposed works. Scheduled monument Cuckoo's Corner Roman settlement 1001787 lies to the north of this area	dominated by magnetic interference from existing pipe.	

SURVEY AREA	M2	GEOLOGY	REASON FOR SURVEY	SUMMARY INTERPRETATION OF GEOPHYSICAL ANOMALIES		
181	5109	Superficial: n/a	Scheduled monument Cuckoo's	No anomalies of any archaeological potential. Southeast of dataset		
		Bedrock: West Melbury Marly Chalk Formation - Chalk	Corner Roman settlement 1001787 lies to the north of this area	dominated by magnetic interference from existing pipe.		
188	7334	Superficial: river terrace deposits, 2 - sand and gravel	Roman pot recovered during construction of the pipeline	No anomalies of any archaeological potential. Existing pipe within south of dataset.		
		Bedrock: west Melbury Marly Chalk Formation - Chalk	recorded by HCC adjacent within the redline of proposed works. Unknown age crop marks also within this area			
189	6241	Superficial: n/a	Roman pot recovered during	No anomalies of any archaeological potential.		
		Bedrock: Upper Greensand Formation - Calcareous Sandstone and Siltstone	construction of the pipeline recorded by HCC adjacent within the redline of proposed works. Unknown age crop marks also within this area			
190	778	Superficial: n/a	Scheduled monument Cuckoo's	No anomalies of any archaeological potential.		
		Bedrock: Upper Greensand Formation - Calcareous Sandstone and Siltstone	Corner Roman settlement 1001787 lies to the west of this area			
193	16684	Superficial: River Terrace Deposits, 2 - Sand and Gravel	Scheduled monument Cuckoo's Corner Roman settlement 1001787	No anomalies of any archaeological potential.		
		Bedrock: West Melbury Marly Chalk Formation - Chalk	lies to the west of this area			
194	7682	Superficial: River Terrace Deposits, 2 - Sand and Gravel	Scheduled monument Cuckoo's Corner Roman settlement 1001787 lies to the west of this area	No anomalies of any archaeological potential. North of dataset dominated by magnetic interference from existing pipe.		
		Bedrock: West Melbury Marly Chalk Formation - Chalk				
195	7020	Superficial: n/a	Scheduled monument Cuckoo's Corner Roman settlement 1001787	No anomalies of any archaeological potential. North of dataset dominated by magnetic interference from existing pipe.		
		Bedrock: West Melbury Marly Chalk Formation - Chalk	ies to the west of this area	dominated by magnetic interierence from existing pipe.		
196	5168	Superficial: n/a	Scheduled monument Cuckoo's Corner Roman settlement 1001787	No anomalies of any archaeological potential. Magnetic disturbance		
		Bedrock: West Melbury Marly Chalk Formation - Chalk	lies to the west of this area	throughout.		
197	5572	Superficial: n/a	Unknown age cropmarks recorded by HCC within redline of proposed works	No anomalies of any archaeological potential. Series of ploughing trends. North of dataset dominated by magnetic interference from		
		Bedrock: West Melbury Marly Chalk Formation - Chalk		existing pipe.		
198	37522	Superficial: n/a	Unknown age cropmarks recorded by HCC within redline of proposed	No anomalies of any archaeological potential. Dataset dominated by magnetic interference from existing pipe.		
		Bedrock: Upper Greensand Formation - Calcareous Sandstone and Siltstone	works. Adjacent to Froyle (Upper) HCC conservation area - possible Roman archaeology discovered during evaluation	magnetic interference non existing pipe.		
201	14915	Superficial: n/a	Unknown age cropmarks recorded	No anomalies of any archaeological potential. North of dataset dominated by magnetic interference from existing pipe.		
		Bedrock: Upper Greensand Formation - Calcareous Sandstone and Siltstone	by HCC within redline of proposed works	аотпакеа ву паднетс птененсе поттехізті д ріре.		
203	7163	Superficial: n/a	Roman cremation urns 17022 and	No anomalies of any archaeological potential. Dataset dominated by		
		Bedrock: Upper Greensand Formation - Calcareous Sandstone and Siltstone	site of Roman villa 17044 recorded adjacent to redline of proposed works	magnetic interference from existing pipe.		
204	8862	Superficial: n/a	Roman cremation urns 17022 and	No anomalies of any archaeological potential. Dataset dominated		
		Bedrock: West Melbury Marly Chalk Formation and Zig Zag Chalk Formation (undifferentiated) - Chalk	site of Roman villa 17044 recorded adjacent to redline of proposed works	by magnetic interference from existing pipe. Former field boundary in north.		

SURVEY AREA	M2	GEOLOGY	REASON FOR SURVEY	SUMMARY INTERPRETATION OF GEOPHYSICAL ANOMALIES
205	7747	Superficial: n/a  Bedrock: West Melbury  Marly Chalk Formation and  Zig Zag Chalk Formation  (undifferentiated) - Chalk	Roman cremation urns 17022 and site of Roman villa 17044 recorded adjacent to redline of proposed works	No anomalies of any archaeological potential. Dataset dominated by magnetic interference from existing pipe.
206	6238	Superficial: n/a Bedrock: West Melbury Marly Chalk Formation and Zig Zag Chalk Formation (undifferentiated) - Chalk	Roman cremation urns 17022 and site of Roman villa 17044 recorded adjacent to redline of proposed works	AAA2 within south comprising the northwestern extent of a ring-ditch. Northwest of dataset dominated by magnetic interference from existing pipe.
207	10525	Superficial: n/a Bedrock: West Melbury Marly Chalk Formation and Zig Zag Chalk Formation (undifferentiated) - Chalk	Roman cremation urns 17022 and site of Roman villa 17044 recorded adjacent to redline of proposed works	No anomalies of definite archaeological potential. Isolated high magnitude pit-type anomaly of possible archaeological potential. Northwest of dataset dominated by magnetic interference from existing pipe.
208	8558	Superficial: n/a  Bedrock: Upper Greensand Formation - Calcareous Sandstone and Siltstone	Roman cremation urns 17022 and site of Roman villa 17044 recorded adjacent to redline of proposed works	No anomalies of any archaeological potential. Dataset dominated by magnetic interference from existing pipe.
209	800	Superficial: n/a  Bedrock: Upper Greensand Formation - Calcareous Sandstone and Siltstone	Scheduled monument Earthwork at Penley 1001922, Roman villa 17507 and Roman cremation burial 39996 recorded by HCC adjacent to redline of proposed works	No anomalies of any archaeological potential.
210	10209	Superficial: n/a  Bedrock: Upper Greensand Formation - Calcareous Sandstone and Siltstone	Scheduled monument Earthwork at Penley 1001922, Roman villa 17507 and Roman cremation burial 39996 recorded by HCC adjacent to redline of proposed works	No anomalies of any archaeological potential. Northwest of dataset dominated by magnetic interference from existing pipe. East/west service pipe within centre of dataset.
211	8938	Superficial: n/a Bedrock: Upper Greensand Formation - Calcareous Sandstone and Siltstone	Unknown age cropmarks recorded by HCC adjacent to redline of proposed works	No anomalies of any archaeological potential. Northwest of dataset dominated by magnetic interference from existing pipe.
217	10827	Superficial: n/a Bedrock: Seaford Chalk Formation - Chalk	Scheduled monument Barley Pound earthworks 1001919, Roman villa discovered in 1817 and crop marks recorded by HCC adjacent to redline of proposed works.	No anomalies of any archaeological potential. West of dataset dominated by magnetic interference from existing pipe. Geological variation across centre of dataset.
218	5224	Superficial: n/a  Bedrock: Upper Greensand Formation - Calcareous Sandstone and Siltstone	Scheduled monument Barley Pound earthworks 1001919, Roman villa discovered in 1817 and crop marks recorded by HCC adjacent to redline of proposed works.	No anomalies of any archaeological potential. West of dataset dominated by magnetic interference from existing pipe.
245	3651	Superficial: n/a  Bedrock: London Clay Formation - Clay, Silt and Sand	WWII installations recorded by HCC adjacent to redline of proposed works	No anomalies of any archaeological potential. Data dominated by modern ferrous disturbance throughout.
246	1002	Superficial: n/a  Bedrock: London Clay  Formation - Clay, Silt and Sand	WWII installations recorded by HCC adjacent to redline of proposed works	No anomalies of any archaeological potential. Data dominated by modern ferrous disturbance throughout.
247	9538	Superficial: n/a  Bedrock: London Clay  Formation - Clay, Silt and Sand	WWII installations recorded by HCC adjacent to redline of proposed works	No anomalies of any archaeological potential.
248	3266	Superficial: n/a  Bedrock: London Clay Formation - Clay, Silt and Sand	WWII installations recorded by HCC adjacent to redline of proposed works	No anomalies of any archaeological potential.

SURVEY AREA	M2	GEOLOGY	REASON FOR SURVEY	SUMMARY INTERPRETATION OF GEOPHYSICAL ANOMALIES
250	5032	Superficial: n/a  Bedrock: London Clay Formation - Clay, Silt and Sand	WWII installations recorded by HCC adjacent to redline of proposed works	No anomalies of any archaeological potential.
251	470	Superficial: n/a  Bedrock: London Clay Formation - Clay, Silt and Sand	WWII installations recorded by HCC adjacent to redline of proposed works	No anomalies of any archaeological potential. Data dominated by modern ferrous disturbance throughout.
253	2792	Superficial: n/a Bedrock: London Clay Formation - Clay, Silt and Sand	WWII installations recorded by HCC adjacent to redline of proposed works	No anomalies of any archaeological potential. Data dominated by modern ferrous disturbance throughout.
321	11732	Superficial: Alluvium - Sand, Silt and Clay Bedrock: Bagshot Formation	Offline proposed works in an area of apparently unmodified ground with low vegetation	No anomalies of any archaeological potential. Data in the west dominated by magnetic interference from existing pipe and in the east by magnetic disturbance from alluvial and river terrace deposits. Two north/south former field boundaries in the centre of the dataset.
322	7577	- Sand  Superficial: Alluvium - Sand, Silt and Clay  Bedrock: Bagshot Formation - Sand	Offline proposed works in an area of apparently unmodified ground with low vegetation	No anomalies of any archaeological potential. Data dominated by magnetic disturbance from alluvial and river terrace deposits.
386	8036	Superficial: n/a Bedrock: Windlesham Formation - Sand	Scheduled monuments Bowl barrow 1008887 and Bowl barrow 1011600 site adjacent south and north of the redline of proposed works. Other possible bowl barrows and earthworks are also adjacent	No anomalies of any archaeological potential. West of dataset dominated by magnetic interference from existing pipe.
434	5611	Superficial: Kempton Park Gravel Formation - Sand and Gravel Bedrock: Bagshot Formation - Sand	Mesolithic tranchet axe findspot and Roman bronze artefact findspot recorded by SCC adjacent to redline of proposed works	No anomalies of any archaeological potential. North of dataset dominated by magnetic interference from existing pipe.
435	16207	Superficial: Lynch Hill Gravel Member - Sand and Gravel Bedrock: Bagshot Formation - Sand	Post -med Hardwick Court Farm 10585 and associated buildings, including moat 602 recorded by SCC adjacent to redline of proposed works. Possible Roman road London to Winchester 4619 recorded by SCC adjacent redline of proposed works	No anomalies of any archaeological potential. Five dipolar linear anomalies locate buried service pipes. North-west/south-east linear anomaly in centre of dataset.
442	15257	Superficial: Kempton Park Gravel Formation - Sand and Gravel Bedrock: Bagshot Formation - Sand	Ring ditch recorded by SCC adjacent to redline of proposed works	No anomalies of any archaeological potential. North of dataset dominated by magnetic interference from existing pipe.
443	17976	Superficial: Alluvium – Silt Bedrock: Bagshot Formation - Sand	Ring ditch recorded by SCC adjacent to redline of proposed works	No anomalies of any archaeological potential. Geological variation throughout the western half of the dataset with magnetic interference from the existing pipe.
444	16354	Superficial: Alluvium – Silt Bedrock: Bagshot Formation - Sand	Bronze age tools 1959 and medieval coins 2855 findspot recorded by SCC adjacent to the redline of proposed works	No anomalies of any archaeological potential. Broad and amorphous anomalies caused by variations in the alluvial deposits. The large ferrous spike in the south-west caused by an infilled clay pit.
445	19450	Superficial: Alluvium – Silt Bedrock: Bagshot Formation - Sand	Bronze age tools 1959 and medieval coins 2855 findspot recorded by SCC adjacent to the redline of proposed works	No anomalies of any archaeological potential. Broad and amorphous anomalies caused by variations in the alluvial deposits.

### APPENDIX 2 MAGNETOMETER SURVEY

## Magnetic susceptibility and soil magnetism

Iron makes up about 6% of the earth's crust and is mostly present in soils and rocks as minerals such as maghaemite and haematite. These minerals have a weak, measurable magnetic property termed magnetic susceptibility. Human activities can redistribute these minerals and change (enhance) others into more magnetic forms so that by measuring the magnetic susceptibility of the topsoil, areas where human occupation or settlement has occurred can be identified by virtue of the attendant increase (enhancement) in magnetic susceptibility. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected.

The magnetic susceptibility of a soil can also be enhanced by the application of heat. This effect can lead to the detection of features such as hearths, kilns or areas of burning.

# Types of magnetic anomaly

In the majority of instances anomalies are termed 'positive'. This means that they have a positive magnetic value relative to the magnetic background on any given site. However some features can manifest themselves as 'negative' anomalies that, conversely, means that the response is negative relative to the mean magnetic background.

Where it is not possible to give a probable cause of an observed anomaly a '?' is appended.

It should be noted that anomalies interpreted as modern in origin might be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

The types of response mentioned above can be divided into five main categories that are used in the graphical interpretation of the magnetic data:

**Isolated dipolar anomalies (iron spikes)** These responses are typically caused by ferrous material either on the surface or in the topsoil. They cause a rapid variation in the magnetic response giving a characteristic 'spiky' trace. Although ferrous archaeological artefacts could produce this type of response, unless there is supporting evidence for an archaeological interpretation, little emphasis is normally given to such anomalies, as modern ferrous objects are common on rural sites, often being present as a consequence of manuring.

**Areas of magnetic disturbance** These responses can have several causes often being associated with burnt material, such as slag waste or brick rubble or other strongly magnetised/fired material. Ferrous structures such as pylons, mesh or barbed wire fencing and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

**Linear trend** This is usually a weak or broad linear anomaly of unknown cause or date. These anomalies are often caused by agricultural activity, either ploughing or land drains being a common cause.

Areas of magnetic enhancement/positive isolated anomalies Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response (sometimes only visible on an XY trace plot) on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an 'iron spike' anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an anthropogenic origin without intrusive investigation or other supporting information.

**Linear and curvilinear anomalies** Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by infilled archaeological ditches.

# APPENDIX 3 SURVEY LOCATION **INFORMATION**

An initial survey base station was established using a Trimble VRS differential Global Positioning System (dGPS). The magnetometer data was georeferenced using a Trimble RTK differential Global Positioning System (Trimble R8s model).

Temporary sight markers were laid out using a Trimble VRS differential Global Positioning System (Trimble R8s model) to guide the operator and ensure full coverage. The accuracy of this dGPS equipment is better than 0.01m.

The survey data were then super-imposed onto a base map provided by the client to produce the displayed block locations. However, it should be noted that Ordnance Survey positional accuracy for digital map data has an error of 0.5m for urban and floodplain areas, 1.0m for rural areas and 2.5m for mountain and moorland areas. This potential error must be considered if coordinates are measured off hard copies of the mapping rather than using the digital coordinates.

Headland Archaeology cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party.

# APPENDIX 4 GEOPHYSICAL SURVEY **ARCHIVE**

The geophysical archive comprises an archive disk containing the raw data in XYZ format, a raster image of each greyscale plot with associate world file, and a PDF of the report.

The project will be archived in-house in accordance with recent good practice guidelines (http://guides.archaeologydataservice. ac.uk/g2gp/Geophysics 3). The data will be stored in an indexed archive and migrated to new formats when necessary.

### APPENDIX 5 DATA PROCESSING

The gradiometer data has been presented in this report in processed greyscale and minimally processed XY trace plot format.

Data collected using RTK GNSS-based methods cannot be produced without minimal processing of the data. The minimally processed data has been interpolated to project the data onto a regular grid and de-striped to correct for slight variations in instrument calibration drift and any other artificial data.

A high pass filter has been applied to the greyscale plots to remove low frequency anomalies (relating to survey tracks and modern agricultural features) in order to maximise the clarity and interpretability of the archaeological anomalies.

The data has also been clipped to remove extreme values and to improve data contrast.

# 2019 by Headland Archaeology (UK) Ltd File Name: STLP18-Report-v2.pdf

# APPENDIX 6 OASIS DATA COLLECTION FORM: ENGLAND

# OASIS ID: headland5-350652

PROJECT DETAILS	
Project name	Southampton to London Pipeline Project
Short description of the project	Headland Archaeology (UK) Ltd has undertaken a geophysical (magnetometer) survey, covering approximately 126 hectares, along the proposed route of the Southampton to London Pipeline. This study informs the cultural heritage inputs for the Environmental Statement, prior to the installation of the replacement pipeline (the project). The survey has evaluated 102 Geophysical Survey Areas, identifying two distinct areas of clear archaeological activity comprising a ring-ditch and a sub-rectangular enclosure. These areas are assessed as having high archaeological potential. Anomalies at several other locations have been interpreted as having possible archaeological potential, including possible infilled pits and ditches. However, the narrow survey corridor, fragmentary nature of the anomalies, magnetic interference from the existing pipeline and/or an absence of supporting archaeological information (cropmarks or HER data) precludes a confident interpretation. These anomalies are ascribed a moderate archaeological potential. Anomalies due to geological and pedological variation are common throughout all survey areas and linear trend anomalies due to post-medieval agricultural activity (boundary removal, field drains or ploughing) are also recorded in virtually all parts of the corridor.
Project dates	Start: 16-10-2018 End: 08-11-2018
Previous/future work	Not known / Not known
Any associated project reference code	STLP18 - Contracting Unit No.
Type of project	Field evaluation
Site status	None
Current Land use	Cultivated Land 4 - Character Undetermined
Current Land use	Grassland Heathland 5 - Character undetermined
Monument type	None
Monument type	None
Significant Finds	None
Significant Finds	None
Methods & techniques	"Geophysical Survey"
Development type	Pipelines/cables (e.g. gas, electric, telephone, TV cable, water, sewage, drainage etc.)
Prompt	National Planning Policy Framework - NPPF
Position in the planning process	Not known / Not recorded
Solid geology (other)	Bracklesham and Barton Group; White Chalk Formation; Gault and Upper Greensand Formation
Drift geology	BRICKEARTH, MAINLY LOESS
Drift geology	CLAY WITH FLINTS
Drift geology	ALLUVIUM
Techniques	Magnetometry
PROJECT LOCATION	
Country	England
Site location	HAMPSHIRE SOUTHAMPTON SOUTHAMPTON Southampton to London Pipeline
Study area	126 Hectares
Site coordinates	SU 5128 1438 50.926042434296 -1.270284499981 50 55 33 N 001 16 13 W Line
Site coordinates	TQ 0550 7078 51.425697448096 -0.482386837034 51 25 32 N 000 28 56 W Line

PROJECT CREATORS	
Name of Organisation	Headland Archaeology
Project brief originator	Jacobs
Project design originator	Headland Archaeology
Project director/manager	Harrison, S
Project supervisor	Bishop, R
Type of sponsor/funding body	Developer
PROJECT ARCHIVES	
Physical Archive Exists?	None
Digital Archive recipient	In house
Digital Contents	"Survey"
Digital Media available	"Geophysics,",Text"
Paper Archive Exists?	None
T	
PROJECT BIBLIOGRAPHY 1	
Publication type	Grey literature (unpublished document/manuscript)
Title	Southampton to LondoN Pipeline Project; Geophysical Survey
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