ARP Geotechnical Limited	Windowless Sample Log	Borehole No. **WS4** Sheet 1 of 1

Project Name:	Upper Hoyland Road, Barnsley	Project No. HDE/01	Co-ords: 436169.63 - 401191.16	Date 24/04/2018
Location:	Upper Hoyland Road, Barnsley		Level: 162.17	Scale 1:20
Client:	Hoyland Developments Ltd		Rig Crew: RP Drilling Ltd	Logged: OG

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.10	ES					MADE GROUND: Dark brown sandy gravel with sub angular gravel of sandstone, mudstone and occasional brick and ceramics.
					0.20	161.97		MADE GROUND: Dark greyish brown slightly gravelly silty sand with rare gravel sized fragments of brick and coal.
					0.40	161.77		Brown slightly gravelly silty fine SAND (Completely weathered bedrock) [Pennine Middle Coal Measures].
					0.50	161.67		Weak pale yellow and orangish brown fine SANDSTONE recovered as slightly sandy gravel. [Pennine Middle Coal Measures].
		0.80	SPT	50 (25 for 85mm/50 for 150mm)	0.80	161.37	RECOVERY NO RECOVERY NO RECOVERY	No recovery - SPT test
					1.04	161.13		End of Borehole at 1.040m Refusal

Groundwater: Dry

Backfill: Backfilled with arisings.

Remarks:

ARP Geotechnical Limited

Windowless Sample Log

Borehole No. **WS5**

Sheet 1 of 1

Project Name: Upper Hoyland Road, Barnsley	Project No. HDE/01	Co-ords: 436154.84 - 401194.24	Date 24/04/2018
Location: Upper Hoyland Road, Barnsley		Level: 162.17	Scale 1:20
Client: Hoyland Developments Ltd		Rig Crew: RP Driller Ltd	Logged: OG

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00	ES		0.05	162.12		MADE GROUND: Brown slightly gravelly sand.
					0.20	161.97		Pale yellow and orange slightly sandy slightly silty angular GRAVEL of weak sandstone (Completely weathered bedrock) [Pennine Middle Coal Measures]
		0.40 - 0.50	D					Yellow slightly gravelly silty fine SAND. (Completely weathered bedrock) [Pennine Middle Coal Measures].
					0.60	161.57		Weak pale yellow and orange fine SANDSTONE recovered as sandy gravel. [Pennine Middle Coal Measures]
					0.80	161.37	RECOVERY NO RECOVERY NO	No recovery - SPT test
		1.00	SPT	50 (25 for 85mm/50 for 105mm)	0.99	161.18		End of Borehole at 0.990m Refusal

Groundwater: Dry

Backfill: Backfill with arisings.

Remarks:

ARP Geotechnical Limited

Windowless Sample Log

Borehole No. **WS6**

Sheet 1 of 1

Project Name: Upper Hoyland Road, Barnsley	Project No. HDE/01	Co-ords: 436173.25 - 401206.27	Date 24/04/2018
Location: Upper Hoyland Road, Barnsley		Level: 159.76	Scale 1:20
Client: Hoyland Developments Ltd		Rig Crew: RP Drilling Ltd	Logged: OG

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.05	159.71		Bitmac
		0.20 - 0.30	ES					MADE GROUND: Dark grey and black gravelly silty sand. Gravel sized fragments are angular and sub angular of brick, coal and mudstone.
					0.30	159.46		
		0.40	SPT	50 (25 for 75mm/50 for 80mm)	0.40	159.36		MADE GROUND: Greenish grey and orangish brown slightly gravelly silty sand with rare cobbles.
							NO RECOVERY	No recovery - SPT test
					0.56	159.20	NO RECOVERY	End of Borehole at 0.560m Refusal

Groundwater: Moist at 0.4m

Backfill: Backfilled with arisings.

Remarks:

ARP Geotechnical Limited

Windowless Sample Log

Borehole No. **WS7**

Sheet 1 of 1

Project Name: Upper Hoyland Road, Barnsley	Project No. HDE/01	Co-ords: 436142.56 - 401193.97	Date 24/04/2018
Location: Upper Hoyland Road, Barnsley		Level: 163.13	Scale 1:20
Client: Hoyland Developments Ltd		Rig Crew: RP Drilling Ltd	Logged: OG

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.20	ES					MADE GROUND: Black and red sandy angular gravel sized fragments of brick, coal, mudstone and sandstone.
					0.20	162.93		Dark brown SILT.
					0.30	162.83		Brown occasionally orange slightly gravelly silty fine to medium SAND. (Completely weathered siltstone) [Pennine Middle Coal Measures].
					0.80	162.33		Very weak pale yellow fine SANDSTONE. [Pennine Middle Coal Measures].
		0.90	SPT	50 (25 for 100mm/50 for 75mm)	0.90	162.23	RECOVERY NO RECOVERY NO	No recovery - SPT test
					1.08	162.05		End of Borehole at 1.080m Refusal

Groundwater: Dry

Backfill: Backfilled with arisings.

Remarks:

ARP Geotechnical Limited

Windowless Sample Log

Borehole No. **WS8**

Sheet 1 of 1

Project Name: Upper Hoyland Road, Barnsley	Project No. HDE/01	Co-ords: 436151.76 - 401200.96	Date 24/04/2018
Location: Upper Hoyland Road, Barnsley		Level: 161.93	Scale 1:20
Client: Hoyland Developments Ltd		Rig Crew: RP Drilling Ltd	Logged: OG

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.20	ES		0.10	161.83		MADE GROUND: Brown gravelly sandy topsoil. Gravel sized fragments are angular of brick, ceramics and glass
					0.20	161.73		MADE GROUND: Dark brown gravelly sand.
					0.45	161.48		MADE GROUND: Dark grey slightly gravelly slightly sandy silt.
					0.70	161.23		Brown and yellowish brown slightly gravelly silty fine SAND. (Completely weathered bedrock) [Pennine Middle Coal Measures].
		0.90	SPT	50 (25 for 45mm/50 for 80mm)	0.85	161.08		Pale yellow gravelly silty fine to medium SAND. (Completely weathered bedrock) [Pennine Middle Coal Measures].
					0.90	161.03	RECOVERY	Very weak pale yellow fine SANDSTONE [Pennine Middle Coal Measures].
					1.03	160.90	NO RECOVERY	No recovery - SPT test
								End of Borehole at 1.030m Refusal

Groundwater: Dry

Backfill: Backfilled with arisings.

Remarks:

ARP Geotechnical Limited

Windowless Sample Log

Borehole No. **WS9**

Sheet 1 of 1

Project Name: Upper Hoyland Road, Barnsley	Project No. HDE/01	Co-ords: 436168.00 - 401218.48	Date 24/04/2018
Location: Upper Hoyland Road, Barnsley		Level: 159.37	Scale 1:20
Client: Hoyland Developments Ltd		Rig Crew: RP Drilling Ltd	Logged: OG

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10	159.27		BItmac
								MADE GROUND: Dark grey sandy slightly silty gravel. Gravel sized fragments are angular of mudstone and sandstone.
		0.35 - 0.40	ES		0.35	159.02		
		0.40	SPT	50 (25 for 75mm/50 for 50mm)	0.40	158.97	NO RECOVERY	Very weak yellow and grey fine SANDSTONE. Pennine Middle Coal Measures].
					0.53	158.84	NO	No recovery - SPT test
								End of Borehole at 0.530m Refusal

1

2

3

4

Groundwater: Dry

Backfill: Backfilled with arisings.

Remarks:

APPENDIX D

LABORATORY TEST CERTIFICATES AND SCREENING VALUES

ARP GEOTECHNICAL LIMITED
SOIL CONTAMINANT SCREENING VALUES
RESIDENTIAL WITH HOME-GROWN PRODUCE

Determinand	S4UL (mg/kg)			C4SL (mg/kg)		
Arsenic	37			37		
Cadmium	11			22		
Chromium (trivalent)	910					
Chromium (hexavalent)	6			21		
Lead				200		
Inorganic Mercury	40					
Selenium	250					
Copper	2400					
Nickel	130					
Zinc	3700					
Acidity (pH)	*Should be Greater Than 5			*Should be Greater Than 5		
	1% SOM	**2.5% SOM**	**6% SOM**	**1% SOM**	**2.5% SOM**	**6% SOM**
Acenaphthene	210	510	1,100			
Acenaphthylene	170	420	920			
Anthracene	2,400	5,400	11,000			
Benzo(a)anthracene	7.2	11	13			
Benzo(a)pyrene	2.2	2.7	3			5
Benzo(b)fluoranthene	2.6	3.3	3.7			
Benzo(g,h,I)perylene	320	340	350			
Benzo(k)fluoranthene	77	93	100			
Chrysene	15	22	27			
Dibenzo(a,h)anthracene	0.24	0.28	0.3			
Fluoranthene	280	560	890			
Fluorene	170	400	860			
Indeno(1,2,3-cd)pyrene	27	36	41			
Naphthalene	2.3	5.6	13			
Phenanthrene	95	220	440			
Pyrene	620	1,200	2,000			
Phenols	120	200	380			
Total TPH	*Above 500, speciate and compare with values below:					
C5 to C6 Aliphatic	42	78	160			
C6 to C8 Aliphatic	100	230	530			
C8 to C10 Aliphatic	27	65	150			
C10 to C12 Aliphatic	130	48	760			
C12 to C16 Aliphatic	1100	2,400	4,300			
C16 to C35 Aliphatic	65,000	92,000	110,000			
C35 TO C44 Aliphatic	65,000	92,000	110,000			
C5 to C7 Aromatic (Benzene)	70	140	300			
C7 to C8 Aromatic (Toluene)	130	290	660			
C8 to C10 Aromatic	34	83	190			
C10 to C12 Aromatic	74	180	380			
C12 to C16 Aromatic	140	330	660			
C16 to C21 Aromatic	260	540	930			
C21 TO C35 Aromatic	1100	1,500	1,700			
C35 TO C44 Aromatic	1100	1,500	1,700			
Asbestos	*Should be None Detected			*Should be None Detected		

* In House Value/Approach S4UL = Suitable 4 Use Level, CIEH/LQM 2014 C4SL = Cat 4 Screening Level, DEFRA, 2014

Blank cell indicates no published value or in-house value. Some values presented are above saturation limits.

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ARP GEOTECHNICAL LIMITED
SOIL CONTAMINANT SCREENING VALUES
PUBLIC OPEN SPACE NEAR RESIDENTIAL

Determinand	S4UL (mg/kg)			C4SL (mg/kg)		
Arsenic	79			79		
Cadmium	120			220		
Chromium (trivalent)	1500					
Chromium (hexavalent)	7.7			21		
Lead				630		
Inorganic Mercury	120					
Selenium	1100					
Copper	12000					
Nickel	230					
Zinc	81000					
Acidity (pH)	*Should be Greater Than 5					
	1% SOM	**2.5% SOM**	**6% SOM**	**1% SOM**	**2.5% SOM**	**6% SOM**
Acenaphthene	15000	15000	15000			
Acenaphthylene	15000	15000	15000			
Anthracene	74000	74000	74000			
Benzo(a)anthracene	29	29	29			
Benzo(a)pyrene	5.7	5.7	5.7			10
Benzo(b)fluoranthene	7.1	7.2	7.2			
Benzo(g,h,I)perylene	640	640	640			
Benzo(k)fluoranthene	190	190	190			
Chrysene	57	57	57			
Dibenzo(a,h)anthracene	0.57	0.57	0.57			
Fluoranthene	3100	3100	3100			
Fluorene	9900	9900	9900			
Indeno(1,2,3-cd)pyrene	82	82	82			
Naphthalene	4900	4900	4900			
Phenanthrene	3100	3100	3100			
Pyrene	7400	7400	7400			
Phenols	440	690	1300			
Total TPH	*Above 3,800, speciate and compare with values below:					
C5 to C6 Aliphatic	570000	590000	600000			
C6 to C8 Aliphatic	600000	610000	620000			
C8 to C10 Aliphatic	13000	13000	13000			
C10 to C12 Aliphatic	13000	13000	13000			
C12 to C16 Aliphatic	13000	13000	13000			
C16 to C35 Aliphatic	250000	250000	250000			
C35 TO C44 Aliphatic	250000	250000	250000			
C5 to C7 Aromatic (Benzene)	56000	56000	56000			
C7 to C8 Aromatic (Toluene)	56000	56000	56000			
C8 to C10 Aromatic	5000	5000	5000			
C10 to C12 Aromatic	5000	5000	5000			
C12 to C16 Aromatic	5100	5100	5000			
C16 to C21 Aromatic	3800	3800	3800			
C21 TO C35 Aromatic	3800	3800	3800			
C35 TO C44 Aromatic	3800	3800	3800			
Asbestos	*Should be None Detected			*Should be None Detected		

* In House Value/Approach S4UL = Suitable 4 Use Level, CIEH/LQM 2014 C4SL = Cat 4 Screening Level, DEFRA, 2014

Blank cell indicates no published value or in-house value. Some values presented are above saturation limits.

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Certificate of Analysis

Certificate Number 18-09868-1

09-May-18

Client ARP Geotechnical
5/6 Northwest Business Park
Servia Hill
Leeds
LS6 2QH

Our Reference 18-09868-1

Client Reference HDE-01

Order No (not supplied)

Contract Title Upper Hoyland Road, Barnsley

Description 14 Soil samples.

Date Received 26-Apr-18

Date Started 26-Apr-18

Date Completed 09-May-18

Test Procedures Identified by prefix DETSn (details on request).

Notes **This report supersedes 18-09868, extra testing added.**

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Soil Samples

Our Ref 18-09868-1
Client Ref HDE-01
Contract Title Upper Hoyland Road, Barnsley

			Lab No	1330150	1330152	1330154	1330156	1330157	1330158
			Sample ID	WS1	WS1	WS2	WS3	WS3	WS4
			Depth	0.00-0.10	1.00	0.40-0.50	0.15-0.30	0.40-0.60	0.00-0.10
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	24/04/18	24/04/18	24/04/18	24/04/18	24/04/18	24/04/18
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	20			24		19
Cadmium	DETSC 2301#	0.1	mg/kg	0.1			0.7		0.4
Chromium III	DETSC 2301*	0.15	mg/kg	280			550		51
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0			< 1.0		< 1.0
Copper	DETSC 2301#	0.2	mg/kg	64			91		48
Lead	DETSC 2301#	0.3	mg/kg	24			150		51
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05			10		0.32
Nickel	DETSC 2301#	1	mg/kg	43			280		20
Selenium	DETSC 2301#	0.5	mg/kg	2.0			4.2		< 0.5
Zinc	DETSC 2301#	1	mg/kg	49			190		97
Inorganics									
pH	DETSC 2008#			10.4	7.0	6.2	10.7	5.9	8.9
Organic matter	DETSC 2002#	0.1	%	5.9			2.5		4.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	110	140	120	290	160	170
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.20			0.21		0.19
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01					
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01					
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01					
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5					
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2					
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	19					
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	290					
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	310					
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01					
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01					
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01					
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	1.5					
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	1.3					
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	22					
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	400					
Aromatic C5-C35	DETSC 3072*	10	mg/kg	430					
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	730					
EPH (C10-C40)	DETSC 3311#	10	mg/kg	1300			< 10		230
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1			< 0.1		< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	0.1			< 0.1		< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1			< 0.1		< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1			< 0.1		< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.6			< 0.1		0.2
Anthracene	DETSC 3301	0.1	mg/kg	0.2			< 0.1		< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 18-09868-1
Client Ref HDE-01
Contract Title Upper Hoyland Road, Barnsley

			Lab No	1330150	1330152	1330154	1330156	1330157	1330158
			Sample ID	WS1	WS1	WS2	WS3	WS3	WS4
			Depth	0.00-0.10	1.00	0.40-0.50	0.15-0.30	0.40-0.60	0.00-0.10
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	24/04/18	24/04/18	24/04/18	24/04/18	24/04/18	24/04/18
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Fluoranthene	DETSC 3301	0.1	mg/kg	1.6			< 0.1		0.4
Pyrene	DETSC 3301	0.1	mg/kg	1.6			< 0.1		0.4
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	1.3			< 0.1		0.3
Chrysene	DETSC 3301	0.1	mg/kg	1.9			< 0.1		0.3
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	2.6			< 0.1		0.3
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	1.3			< 0.1		0.2
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	1.7			< 0.1		0.2
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	2.4			< 0.1		0.2
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	0.4			< 0.1		< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	2.2			< 0.1		0.2
PAH Total	DETSC 3301	1.6	mg/kg	18			< 1.6		2.7
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3			< 0.3		0.4

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 18-09868-1
Client Ref HDE-01
Contract Title Upper Hoyland Road, Barnsley

			Lab No	1330160	1330161	1330162	1330163
			Sample ID	WS5	WS6	WS7	WS8
			Depth	0.40-0.50	0.20-0.30	0.00-0.20	0.10-0.20
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	24/04/18	24/04/18	24/04/18	24/04/18
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg		22	6.4	5.3
Cadmium	DETSC 2301#	0.1	mg/kg		0.1	< 0.1	0.2
Chromium III	DETSC 2301*	0.15	mg/kg		35	26	140
Chromium, Hexavalent	DETSC 2204*	1	mg/kg		< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg		37	28	13
Lead	DETSC 2301#	0.3	mg/kg		31	21	14
Mercury	DETSC 2325#	0.05	mg/kg		< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg		64	57	4.3
Selenium	DETSC 2301#	0.5	mg/kg		1.3	< 0.5	3.8
Zinc	DETSC 2301#	1	mg/kg		120	100	34
Inorganics							
pH	DETSC 2008#			6.1	9.5	4.8	11.3
Organic matter	DETSC 2002#	0.1	%		4.6	0.9	8.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	31	63	1500	520
Sulphate as SO4, Total	DETSC 2321#	0.01	%		0.06	1.1	0.80
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg				< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg				< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg				< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg				< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg				4.3
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg				48
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg				720
Aliphatic C5-C35	DETSC 3072*	10	mg/kg				770
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg				< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg				< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg				< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg				1.7
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg				2.8
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg				46
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg				700
Aromatic C5-C35	DETSC 3072*	10	mg/kg				750
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg				1500
EPH (C10-C40)	DETSC 3311#	10	mg/kg		160	23	4600
PAHs							
Naphthalene	DETSC 3301	0.1	mg/kg		< 0.1	< 0.1	< 1.0
Acenaphthylene	DETSC 3301	0.1	mg/kg		< 0.1	< 0.1	< 1.0
Acenaphthene	DETSC 3301	0.1	mg/kg		< 0.1	< 0.1	1.3
Fluorene	DETSC 3301	0.1	mg/kg		< 0.1	< 0.1	< 1.0
Phenanthrene	DETSC 3301	0.1	mg/kg		< 0.1	< 0.1	6.5
Anthracene	DETSC 3301	0.1	mg/kg		< 0.1	< 0.1	2.5

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 18-09868-1
Client Ref HDE-01
Contract Title Upper Hoyland Road, Barnsley

			Lab No	1330160	1330161	1330162	1330163
			Sample ID	WS5	WS6	WS7	WS8
			Depth	0.40-0.50	0.20-0.30	0.00-0.20	0.10-0.20
			Other ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sampling Date	24/04/18	24/04/18	24/04/18	24/04/18
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Fluoranthene	DETSC 3301	0.1	mg/kg		0.3	< 0.1	17
Pyrene	DETSC 3301	0.1	mg/kg		0.3	< 0.1	18
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg		0.1	< 0.1	6.3
Chrysene	DETSC 3301	0.1	mg/kg		0.2	< 0.1	9.9
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg		0.2	< 0.1	12
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg		0.2	< 0.1	5.0
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg		0.2	< 0.1	13
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg		0.2	< 0.1	11
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg		0.1	< 0.1	1.5
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg		0.2	< 0.1	12
PAH Total	DETSC 3301	1.6	mg/kg		2.0	< 1.6	120
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg		< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 18-09868-1
Client Ref HDE-01
Contract Title Upper Hoyland Road, Barnsley

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1330150	WS1 0.00-0.10	SOIL	NAD	none	A Christodoulou
1330151	WS1 0.10-0.20	SOIL	NAD	none	A Christodoulou
1330153	WS2 0.00-0.20	SOIL	NAD	none	A Christodoulou
1330155	WS3 0.00-0.10	SOIL	NAD	none	A Christodoulou
1330156	WS3 0.15-0.30	SOIL	NAD	none	A Christodoulou
1330158	WS4 0.00-0.10	SOIL	NAD	none	A Christodoulou
1330159	WS5	SOIL	NAD	none	A Christodoulou
1330161	WS6 0.20-0.30	SOIL	Chrysotile	Chrysotile Present in bitumen only	A Christodoulou
1330162	WS7 0.00-0.20	SOIL	NAD	none	A Christodoulou
1330163	WS8 0.10-0.20	SOIL	NAD	none	A Christodoulou

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 18-09868-1
Client Ref HDE-01
Contract Upper Hoyland Road, Barnsley

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1330150	WS1 0.00-0.10 SOIL	24/04/18	GJ 60ml, PG		
1330151	WS1 0.10-0.20 SOIL	24/04/18	GJ 60ml, PG		
1330152	WS1 1.00 SOIL	24/04/18	GJ 60ml, PG		
1330153	WS2 0.00-0.20 SOIL	24/04/18	GJ 60ml, PG		
1330154	WS2 0.40-0.50 SOIL	24/04/18	GJ 60ml, PG		
1330155	WS3 0.00-0.10 SOIL	24/04/18	GJ 60ml, PG		
1330156	WS3 0.15-0.30 SOIL	24/04/18	GJ 60ml, PG		
1330157	WS3 0.40-0.60 SOIL	24/04/18	GJ 60ml, PG		
1330158	WS4 0.00-0.10 SOIL	24/04/18	GJ 60ml, PG		
1330159	WS5 SOIL	24/04/18	GJ 60ml, PG		
1330160	WS5 0.40-0.50 SOIL	24/04/18	GJ 60ml, PG		
1330161	WS6 0.20-0.30 SOIL	24/04/18	GJ 60ml, PG		
1330162	WS7 0.00-0.20 SOIL	24/04/18	GJ 60ml, PG		
1330163	WS8 0.10-0.20 SOIL	24/04/18	GJ 60ml, PG		

Key: G-Glass P-Plastic J-Jar G-Bag

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

APPENDIX E

RISK CATEGORISATION TABLES

Severity of Consequence

Severe	Short term (acute) risks to human health, likely to result in significant harm. Major pollution of (watercourses or groundwater)
Medium	Long-term (Chronic) damage (significant harm) to human health. Pollution of sensitive water resources.
Mild	Pollution of non-sensitive water resources.
Minor	Non-permanent health effects easily prevented by use of personal protective equipment during site works.

Probability of Risk Event Occurring

High Likelihood	There is a pollutant linkage and an event that either appears very likely in the short term, almost inevitable in the long term, or there is evidence of harm or pollution at the receptor.
Likely	There is a pollution linkage and all the elements are present and in the right place, so that a risk event is possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which a risk event could occur. However, it is not certain that such an event would take place even over a longer period, and even less likely in the short term.
unlikely	There is a pollution linkage, but circumstances are such that it is improbable that an event would occur even in the very long term.

Comparison of Probability Against Severity of Consequence

		Severity of Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High Likelihood**	**Very High Risk**	**High Risk**	**Moderate Risk**	**Moderate/ Low Risk**
	Likely	**High Risk**	**Moderate Risk**	**Moderate/ Low Risk**	**Low Risk**
	Low Likelihood	**Moderate Risk**	**Moderate/ Low Risk**	**Low Risk**	**Very Low Risk**
	Unlikely	**Moderate/ Low Risk**	**Low Risk**	**Very Low Risk**	**Very Low Risk**

Risk Categories - Definitions

Very High Risk	High probability that severe harm could arise to a receptor, or there is evidence that severe harm is already occurring. Urgent investigation is required and urgent remediation is likely to be required.
High Risk	Harm is likely to arise to a receptor. Urgent investigation is required and remediation may be necessary in the short term and likely over the longer term.
Moderate Risk	Possible that harm could arise to a receptor, but low likelihood that such harm would be severe. Harm is likely to be mild. Investigation normally required to clarify risk. Some remedial works may be required in the long-term.
Moderate/ Low Risk	Possible that harm could arise to a receptor, but where a combination of likelihood and consequence results in a risk that is above low, but is not of sufficient concern to be classified as mild. Limited further investigation may be required to clarify the risk. If necessary, remediation works are likely to be limited in extent.
Low Risk	Possible that harm could arise to a receptor. Such harm, at worst, would normally be mild.
Very Low Risk	Low possibility that harm could arise to a receptor. Such harm is unlikely to be any worse than mild.

APPENDIX F

PROPOSED LAYOUT PLAN



APPENDIX G

CONTAMINATION REMEDIATION STATEMENT



CONTAMINATION REMEDIATION STATEMENT

ON

LAND AT UPPER HOYLAND ROAD, HOYLAND, NEAR BARNSLEY

ON BEHALF OF

HOYLAND DEVELOPMENTS LTD

ARP GEOTECHNICAL LTD

CHARTERED CONSULTING ENGINEERS

Northwest House 5/6 Northwest Business Park Servia Hill Leeds LS6 2QH

0113 245 8498 0113 244 3864 leeds@arpgeotechnical.co.uk www.arpgeotechnical.co.uk

CLIENT:	HOYLAND DEVELOPMENTS LTD
JOB NUMBER:	HDE/01
PROJECT:	LAND AT UPPER HOYLAND ROAD, HOYLAND, NEAR BARNSLEY
REPORT TYPE:	CONTAMINATION REMEDIATION STATEMENT
REPORT REFERENCE:	HDE/01rem1

	Name	**Signature**
Prepared By:	O Gwilym BSc MSc FGS	
Reviewed By:	J Race BSc CGeol FGS EurGeol	
Authorised By:	A Radcliffe BEng CEng MIStructE	

ISSUE	**DATE**	**STATUS**
1	11TH JUNE 2018	V1 FINAL

1.0 Introduction

1.1 This document has been prepared to provide information for the Client and other interested parties, such as the Regulatory Authorities, outlining how contamination encountered on the site will be managed to ensure that the site is environmentally suitable for the intended residential use. The document should be agreed, prior to implementation, with the relevant Regulatory Authorities, usually the local Planning Authority and NHBC or other building control provider.

2.0 The Site

2.1 The ARP Geotechnical Ltd Stage 2 Geo-environmental Report, dated June 2018 under reference HDE/01r1, makes an assessment of contamination, along with other aspects.

2.2 The conceptual site model is for a residential development, including private gardens.

2.3 The site currently comprises various farm buildings and a scaffold storage yard with an access road to the northeast leading onto Upper Hoyland Road. The farm buildings include two sandstone and timber stables on the northeast, with suspected asbestos roofs, and an open sided hay barn on the south and several metal shipping containers. The site is predominantly under hardstanding, comprising hardcore or bituminous surfacing, with small patches of topsoil cover.

2.4 The site slopes steeply from the southwest to the northeast, from approximately 165m AOD down to approximately 159m AOD. The access road then slopes down to the northeast towards Upper Hoyland Road at approximately 156m AOD. The site is bounded by fields to the south and southeast with residential properties along the northern and northeastern boundary.

2.5 At the time of the site investigation, fragments of suspected asbestos cement roofing were identified at the surface in the north of the site. In addition, a stockpile of rubble was present in the southwest corner of the site, a pile of manure present towards the south, and hay bales were stored towards the eastern boundary.

2.6 An assessment of geological maps by ARP indicates that the site is underlain by undifferentiated strata (mudstone, siltstone and minor sandstone) on the southeast and sandstone on the northwest, of the Pennine Middle Coal Measures Formation. No drift cover is indicated and the general strata dip is around 4 to 5 degrees to the northeast. No made ground is shown to be present on the site. No faults are indicated with any potential to adversely affect the site.

2.7 The strata beneath the site are classed as a 'Secondary A' aquifer. There are no sensitive groundwater abstractions within 500m of the site.

2.8 The nearest surface water feature down gradient of the site is a drain, approximately 500m to the northeast. There are no active surface water abstractions within 500m of the site.

2.9 The JPG report states that the site is within a radon affected area, as between 1% and 3% of the properties are above the action level for radon gas, but that no radon protection is required for the site. In these situations of apparent conflict, it may be prudent to provide basic radon protection to avoid conveyancing difficulties.

2.10 Ordnance Survey archive maps show that the current farm buildings on the north have been present since the 1890s.

2.11 The ground investigation revealed that the southern end of the site was under hardcore to between 0.2m and 0.4m depth, with localised topsoil to 0.1m depth. Bitmac cover to 0.1m was encountered surrounding the buildings to the north. This was underlain by made ground to a maximum depth of 0.45m. The made ground was underlain by granular residual soils recovered as very dense silty sand and gravel to 1m. Weak to very weak sandstone was encountered in window sample boreholes WS4, WS5, WS7, WS8 and WS9 and proven to a maximum depth of 1m. Window sample boreholes WS1, WS2, WS3 and WS6 are inferred to have terminated on intact bedrock, as shallow as around 0.5m locally.

2.12 The contamination testing revealed the made ground to contain an elevated concentration of benzo(a)pyrene (13mg/kg) and microscopic chrysotile (white) asbestos (within bitumen, no free fibres was detected within the made ground in WS6. Such contamination can be sporadic and unless further sampling and testing demonstrates otherwise, there should be viewed to be a potential for its presence within the made ground elsewhere on the site.

2.13 Any migration of contamination on site to utilities is unlikely to be significant. However, the local water company will probably require details of the contaminants present on the site, to allow them to make their own assessment.

3.0 Remediation Strategy

3.1 An asbestos survey should be carried out prior to any demolition or work on the existing buildings on the site, and any identified asbestos should be removed and disposed to a licenced facility. The work should be carried out by appropriately qualified Contractors. The asbestos survey should also include an inspection of suspected asbestos cement roof tiles identified on the surface of the site. If confirmed to be asbestos, the material should be removed and disposed to a licensed facility.

3.2 A stockpile of rubble is present towards the south of the site. This material is likely to require removal from site. The receiving tip may require Waste Acceptance Criteria testing and asbestos quantification. The disposal/transfer documents should be retained for inclusion in the Validation Report.

3.3 As sampling on the site to date has been restricted by buildings and other obstructions, once these have been cleared, it is recommended that further sampling and testing is undertaken. The results will be assessed and it may be necessary to revise this Remediation Statement.

3.4 Where any garden or landscape areas overlie the existing made ground a minimum 0.6m thickness of uncontaminated soils (topsoil and subsoil) should be provided, underlain by a hard break layer or robust geogrid/geotextile. In areas of hardstanding or building footprints, the cover blanket is not required. The required profile is outlined below.

Thickness (m)	Description
Minimum 0.1	Topsoil
Minimum 0.5	Subsoil
Minimum 0.1	Hard Break (crushed stone, brick concrete) OR: Robust Geogrid/Geotextile

3.5 Alternatively, the affected made ground can be removed off site and taken to a suitably licensed landfill. The waste receiver may require Waste Acceptance Criteria Testing (WAC). Following removal of the affected made ground from the site (if this option is selected), validation inspection and testing will be required, to demonstrate that the unsuitable soil has been successfully removed.

3.6 Any imported soils used within the cover blanket will need to be verified as suitable by inspection and testing, in accordance with guidance supplied in the document produced by the Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG): "Guidance on the Verification Requirements for Cover Systems".

4.0 Validation Inspection

4.1 To satisfy the Regulatory Authorities, verification that the above measures have been successfully implemented needs to be independently confirmed, in accordance with the guidance supplied in the document produced by the Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG): "Guidance on the Verification Requirements for Cover Systems". The measures described below will be required to ensure compliance with the document.

4.2 Following placement of topsoil and subsoil to garden and areas, it will be necessary to excavate inspection pits to confirm the required 0.6m cover of uncontaminated soil has been placed. The trial pits will be photographed, to include a reference scale, and the photographs included within any report to enable the location on site to be identified.

4.3 If the contaminated made ground is removed from site, then the surface will need to be inspected by an Engineer, and sampled and tested on a maximum 25m spacing to confirm its uncontaminated status. The area will be photographed and all the details included within a Validation Letter Report. The disposal/transfer documents should be retained for inclusion in the Validation Report.

5.0 Materials Testing

5.1 For any subsoil and topsoil used on the cover blanket, the source will need to be confirmed, and the material tested for the attached suite of contaminants, to comply with the maximum screening values listed. The frequency of testing is given on the table below. Any samples already tested in the site investigations carried out to date are included as part of the overall total required.

Material Type	Number of Samples
Topsoil or subsoil from greenfield site	Minimum 3No. or 1 per 250m^3 (whichever is greater)
Topsoil or subsoil from brownfield site	Minimum 6No. or 1 per 100m^3 (whichever is greater)

5.2 The material should be placed in quarantined stockpiles and once a stockpile has been approved by the Engineer, no further material should be added to the stockpile, and any further import should be stockpiled separately. Any cross contamination of materials should be avoided, and further testing carried out where any cross contamination is suspected to have occurred.

5.3 If space is insufficient on the site to store quarantined stockpiles, topsoil/subsoil can be placed directly in to the appropriate gardens/landscape areas, but samples of each material would need to be tested by means of validation trial pits.

5.4 The results of all the laboratory analysis, excavation logs, plans, photographs, and import documents will form part of the Remediation Validation Report.

5.5 In order to enable the scheme to progress and sales of properties to continue throughout construction of the development, Validation Reports may be prepared for specific plots, if required, showing how the contamination has been dealt with. This will enable enquiries during the sales of the properties to be satisfied. On completion of the development, the discharge of any associated planning condition may be achieved by submission of all the interim validation letters, or issuing the information as a single combined Validation Report.

6.0 Unexpected Contamination

6.1 Any unexpected contamination uncovered during the works shall be inspected, sampled and analysed in a laboratory for the suite of determinands appended to this Remediation Statement, and compared to the maximum concentration levels listed on the enclosure. Works on the affected materials shall cease until the appraisal is complete and, if necessary, a revised Remediation Statement is to be prepared and approved by the Planning Authority before work is recommenced.

ARP GEOTECHNICAL LIMITED
SOIL CONTAMINANT SCREENING VALUES
RESIDENTIAL WITH HOME-GROWN PRODUCE

Determinand	S4UL (mg/kg)			C4SL (mg/kg)		
Arsenic	37			37		
Cadmium	11			22		
Chromium (trivalent)	910					
Chromium (hexavalent)	6			21		
Lead				200		
Inorganic Mercury	40					
Selenium	250					
Copper	2400					
Nickel	130					
Zinc	3700					
Acidity (pH)	*Should be Greater Than 5			*Should be Greater Than 5		
	1% SOM	**2.5% SOM**	**6% SOM**	**1% SOM**	**2.5% SOM**	**6% SOM**
Acenaphthene	210	510	1,100			
Acenaphthylene	170	420	920			
Anthracene	2,400	5,400	11,000			
Benzo(a)anthracene	7.2	11	13			
Benzo(a)pyrene	2.2	2.7	3			5
Benzo(b)fluoranthene	2.6	3.3	3.7			
Benzo(g,h,I)perylene	320	340	350			
Benzo(k)fluoranthene	77	93	100			
Chrysene	15	22	27			
Dibenzo(a,h)anthracene	0.24	0.28	0.3			
Fluoranthene	280	560	890			
Fluorene	170	400	860			
Indeno(1,2,3-cd)pyrene	27	36	41			
Naphthalene	2.3	5.6	13			
Phenanthrene	95	220	440			
Pyrene	620	1,200	2,000			
Phenols	120	200	380			
Total TPH	*Above 500, speciate and compare with values below:					
C5 to C6 Aliphatic	42	78	160			
C6 to C8 Aliphatic	100	230	530			
C8 to C10 Aliphatic	27	65	150			
C10 to C12 Aliphatic	130	48	760			
C12 to C16 Aliphatic	1100	2,400	4,300			
C16 to C35 Aliphatic	65,000	92,000	110,000			
C35 TO C44 Aliphatic	65,000	92,000	110,000			
C5 to C7 Aromatic (Benzene)	70	140	300			
C7 to C8 Aromatic (Toluene)	130	290	660			
C8 to C10 Aromatic	34	83	190			
C10 to C12 Aromatic	74	180	380			
C12 to C16 Aromatic	140	330	660			
C16 to C21 Aromatic	260	540	930			
C21 TO C35 Aromatic	1100	1,500	1,700			
C35 TO C44 Aromatic	1100	1,500	1,700			
Asbestos	*Should be None Detected			*Should be None Detected		

* In House Value/Approach S4UL = Suitable 4 Use Level, CIEH/LQM 2014 C4SL = Cat 4 Screening Level, DEFRA, 2014

Blank cell indicates no published value or in-house value. Some values presented are above saturation limits.

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ARP GEOTECHNICAL LIMITED
SOIL CONTAMINANT SCREENING VALUES
PUBLIC OPEN SPACE NEAR RESIDENTIAL

Determinand	S4UL (mg/kg)			C4SL (mg/kg)		
Arsenic	79			79		
Cadmium	120			220		
Chromium (trivalent)	1500					
Chromium (hexavalent)	7.7			21		
Lead				630		
Inorganic Mercury	120					
Selenium	1100					
Copper	12000					
Nickel	230					
Zinc	81000					
Acidity (pH)	*Should be Greater Than 5					
	1% SOM	**2.5% SOM**	**6% SOM**	**1% SOM**	**2.5% SOM**	**6% SOM**
Acenaphthene	15000	15000	15000			
Acenaphthylene	15000	15000	15000			
Anthracene	74000	74000	74000			
Benzo(a)anthracene	29	29	29			
Benzo(a)pyrene	5.7	5.7	5.7			10
Benzo(b)fluoranthene	7.1	7.2	7.2			
Benzo(g,h,I)perylene	640	640	640			
Benzo(k)fluoranthene	190	190	190			
Chrysene	57	57	57			
Dibenzo(a,h)anthracene	0.57	0.57	0.57			
Fluoranthene	3100	3100	3100			
Fluorene	9900	9900	9900			
Indeno(1,2,3-cd)pyrene	82	82	82			
Naphthalene	4900	4900	4900			
Phenanthrene	3100	3100	3100			
Pyrene	7400	7400	7400			
Phenols	440	690	1300			
Total TPH	*Above 3,800, speciate and compare with values below:					
C5 to C6 Aliphatic	570000	590000	600000			
C6 to C8 Aliphatic	600000	610000	620000			
C8 to C10 Aliphatic	13000	13000	13000			
C10 to C12 Aliphatic	13000	13000	13000			
C12 to C16 Aliphatic	13000	13000	13000			
C16 to C35 Aliphatic	250000	250000	250000			
C35 TO C44 Aliphatic	250000	250000	250000			
C5 to C7 Aromatic (Benzene)	56000	56000	56000			
C7 to C8 Aromatic (Toluene)	56000	56000	56000			
C8 to C10 Aromatic	5000	5000	5000			
C10 to C12 Aromatic	5000	5000	5000			
C12 to C16 Aromatic	5100	5100	5000			
C16 to C21 Aromatic	3800	3800	3800			
C21 TO C35 Aromatic	3800	3800	3800			
C35 TO C44 Aromatic	3800	3800	3800			
Asbestos	*Should be None Detected			*Should be None Detected		

* In House Value/Approach S4UL = Suitable 4 Use Level, CIEH/LQM 2014 C4SL = Cat 4 Screening Level, DEFRA, 2014

Blank cell indicates no published value or in-house value. Some values presented are above saturation limits.

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