

Site Investigation Report for land off
Gatewen Road, Wrexham

Appendix 12

Geotechnical Test Results



TEST REPORT

Client Coopers (Chester) Ltd
Address Park House
Sandpiper Court
Chester Business Park
Chester
CH4 9QU
Contract 7791 –
Gatewen Road, Wrexham

Purchase Order 9066-ST
Job Number MRN 4089/26
Date of Issue 17 June 2021
Page 1 of 4

Approved Signatories

S J Hutchings, O P Davies

Notes

- 1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.
- 2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.
- 3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation
- 4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted. This does not, however, guarantee the balance of the materials from which the tested samples have been taken to be of equal quality.



Andrew House, Hadfield Street, Dukinfield, Cheshire SK16 4QX Tel: 0161 475 0870
Email: enquiries@murrayrix.com Website: www.murrayrix.com

Also at: London: 020 8523 1999

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MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
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TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

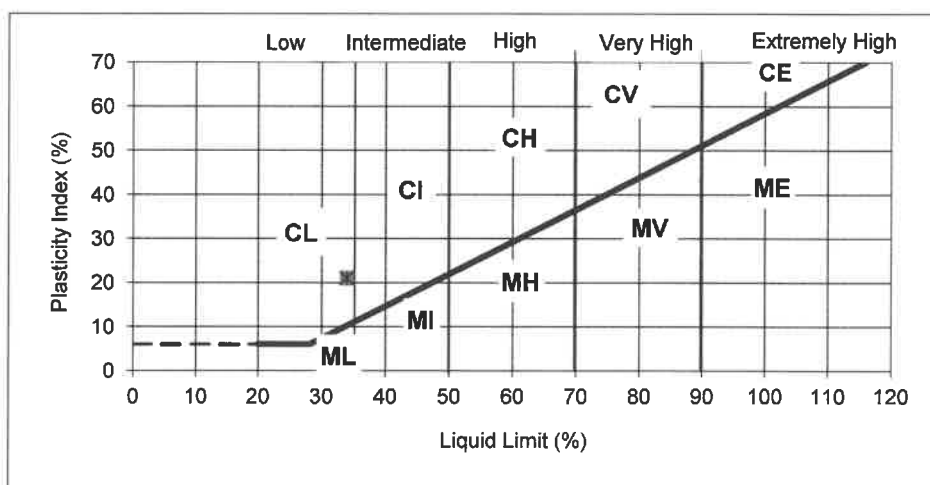
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Coopers (Chester) Ltd
SITE	7791 - Gatewen Road, Wrexham
JOB NUMBER	MRN 4089/26

SAMPLE LABEL	TP107 1.00	DATE SAMPLED	Not advised
SAMPLE No.	99962	DATE RECEIVED	09-Jun-21
DATE TESTED	14-Jun-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
15	34	13	21	94



REMARKS

Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons)
Page 2 of 4 (Laboratory Manager)

DATE 17-Jun-21

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TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3

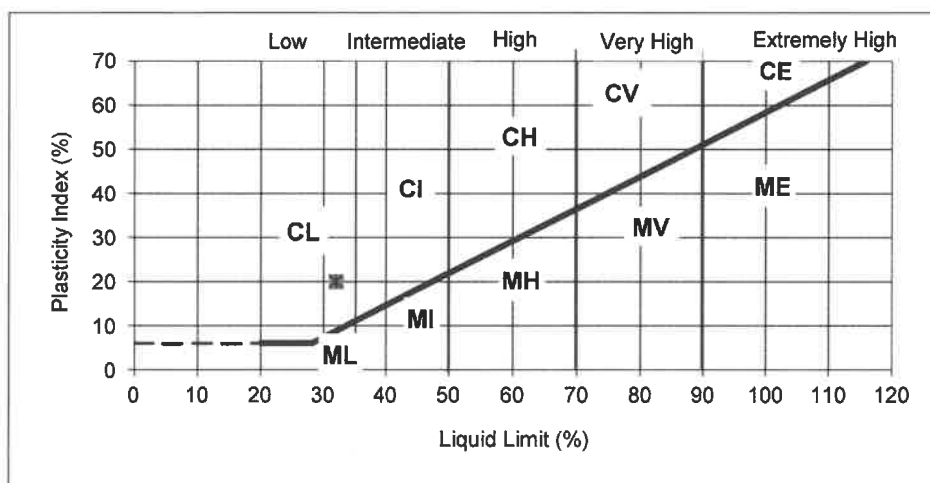
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Coopers (Chester) Ltd
SITE	7791 - Gatewen Road, Wrexham
JOB NUMBER	MRN 4089/26

SAMPLE LABEL	TP111 1.40	DATE SAMPLED	Not advised
SAMPLE No.	99963	DATE RECEIVED	09-Jun-21
DATE TESTED	14-Jun-21	SAMPLED BY	Client

MATERIAL	Firm to stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
18	32	12	20	90



REMARKS

Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons)
Page 3 of 4 (Laboratory Manager)

DATE 17-Jun-21

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TEST CERTIFICATE

LIQUID AND PLASTIC LIMIT

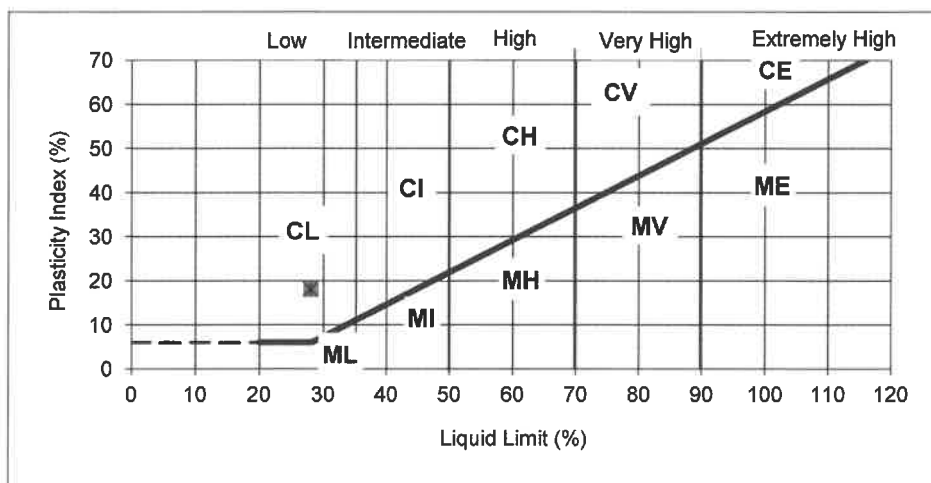
BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Coopers (Chester) Ltd
SITE	7791 - Gatewen Road, Wrexham
JOB NUMBER	MRN 4089/26

SAMPLE LABEL	TP114 1.50	DATE SAMPLED	Not advised
SAMPLE No.	99964	DATE RECEIVED	09-Jun-21
DATE TESTED	14-Jun-21	SAMPLED BY	Client

MATERIAL	Firm brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
18	28	10	18	77



REMARKS

Sample tested in natural condition

SIGNED

NAME O.P. Davies BA (Hons)
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Appendix 13

Tier 1 Risk Assessment Screening Values



Controlled Water Receptor Threshold Values



**Legislation Framework which Drives the Contamination Assessment of
Land in England and Wales**

Soil Tier 1 Threshold Values (mg/kg) Residential and POS

		Elements and compounds	S4UL	Small Terrace	Med/Large Terrace	Semi-detached	Detached	Residential (without Veg)	POS (Resi)	POS (Park)
				White, yellow & green values are NOAEL with orange values C4SL				C4SL (S4UL) (1% SOM)		
Silty clay	Metals/Semi-metals	Arsenic	37	37 (32.4 CLEA)				40 (40)	79 (79)	168 (170)
		Beryllium	1.7 (inh.)	51 (to be used with caution and superseded)				(1.7)	(2.2)	(63)
		Boron	290	291				(11,000)	(21,000)	(46,000)
		Cadmium	11	22 (11 CLEA)				150 (85)	220 (120)	880 (532)
		Chromium (III)	910	3000				(910)	(1,500)	(33,000)
		Chromium (VI)	6	21 (4.3)				21 (6)	51 (7.7)	250 (220)
		Copper	2,400	2,330 (Phytotoxic pH <6 = 100, pH6-7 = 135, pH >7 = 200)				(7,100)	(12,000)	(44,000)
		Lead	-	200				310	630	1,300
		Mercury (methyl)	11	7.4 (SGV withdrawn)				(15)	(40)	(68)
		Mercury (inorganic)	40	169 (SGV withdrawn)				(56)	(120)	(240)
		Mercury (Hg)	1.2	1.2 (SGV withdrawn)				(1.2)	(16)	(30vap (25.8))
		Nickel	130	(130 S4UL) (Phytotoxic pH <6 = 60, pH6-7 = 75, pH >7 = 110)				(180)	(230)	(800)
		Selenium	250	351				(430)	(1,100)	(1,800)
		Vanadium	410	79				(1,200)	(2,000)	(5,000)
		Zinc	3,700	3,750 (Phytotoxic pH <6 = 200, pH6-7 = 200, pH >7 = 300)				(40,000)	(81,000)	(170,000)
	PAH	Acenaphthene	210	205				(3,000 – 57 s)	(15,000)	(29,000)
		Acenaphthylene	170	168				(2,900 – 86.1 s)	(15,000)	(29,000)
		Anthracene	2,400	2,260				(31,000 – 1.17 v)	(74,000)	(150,000)
		Benzo(a)anthracene	7.2	3.1				(11)	(29)	(49)
		Benzo(a)pyrene	2.2	5 (6% SOM) (0.83 CLEA)				5.3 (3.2)	10 (5.7)	21 (11)
		Benzo(b)fluoranthene	2.6	5.56				(3.9)	(7.1)	(13)
		Benzo(ghi)perylene	320	10.7				(360)	(640)	(1,400)
		Benzo(k)fluoranthene	7.7	8.5				(110)	(190)	(370)
		Chrysene	15	6.0				(30)	(57)	(93)
		Dibenz(ah)anthracene	0.24	0.76				(0.31)	(0.57)	(1.1)
		Fluoranthene	280	257				(1,500)	(3,100)	(6,300)
		Fluorene	170	163				(2,800 – 30.9 s)	(9,900)	(20,000)
		Indeno(123-cd)pyrene	27	3.18				(45)	(82)	(150)
		Phenanthrene	95	91.8				(1,300 – 36 s)	(3,100)	(6,200)
		Pyrene	620	563				(3,700)	(7,400)	(15,000)
Sandy loam	BTEx	Naphthalene	2.3	1.54	1.71	1.7	1.97	(2.3)	(4,900)	(1,200 – 76.4 s)
		Benzene	0.087	0.2 (1%) (0.079 CLEA)	0.082	0.082	0.085	0.89 (0.38)	140 (72)	190 (90)
		Toluene	130	119	122	122	125	(869)	(56,000)	(87,000 v)
		Ethylbenzene	47	62.5	68	67.9	71.6	(83)	(24,000)	(17,000 v)
		Xylene (based on p)	56	41.7	45.5	45.3	50.9	(70)	(41,000)	(17,000 v)
	Aliphatic	Phenol	280	184	207	206	224	(750)	(760)	(760)
		5-6	42	30				(42)	(570,000 – 304 s)	(95,000 – 304 s)
		6-8	100	73				(100)	(600,000)	(150,000 – 144 s)
		8-10	27	19				(27)	(13,000)	(14,000 – 78 s)
		10-12	130 (48)	93 (48) ^{vap}				(130 – 48 v)	(13,000)	(21,000 – 48 s)
		12-16	1,100 (24)	740 (24) ^{sol}				(1,100 – 24 v)	(13,000)	(25,000 – 24 s)
		16-35	65,000 (8.48)	45,000 (8.48) ^{sol}				(65,000)	(250,000)	(450,000)
		35-44	65,000 (8.48)	45,000 (8.48) ^{sol}				(65,000)	(250,000)	(450,000)
	Aromatic	8-10	34	27				(47)	(5,000)	(7,200 – 613 v)
		10-12	74	69				(250)	(5,000)	(9,200 – 364 s)
		12-16	140	140				(1,800)	(5,100)	(10,000)
		16-21	260 (	250				(1,900)	(3,800)	(7,600)
		21-35	1,100	890				(1,900)	(3,800)	(7,600)

Notes:

The soil organic matter has been assumed to be 1% as this is the most conservative value for organic compounds. Inorganic compounds unaffected by this parameter.

Silty clay strata appears to prove more conservative threshold values for metals, semi-metals and several PAH compounds. Sandy loam strata appears to prove more conservative threshold values for TPH compounds, phenol and naphthalene.

The assessment of hydrocarbon fractions should be completed additively to determine the total risk of the whole range of compounds present as well as by single TPH fractional units, however this should be undertaken on a sample by sample basis where significant hydrocarbon concentrations have been encountered to derive a compound TPH concentration.

Although benzene has a C4SL value, this has been calculated for small terraced housing and not other housing stock, therefore other housing stock should either adopt the more conservative CLEA thresholds or that of a small terraced property. All thresholds not coloured orange (C4SL) for different housing stock have utilised LQM/CIEH Generic Assessment Criteria for Human Health Risk assessment, 2nd edition, 2009. CLEA values in brackets where C4SL values are available.

Vap denotes where the threshold is exceeded beyond the vapour saturation limit. Sol denotes where the threshold is exceeded beyond the solubility saturation limit.

It should be noted that these threshold values only relate to human health risk assessment and an assessment for potential groundwater risk should be undertaken as a separate risk assessment.

CONTROLLED WATER RECEPTOR THRESHOLD VALUES (µg/l)

Compound/element		Groundwater Quality Threshold Values ¹ Maximum value	Environmental Quality Standards (EQS)			
			Long term (mean) for fresh waters ¹³	Short term (95 th percentile) for fresh waters ¹³	Annual average (AA-EQS) for inland surface waters ¹⁴	Maximum allowable concentration (MAC-EQS) ¹⁴ for inland surface waters ¹⁵
Inorganic elements and compounds	Ammonium	500	-	-	-	-
	Arsenic	10	50	-	-	-
	Boron	1000	-	-	-	-
	Cadmium ⁹	5.0	-	-	≤0.08 (Class 1)	≤0.45 (Class 1)
		-	-	-	0.08 (Class 2)	0.45 (Class 2)
		-	-	-	0.09 (Class 3)	0.6 (Class 3)
		-	-	-	0.15 (Class 4)	0.9 (Class 4)
		-	-	-	0.25 (Class 5)	1.5 (Class 5)
	Chromium (III)	50	4.7	32	-	-
	Chromium (VI)	-	3.4	-	-	-
	Chloride	250,000	-	-	-	-
	Chlorine	-	2	5	-	-
	Copper	2000	1 ⁵	-	-	-
	Cyanide	50	1	5	-	-
	Iron	-	1,000	-	-	-
	Lead	10	-	-	1.2 ⁵	14
	Manganese	-	123 ⁵	-	-	-

Compound/element		Groundwater Quality Threshold Values ¹ Maximum value	Environmental Quality Standards (EQS)			
			Long term (mean) for fresh waters ¹³	Short term (95 th percentile) for fresh waters ¹³	Annual average (AA-EQS) for inland surface waters ¹⁴	Maximum allowable concentration (MAC-EQS) ¹⁴ for inland surface waters ¹⁵
	Mercury	1.0	-	-	-	0.07
	Nickel	20	-	-	4 ⁵	34
	Nitrate ²	50,000	-	-	-	-
	Nitrite ²	500	-	-	-	-
	Selenium	-	-	-	-	-
	Sulphate	250,000	-	-	-	-
	Zinc	-	10.9	-	-	-
PAH compounds	Anthracene	-	-	-	0.1	0.1
	Benzo(a)pyrene	0.01	-	-	1.7x10 ⁻⁴	0.27
	Fluoranthene	-	-	-	0.0063	0.12
	Naphthalene	-	-	-	2	130
	PAH compounds (benzo(b)fluoranthene + benzo(k)fluoranthene + benzo(ghi)perylene + indeno(1,2,3-cd)pyrene)	0.1	-	-	1.7x10 ⁻⁴⁽¹²⁾	0.27 ⁽¹²⁾
	Benzo(b)fluoranthene	-	-	-	-	0.017
	Benzo(k)fluoranthene	-	-	-	-	0.017
	Benzo(ghi)perylene	-	-	-	-	8.2x10 ⁻³
	Indeno(1,2,3-cd)pyrene	-	-	-	-	n/a
BTEX compounds	Benzene	1.0	-	-	10	50
	Ethene	-	-	-	-	-
	Toluene	-	74	380	-	-
	Xylene	-	-	-	-	-
VOCs	Carbon tetrachloride	-	-	-	12	n/a

Compound/element		Groundwater Quality Threshold Values ¹ Maximum value	Environmental Quality Standards (EQS)			
			Long term (mean) for fresh waters ¹³	Short term (95 th percentile) for fresh waters ¹³	Annual average (AA-EQS) for inland surface waters ¹⁴	Maximum allowable concentration (MAC-EQS) ¹⁴ for inland surface waters ¹⁵
S > O C	C10-C13 Chloroalkanes (e.g. chloroethane, bromomethane, chloromethane)	-	-	-	0.4	1.4
	1,2-dichloroethane	-	-	-	10	n/a
	Trihalomethanes total (trichloromethane (chloroform) + bromoform + dibromochloromethane + bromodichloromethane)	100	-	-	-	-
	Vinyl chloride	0.5	-	-	-	-
	1,2 dichloroethane	3.0	-	-	-	-
	Trichlorobenzenes	-	-	-	0.4	n/a
	Tetrachloroethane + trichloroethylene	10	-	-	-	-
	Trichloroethylene	-	-	-	10	n/a
	Tetrachloroethane	-	140	1848		
	Tetrachloroethylene	-	-	-	10	n/a
	Trichloromethane (alternative name chloroform)	-	-	-	2.5	n/a
	Tetrachloromethane	3	-	-	-	-
	Benzyl butyl phthalate	-	7.5	51	-	-

Compound/element		Groundwater Quality Threshold Values ¹ Maximum value	Environmental Quality Standards (EQS)			
			Long term (mean) for fresh waters ¹³	Short term (95 th percentile) for fresh waters ¹³	Annual average (AA-EQS) for inland surface waters ¹⁴	Maximum allowable concentration (MAC-EQS) ¹⁴ for inland surface waters ¹⁵
	Bis(2-ethylhexyl)phthalate (alternative name: di(2-ethylhexyl)-phthalate	-	-	-	1.3	n/a
	Brominated diphenylethers ⁸	-	-	-	na	0.14
	2,4-dichlorophenol	-	4.2	140	-	-
	Hexa-chlorobenzene	-	-	-	-	0.05
	Hexa-chlorobutadiene	-	-	-	-	0.6
	Pentachlorophenol	-	-	-	0.4	1
Other organic compounds	Phenol	-	7.7	46	-	-
Pesticides in groundwater	Pesticides & related products ³	-	-	-	-	-
	Aldrin	0.03	-	-	-	-
	Dieldrin	0.03	-	-	-	-
	Heptachlor	0.03	-	-	-	-
	Heptachlo epoxide	0.03	-	-	-	-
	Other pesticides	0.1	-	-	-	-
	Pesticides total ⁴	0.5	-	-	-	-
Pesticides in surface waters	Atrazine	-	-	-	0.6	2.0
	Chlorfenvinphos	-	-	-	0.1	0.3
	Chlorpyrifos (Chlorpyrifosethyl)	-	-	-	0.03	0.1

Compound/element	Groundwater Quality Threshold Values ¹ Maximum value	Environmental Quality Standards (EQS)			
		Long term (mean) for fresh waters ¹³	Short term (95 th percentile) for fresh waters ¹³	Annual average (AA-EQS) for inland surface waters ¹⁴	Maximum allowable concentration (MAC-EQS) ¹⁴ for inland surface waters ¹⁵
Cyclodiene pesticides: aldrin, dieldrin, endrin ¹⁰	-	-	-	0.01	n/a
Cypermethrin	-	0.0001	0.0004	8x10 ⁻⁵	6x10 ⁻⁴
Diazinon	-	0.01	0.02	-	-
DDT total ¹¹	-	-	-	0.025	n/a
2,4 dichlorophenoxyacetic acid (2,4 D)	-	0.3	1.3	-	-
Dichlorvos	-	-	-	6x10 ⁻⁴	7x10 ⁻⁴
Dimethoate	-	0.48	4.0	-	-
Endosulfan	-	-	-	0.005	0.01
Heptachlor and heptachlorepoxyde	-	-	-	2x10 ⁻⁷	3x10 ⁻⁴
Mecoprop	-	18	187	-	-
Permethrin	-	0.001	0.01	-	-
Simazine	-	-	-	1	4
Terbutryn	-	-	-	0.065	0.34

NOTES

- Threshold values based on The Water Supply (Water Quality) Regulations 2016
- The water must satisfy the formula "[nitrate]/50 + [nitrite]/3 ≤ 1", where the square brackets signify the concentrations in mg/l for nitrate (NO₃) and nitrite (NO₂).
- "pesticides and related products" means any of the following, and includes their relevant metabolites, degradation and reaction products— (a) organic insecticide; (b) organic herbicide; (c) organic fungicide; (d) organic nematocide; (e) organic acaricide; (f) organic algicide; (g) organic rodenticide; (h) organic slimicide; (i) any product related to any of (a) to (h) (including any growth regulator).

4. The sum of the concentrations of the individual compounds detected and quantified in the monitoring process.
5. “Bioavailable” meaning the fraction of the dissolved concentration of the metal likely to result in toxic effects as determined using the UKTAG Metal Bioavailability Assessment Tool (also referred to as a PNEC Estimator) for the relevant metal.
6. The Environment Agency (EA) must define the type of river systems according to their alkalinity and altitude and the acid neutralising capacity for the river due to the dissolved carbon content. The definition due to alkalinity and altitude is in Table 1, as follows:

Site altitude	Table 1 - Alkalinity (as mg/l CaCO ₃)				
	<10	≥10 to <50	≥50 to <100	≥100 to <200	>200
Under 80m	Type 1	Type 2	Type 3	Type 5	Type 7
Over 80m			Type 4	Type 6	

The quality of the rivers or river sections will then be categorised by the EA, according to the dissolved oxygen content, biological oxygen demand and ammonia levels relative to the type denoted in Table 1. The ammonia standards would be classified as follows in Table 2.

Table 2 -Ammonia standards for rivers (rivers categorised by type in accordance with river type in Table 1 above.				
Total ammonia as nitrogen (mg/l) (90 percentile)				
Type	High	Good	Moderate	Poor
1, 2, 4 and 6	0.2	0.3	0.75	1.1
3, 5 and 7	0.3	0.6	1.1	2.5

7. Ambient background concentrations have been presented in the Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 with regards to the ambient background dissolved zinc concentrations.
8. The EQS refers to the sum of the concentrations of congener numbers 28, 47, 99, 100, 153 and 154.
9. The EQS for cadmium and its compounds is dependent on the water hardness as specified: Class 1: <40mg CaCO₃/l, Class 2: 40 to <50mg CaCO₃/l, Class 3: 50 to <100mg CaCO₃/l, Class 4: 100 to <200mg CaCO₃/l and Class 5: ≥200mg CaCO₃/l.
10. EQS relates to the sum of aldrin, dieldrin and endrin.
11. DDT total comprises the sum of the isomers 1,1,1-trichloro-2,2 bis (p-chlorophenyl) ethane, 1,1,1-trichloro-2 (o-chlorophenyl)-2-(p-chlorophenyl) ethane, 1,1 -dichloro-2,2 bis (p-chlorophenyl) ethylene and 1,1-dichloro-2,2 bis (p-chlorophenyl) ethane.



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12. For the group of PAH compounds benzo(b)fluoranthene + benzo(k)fluoranthene + benzo(ghi)perylene + indeno(1,2,3-cd)pyrene, the EQS for benzo(a)pyrene must be applied, this being considered to be a marker for these PAH compounds.
13. Fresh water includes rivers and lakes.
14. Where the MAC-EQS is noted as n/a, the AA-EQS values are considered protective against short-term pollution peaks in continuous discharges as they are significantly lower than the values derived on the basis of acute toxicity.
15. Inland surface waters includes rivers and lakes and related artificial or heavily modified water bodies.

Legislation Framework Which Drives the Contamination Assessment of Land in England and Wales

Foreward

In the UK, historical contaminated land is regulated by the planning and development control system and the contaminated land regime set out in Part IIA of the Environmental Protection Act 1990. The Water Act 2003 amended the Part IIA legislation in respect of controlled waters.

When considering an application for development, the potential for the land to be contaminated is a material consideration, and the planning authority should satisfy itself that any contamination is properly assessed and adequately remediated, based on a suitable for use approach. This is to ensure that the land is made suitable for its proposed new use.

For development sites which introduce new potential sources of pollution on site and these are either suspected of, or known to be causing environmental damage, a remediation notice may be placed on the operator under the Environmental Damages (Prevention and Remediation) Regulations, as applicable to England or Wales. The legislation aims to deter pollution events from occurring. When pollution events do occur, apportionment of the 'blame' for the pollution event follows a specific protocol to assess which party, assuming multiple parties have utilised the site, is responsible. The operator deemed responsible for the pollution will then be expected to clean up the pollution ideally voluntarily, or a remediation notice is served enforcing the polluter to undertake the works, assuming an appeal made is unsuccessful.

As such, developers should give due consideration to the Environmental Damages (Prevention and Remediation) Regulations during management of their site activities, for which they are responsible. Fuel tanks are often on site for the refuelling of plant, providing a potential point source of pollution at one or a number of locations about the site, as they are relocated. In addition, soils (generic term for all non-construction materials) used to raise site levels, form engineering platforms (i.e. piling and roads) and for use in garden areas are imported to site.

The legislation is complex and often is interchangeable and may depend upon the time the contamination was released into the environment and the receptors which have been/may be detrimentally affected by the contamination. A summary of the most relevant legislation and guidance is noted below.

Developers should not take on liability for all previous pollution the vendor and previous owners have left on the site. If some liability has to be taken to progress the sale of the site, a full appreciation of the liabilities of the contamination must be understood. It is common during the course of the ground investigation that all sources of historical contamination are not revealed and hence it is prudent to keep liability for these unknown events with the previous operators.

Interaction of the Planning Regime with the Environmental Protection Act 1990 – Part IIA

Current guidance/legislation applicable to England has been published by the Ministry of Housing, Communities and Local Government, the ‘*National Planning Policy Framework*’, February 2019, and by the Department of Environment, Food and Rural Affairs (DEFRA), the ‘*Environmental Protection Act 1990: Part 2A. Contaminated Land Statutory Guidance*’, April 2012. The Welsh Government has published ‘*Planning Policy Wales, Edition 11*’, February 2021 and ‘*Contaminated Land Statutory Guidance for Wales 2012*’, 2013. Both planning policies continue to promote the ‘suitable for use approach’, with the emphasis related to ensuring that the future use or development being undertaken would not be designated as contaminated land under Part IIA of the Environmental Protection Act 1990. Where remediation is required this should be undertaken in such a manner that it would not have an adverse impact on the environment.

In order for a planning decision to be made, a site investigation carried out by a specialist must be provided, which assesses the potential hazards to future site users and the local environment arising from past activities or natural factors. Where remediation is required to mitigate these impacts, the remediation scheme must show that the land would not be designated as contaminated land under Part IIA of the Environmental Protection Act 1990. If contamination cannot be overcome satisfactorily, the authority may refuse planning permission.

The responsibility for ensuring the development is undertaken in such a manner lies with the developer/land owner.

The definition of contaminated land is presented in the Environmental Protection Act 1990 as follows: ‘*any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that—*

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or
(b) significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused;’

Before the local authority can conclude that land appears to be contaminated land, the authority must assess the risk that a significant pollutant linkage exists.

This means that each of the following has to be present:

- (a) a **contaminant**;
- (b) a **receptor**; and
- (c) a **pathway**.

Guidance defines the risk as the combination of:

‘(a) the likelihood that harm, or pollution of water, will occur as a result of contaminants in, on or under the land; and

(b) the scale and seriousness of such harm or pollution if it did occur’.

Legislation Framework Which Drives the Contamination Assessment of Land in England and Wales

The Statutory Guidance under Part IIA of the Environmental Protection Act 1990 both in England and Wales promotes the application of a four category test to assess whether land is contaminated or not. Category 1 sites are sites which have a high likelihood of contamination and would be considered as a significant problem. Category 4 sites are sites which are obviously not contaminated on the basis of either desktop information or a basic intrusive investigation. Categories 2 and 3 lie between the obviously uncontaminated and contaminated sites, with the division between these categories being considered as contaminated land under Part IIA. Risk assessment will be required to assess whether a site lies within Category 2 or 3. The risk assessment will initially be determined by health risks, then by socio-economic factors should health risks be uncertain, with a default decision of contaminated should the tests not be adequately met (refer to Figure 1).

For the purpose of determining whether a site may be classified as contaminated land, soil guideline values (SGV)/generic assessment criteria (GAC) should not be utilised as determining factors. These may be applied to confirm Category 4 sites, these showing categorically that it is considered there is no risk of harm to human health on such sites. However, SGV and GAC threshold values are conservative, indicating that there is no risk at all to human health or very minimal risk. As such, these should not be considered to act as threshold values between Category 3 and Category 4 sites. The Statutory Guidance has made provision for generic screening values to be derived, termed as Category 4 Screening Levels (C4SL), which still provide a cautious assessment but relate the risk associated with normal ambient levels of contaminants, termed the low observed adverse effect level (LOAEL), making for a more pragmatic approach to risk assessment. C4SLs may be applied to site investigations undertaken in support of a planning application. To date C4SLs have been derived arsenic, cadmium, chromium (VI), lead, benzo(a)pyrene and benzene and represent. It has been proposed to derive twenty additional C4SLs including the inorganic and organic contaminants. As C4SLs will result in levels of contaminant concentrations in soils that will still be considered to be acceptable in terms of level of risk in relation to the Part IIA of the Environmental Protection Act 1990.

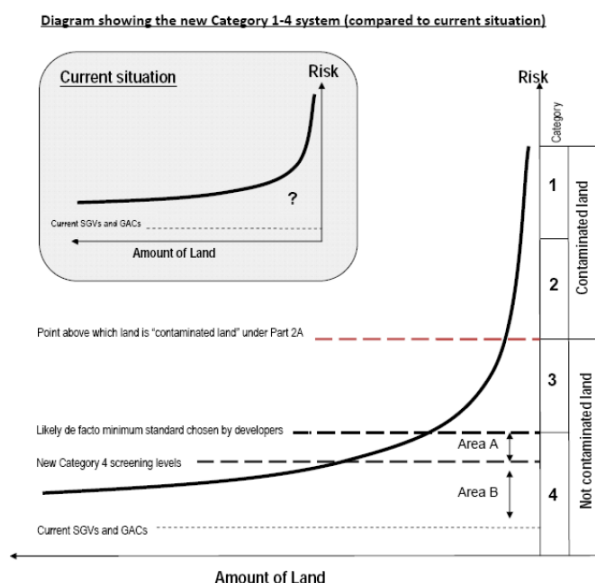


Figure 1: The New Four Category System

Environmental Protection Act 1990 – Part III

It should be noted that under the Environmental Protection Act 1990, the statutory nuisance regime applies to *‘premises which may be prejudicial to health or a nuisance’*. In this case the term *‘health’* does not apply to contaminated land issues. However, nuisance may apply where the effects of deposits of substances on land cause offence to human senses (such as stench).

Environmental Damage (Prevention and Remediation) Regulations

The following legislation made in England and Wales respectively, is designed to control new contamination events.

- *The Environmental Damage (Prevention and Remediation) (England) Regulations 2015* (revoking the 2009 Regulations).
- *The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009*, as amended by *The Environmental Damage (Prevention and Remediation) (Amendment) (Wales) Regulations 2015*.

The meaning of ‘environmental damage’ has been detailed by DEFRA’s guidance document applicable to these Regulations as shown below:

‘An important point to note is that the Regulations are a ‘backstop’, only applying when something has gone wrong and there is an imminent threat or actual ‘environmental damage’ within the scope of the Regulations. The emphasis should be on proactively putting in place appropriate pollution prevention measures to reduce risks to the environment. Those running businesses and other operations can reduce the likelihood of ever being caught by the Regulations’ requirements by minimising risks to the natural resources covered by the Regulations. This means that businesses should be aware, in particular, where they:

- *Operate within or near areas of high biodiversity value, especially Sites of Special Scientific Interest (SSSIs);*
- *Operate near water bodies; and/or*
- *Carry out activities with potential risks to human health*
- *This is so they can take the necessary steps to manage the relevant risks effectively, including implementing and monitoring appropriate pollution prevention measures.*

The Regulations do not cover all types of damage to the environment. They only cover ‘environmental damage’ which is one or more of damage to:

- *protected species and natural habitats or to a site of special scientific interest (these are referred to collectively in the guidance as **damage to species and habitats**);*
- *surface water or groundwater (these are referred to collectively in the guidance as **damage to water**); and,*
- *land. (Damage to land is contamination of land by substances, preparations, organisms or micro-organisms that results in a significant risk of adverse effects on human health.*

Legislation Framework Which Drives the Contamination Assessment of Land in England and Wales

Both the England and Wales Regulations state they do not apply in relation to:

- damage that occurred before the Regulations originally came into force in 2009, but for marine waters July 2015
- damage that occurs or occurred after these dates, or is or was threatened after these dates, but is caused by an incident, event or emission that took place before these dates; or
- damage caused by an incident, event or emission that takes or took place after these dates, if derived from an activity that took place and finished before these dates.
- environmental damage caused by pollution of a diffuse character if the causal link between the damage and specific activities cannot be defined.

The Regulations state where an operator of an activity has caused environmental damage, or where there is sufficient evidence to indicate that environmental damage will eventually occur, the operator must immediately

- take all practicable steps to prevent further damage; and
- notify all relevant details to the relevant enforcing authority.