British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site	Borehole Number
CTRL GI DATA - Entire NDATA19 data set	SA3876

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion		25.61	UR/LCE	Issue 1
	Location	**Dates**	**Engineer**	**Sheet**
	529909 E 183690 N	02/11/1995	RLE	2/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00	K56						orange brown; darkgrey and light brown silty fine sand; locally as dustings on fissures; and occasional coarse sand and fine gravel sized shell fragments. Locally bioturbated. ;(LONDON CLAY - GRADE IIb);Below 10.00m; becoming stiff to very stiff.;Below 12.10m; becoming grey brown.		
10.00	V57								
10.10-10.55	SPT N=35	5.50		4,6/7,9,9,10					
10.05	D54								
10.10-10.55	D55								
11.10-11.55	U58			55 blows					
11.55	D59								
11.60-12.05	SPT N=29	5.50		3,4/6,7,7,9					
11.60-12.05	D60								
12.10-12.55	U61			60 blows					
12.55	D62					(6.10)			
12.60-13.05	SPT N=30	5.50		3,4/6,7,8,9					
12.60-13.05	D63								
13.10-13.55	U64			50 blows					
13.55	D65								
13.60-14.05	SPT N=28	5.50		3,4/5,7,7,9					
13.60-14.05	D66								
14.10-14.55	U67			55 blows					
14.55	D68								
14.60-15.05	SPT N=34	5.50		4,7/7,8,9,10					
14.60-15.05	D69								
15.00	V71								
15.00	K70								
15.10-15.55	U72			75 blows					
15.55	D73								
15.60-16.05	SPT N=39	5.50		4,7/9,9,10,11	10.01	15.60	Very stiff; grey very closely to closely fissured CLAY. Fissures generally subhorizontal (0-20 degrees); smooth; locally slightly polished; planar to curviplanar. Locally with dustings of grey;brownand light brown silty fine sand on fissures. ;(LONDON CLAY - GRADE IIb);At 15.60m; grey brown.;At 20.10m; very thin bed/lens of grey moderately weathered claystone; moderately weak.;Below 20.60m; fissures very closely spaced; randomly orientated.		
15.60-16.05	D74								
16.10-16.55	U75			75 blows					
16.55	D76								
16.60-17.05	D77			OVER WEEKE(2) at 16.60m.					V2
16.60-17.05	SPT N=41	5.50		4,7/8,10,11,12					
17.10-17.55	U79			70 blows					
17.55	D80								
17.60-18.05	SPT N=38	5.50		4,7/9,9,10,10					
17.60-18.05	D81								
18.10-18.55	U82			80 blows					
18.55	D83								
18.60-19.05	SPT N=42	5.50		5,8/9,10,11,12					
18.60-19.05	D84								
19.10-19.55	U85			80 blows					
19.55	D86								
19.60-20.05	SPT N=38	5.50		6,7/8,8,10,12					
19.60-20.05	D87								

Remarks

Scale (approx)	Logged By
1:50	SRJ

Figure No.

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site
CTRL GI DATA - Entire NDATA19 data set

Borehole Number
SA3876

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion		25.61	UR/LCE	Issue 1
	Location	**Dates**	**Engineer**	**Sheet**
	529909 E 183690 N	02/11/1995	RLE	3/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
20.00	K92					(5.40)			
20.00	V93								
20.10-20.55	UNR			150 blows					
20.10-20.60	B88								
20.60-21.05	U89			100 blows					
21.05	D90				4.61	21.00	Very stiff; dark grey very closely fissured CLAY. Fissures generally subhorizontal (0-10 degrees); smooth and planar to undulose locally with a dusting of light brown silty fine sand. Occasional thinlaminae and partings of light grey silt and silty fine sand.;(LONDON CLAY - GRADE I);Below 23.00m; locally slightly sandy (fine).		
21.10-21.55	SPT N=47	5.50		6,8/10,11,13,13					
21.10-21.55	D91								
21.60-22.05	U94			70 blows					
22.05	D95								
22.10-22.55	SPT N=44	5.50		6,7/9,10,12,13					
22.10-22.55	D96								
23.10-23.55	U97			95 blows					
23.55	D98								
23.60-24.05	SPT 50/295	5.50		7,10/11,13,14,12					
23.60-24.05	D99								
24.60-25.05	U100			120 blows					
25.00	K103								
25.00	V104								
25.10-25.54	SPT 50/285	5.50		8,10/10,12,14,14					
25.05	D101								
25.10-25.55	D102								
26.10-26.55	U105			110 blows					
26.55	D106								
26.60-27.04	SPT 50/265	5.50		8,10/12,13,13,12					
26.60-27.05	D107								
27.60-28.05	U108			95 blows					
28.05	D109								
28.10-28.55	SPT 50/295	5.50		7,10/10,12,14,14					
28.10-28.55	D110								
29.10-29.55	U111			90 blows					
29.55	D112								
29.60-30.04	SPT 50/285	5.50		8,10/11,13,14,12					
29.60-30.00	D113								

Remarks

Scale (approx)	Logged By
1:50	SRJ

Figure No.

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site	Borehole Number
CTRL GI DATA - Entire NDATA19 data set	SA3876

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion		25.61	UR/LCE	Issue 1
	Location	**Dates**	**Engineer**	**Sheet**
	529909 E 183690 N	02/11/1995	RLE	4/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
30.00	K114					(12.80)			
30.00	V115								
30.60-31.05	U116			95 blows					
31.05	D117								
31.10-31.53	SPT 50/280	5.50		7,10/12,13,14,11					
31.10-31.55	D118								
32.10-32.55	U119			150 blows					
32.55	D120								
32.60-33.04	SPT 50/285	5.50		8,10/12,12,15,11					
32.60-33.00	D121								
33.60-34.05	U122			135 blows					
33.80	K125				-8.19	33.80			
33.80	V126						Very stiff; brown and grey mottled; fissured CLAY. Fissures randomly orientated; smooth locally polished; planar to undulose.;(WOOLWICH AND READING - UPPER MOTTLED CLAY)		
34.05	D123								
34.10-34.36	SPT 50/105	5.50		12,13/25,25					
34.10-34.40	D124								
						(1.31)			
34.60-35.05	U127			150 blows					
35.10	D128				-9.50	35.11	Complete at 35.11m		

Remarks	Scale (approx)	Logged By
	1:50	SRJ
	Figure No.	

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site	Borehole Number
CTRL GI DATA - Entire NDATA19 data set	SR3758

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion		24.84	UR/LCE	Issue 1
Location		**Dates**	**Engineer**	**Sheet**
529858 E 183430 N		18/10/1995	RLE	1/7

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							Loose; black slightly clayey silty fine to coarse ASH SAND with some angular and subangular; predominantly fine and medium with a little coarse clinker gravel.;(MADE GROUND);Below 0.30m; becoming black and grey slightly sandy (medium and coarse) GRAVEL.;Below 1.20m; with occasional gravel sized pockets of soft black; grey and brown slightly sandy clay with a little fine gravel.;Below 1.70m; silty SANDand angular and subangular; fine to coarse predominantly CLINKER with a little FLINT GRAVEL;Below 2.70m; becoming clayey ASH SAND with much clinker gravel.		
0.20	V2								
0.20	K1								
0.50	K3								
0.50	V4								
0.50-0.70	B5								
1.20	B8								
1.00	K6								
1.00	V7								
1.20-1.65	SPT N=6			1,2/2,1,2,1					
1.20-1.70	S8								
2.20-2.65	D14								
1.70	B12					(3.30)			
1.70-2.15	SPT N=7	1.60		1,1/2,1,2,2					
1.70-2.15	D9								
2.00	K10								
2.00	V11								
2.20-2.65	SPT N=8	2.10		2,3/2,3,1,2					
2.20-2.70	B13								
3.20-3.65	D20								
2.70-3.15	D16								
2.70-3.15	SPT N=6	2.60		1,2/1,2,2,1					
2.70-3.20	B1800.00	0	0						
3.00	K17								
3.00	V18								
3.20-3.65	SPT N=6	3.00		1,1/1,1,2,2	21.54	3.30			
3.20-3.70	B19						Soft to firm; brown and grey locally mottled black slightly sandy (fine to coarse) CLAY with a little angular to subrounded; fine and medium flint and brick gravel.;(MADE GROUND)		
3.40	K21								
3.40	V22								
3.70-4.15	U23			40 blows					
						(1.40)			
4.20	D24								
4.30-4.75	U25			26 blows					
4.70	K27				20.14	4.70	Firm; brown and orange brown locally slightly sandy (fine and medium) very silty CLAY with occasional subangular; fine and medium gravel sized firm to stiff; grey brown lithorelicts and occasional subrounded; medium gravel sized light grey weak calcareous siltstone nodules. Occasional fine roots (<1mm); locally gleyed grey along root traces.;(LONDON CLAY - GRADE IV);From 4.90m to 5.00m; with some nodules (<15mm) of grey siltstone with selenite.		
4.70	V28					(0.70)			
4.80	D26								
4.90-5.35	U29			31 blows					
5.50-5.95	U33			50 blows					
5.40	V32				19.44	5.40			
5.40	D30								
5.40	K31					(0.60)			
6.10	D35								
6.00	TCR SCR RQD FI				18.84	6.00	From 0.00m to 6.00m the hole was advanced by Cable Percussion Techniques. For details see previous figure.		
	100.00	0	0				Stiff; brown indistinctly laminated very closely fissured CLAY. Fissures randomly orientated; surfaces smooth; occasionally pitted; gleyed blue grey with rare root traces.;(LONDON CLAY - GRADE IIIb);At 7.05m; pocket (60mm x 8mm) of orange brown silty sand and medium gravel sized weathered siltstone fragments and occasional selenite crystals.;At 7.88m; probable lens (>100mm x 15mm) of orange brown silty sand sized weathered siltstone fragments.;Below 7.90m; fissure surfaces stained orange brown.;At 9.20m; lenseloid nodule (70mm x 5mm) of brown siltstone; moderately weak.;Below 9.50m; with occasional selenite (<8mm).;At 9.70m and 11.10m; laminae/lenseloid nodule (>100mm x 4mm) of brown friable siltstone.;At 11.27m; lamination (8mm thick) of brown and grey siltstone; weak.		
7.00	D36								
6.87									
	100.00	0	0						
7.60									
8.00	D37								
	100.00	0	0						
9.00	D38								
9.10									
	96.00	0	0						
10.00	D39								

Remarks
1) Prior to boring an inspection pit was excavated by hand to 1.20m depth. ;2) Groundwater was notencountered.;3) Arrangements for Aquifer Protection were implemented.;4) Insitu tests for gas composition were carried out during boreholeconstruction.;5) The borehole was commenced using Cable Percussion techniques. For details see previous sheet.;6) TCR; SCR and RQD values have been based on corrected depths to ensure values of not more than 100% were achieved as per Union Railways Instruction number L/C08.;7) The following Geobore S corebits were used: From 6.00m to 53.65m; Diamond Surface Set. From 53.65m to 56.75m; Diamond Clam bit.;8) On completion of boring; a 19mmstandpipe piezometer was installed with the tip at 55.90m depth and the following detail: From 56.75m to 54.60m; sand filter response zone; from54.60m to 53.00m; bentonite seal; from 53.00m to 0.70m; cement/bentonite grout; and from 0.70m to ground level concrete and a double flush stopcock cover.

Scale (approx)	Logged By
1:50	SRJ/N
Figure No.	

Site	Borehole Number
CTRL GI DATA - Entire NDATA19 data set	SR3758

Machine:	Diameter	Ground Level (mOD)	Client	Job Number
Flush :		24.84	UR/LCE	Issue 1
Bit Size :				
Method :	Location	Dates	Engineer	Sheet
	529858 E 183430 N	18/10/1995	RLE	2/7

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(5.55)			
10.60										
	100.00		0	0		13.29	11.55	Very stiff; grey brown indistinctly laminated very closely fissured CLAY. Fissures randomly orientated; planar and curviplanar; smooth and clean.;(LONDON CLAY - GRADE IIb);Below 12.30m; fissures veryclosely occasionally closely spaced; generally 70 to 90 degrees and 10 to 30 degrees.;At 12.41m; lamination (4mm thick) of grey silt.;At 12.50m; pocket (30mm x 15mm) of light brown friable silt.;At13.50m; nodule (20mm x 5mm) of grey pyritised siltstone.;At 13.60m; lamination (8mm thick) of light brown friable silt.;At 14.30m; lamination (3mm thick) of grey silt and some nodules (<20mm x 3mm) of grey siltstone.;At 14.72m; nodule (40mm x 3mm) of grey pyritised siltstone; moderately weak.;At 16.15m; lens (60mm x 5mm) of light brown silt.;From 16.60m to 16.84m; possible nodule (240mm thick) of greycalcareousclaystone; moderately strong.;At 17.84m; fossilised pyritised wood fragment (60mm x 15mm).		
12.10										
	100.00		0	0						
12.95										
	100.00		0	0						
13.60										
	100.00		0	0						
							(6.55)			
15.10										
	100.00		0	0						
16.60										
	100.00		0	0						
18.10						6.74	18.10	Very stiff; grey brown indistinctly laminated closely fissured (possibly very silty) CLAY with occasional lenses (90mm x 2mm) of light brown fine sand. Fissures generally inclined 60 to 80 degrees and 10 to 30 degrees; generally planar; smooth and clean.;(LONDON CLAY - GRADE IIb);At 18.78m; lamination (12mm thick) of grey silt.;From 19.75m to 20.15m; with occasional white shell fragments (<2mm) ;At 21.58m; nodule (80mm x 40mm) of grey pyritised sandy silstone; moderately weak.;From 22.05m to 22.60m; clay; fissures very closely spaced 10 to 20 degrees and 80 degrees; planar and curviplanar; smooth and clean.;At 22.67m; very thin bed (35mm thick) of grey silty fine sand with some carbonaceous material.;From 22.90m to 23.40m; clay.;Below 23.40m; with many grey dustings of grey and light brown fine sand andclosely to		
19.60										

Remarks

Scale (approx)	Logged By
1:50	SRJ/N

Figure No.

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site: CTRL GI DATA - Entire NDATA19 data set

Borehole Number: SR3758

Machine:	**Diameter**	**Ground Level (mOD)**	**Client**	**Job Number**
Flush :		24.84	UR/LCE	Issue 1
Bit Size :				
Method :	**Location**	**Dates**	**Engineer**	**Sheet**
	529858 E 183430 N	18/10/1995	RLE	3/7

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	100.00		0	0				mediumly spaced laminae/lenses (>100mm x 10mm) of grey fine sand.;At 25.03m to 26.40m; clay.;At 26.28m; nodule (25mm diameter) of grey pyritised siltstone.;At 26.50m; nodule (20mm diameter) of grey pyritised siltstone.;At 28.85m; nodule (10mm diameter) of grey pyritised siltstone.;At 29.30m; fossilised wood fragment (40mm x 5mm).		
20.50	100.00		0	0						
21.10	100.00		0	0						
22.60	100.00		0	0						
23.55	100.00		0	0			(11.32)			
24.10	100.00		0	0						
25.60	100.00		0	0						
27.10	100.00		0	0						
27.65	100.00		0	0						
28.60	100.00		0	0						
29.40	100.00		0	0		-4.58	29.42			

Remarks

Scale (approx)	Logged By
1:50	SRJ/N

Figure No.

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site CTRL GI DATA - Entire NDATA19 data set			**Borehole Number** SR3758
Machine:	**Diameter**	**Ground Level (mOD)** 24.84	**Client** UR/LCE	**Job Number** Issue 1
Flush :				
Bit Size :				
Method :	**Location** 529858 E 183430 N	**Dates** 18/10/1995	**Engineer** RLE	**Sheet** 4/7

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
30.10	100.00		0	0						
31.05	100.00		0	0			(4.88)			
32.50	100.00		0	0						
33.10	100.00		0	0						
33.80	100.00		0	0		-9.46	34.30	Very stiff; blue grey mottled brown fissured friable CLAY. Fissures closely spaced; inclined 30 to 50 degrees; planar; rough; occasionally polished and clean.;(WOOLWICH AND READING - UPPER MOTTLED CLAY? becoming LOWER MOTTLED CLAY?);Below 30.46m; mottled blue grey and red brown.;At 34.30m; purple mottled yellow brown.;Below 34.80m; blue grey mottled red brown.;Below 35.70m; mottled purple; yellow brown and red brown.;Below 38.35m; blue grey mottled yellow brown and red brown.;From 37.60m to 38.00m; fissures extremely closely spaced; randomly orientated; planar; polished and striated; clean.		
34.60	100.00		0	0						
35.35	100.00		0	0						
36.10	100.00		0	0						
37.10	100.00		0	0						
37.85	100.00		0	0						
38.35	100.00		0	0						
39.07	100.00		0	0						
39.80										

Remarks

Scale (approx)	Logged By
1:50	SRJ/N

Figure No.

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site: CTRL GI DATA - Entire NDATA19 data set

Borehole Number: SR3758

Machine:	Diameter	Ground Level (mOD)	Client	Job Number
Flush :		24.84	UR/LCE	Issue 1
Bit Size :				
Method :	Location	Dates	Engineer	Sheet
	529858 E 183430 N	18/10/1995	RLE	5/7

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(7.84)			
	100.00		0	0						
40.85										
	100.00		0	0						
42.00						-17.30	42.14	Purple brown fine and medium SAND.;(WOOLWICH AND READING - UPPER SAND?);Below 42.54m; clayey.;Below 42.95m; grey mottled yellow brown and red brown.;Below 43.13m; green grey and glauconitic.		
	100.00		0	0			(1.24)			
42.95						-18.54	43.38	Green grey occasionally mottled yellow brown and red brown clayey fine and medium glauconitic SAND with rare weathered rounded; fine and medium flint gravel.		
	100.00		0	0			(0.47)			
43.85						-19.01	43.85	Occasional fissures irregular; inclined 70 to 80 degrees; rough; clean.;(UPNOR FORMATION)		
	95.00		0	0			(1.55)	Grey clayey silty locally slightly glauconitic fine and medium SAND with many extremely closely spaced lenses (<80mm x 10mm) of light grey medium sand. ;(UPNOR FORMATION);From 43.85m to 44.28m;mottled yellow brown.;		
45.35						-20.56	45.40			
							(0.64)	Very stiff; grey CLAY with extremely closely spaced partings and lenses (<80mm x 3mm) of light grey locally slightly glauconitic medium sand.;(UPNOR FORMATION);At 45.52m; nodule (80mm x 15mm) of greypyritised siltstone.		
	100.00		0	0		-21.20	46.04			
46.85								Grey brown fine and medium SAND with very closely and closely spaced bands of thinly interlaminated; very stiff grey clay and light grey fine and medium sand.;(UPNOR FORMATION);From 48.00m to 49.80m;thickly interlaminated to thickly interbedded (occasionally discontinuous) very stiff grey clay and light grey fine and medium sand.;Below 49.80m; becoming silty with occasional black rounded fineand medium flint gravel.		
	100.00		0	0			(3.81)			
48.85										
	100.00		0	0						
49.85						-25.01	49.85	Grey slightly silty fine and medium SAND.;(THANET SAND)		

Remarks

Scale (approx)	Logged By
1:50	SRJ/N

Figure No.

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site	Borehole Number
CTRL GI DATA - Entire NDATA19 data set	SR3758

Machine:	Diameter	Ground Level (mOD)	Client	Job Number
Flush :		24.84	UR/LCE	Issue 1
Bit Size :				
Method :	Location	Dates	Engineer	Sheet
	529858 E 183430 N	18/10/1995	RLE	6/7

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	100.00	72.00	12.00	0			(1.00)			
50.90						-26.01	50.85	Black stained dark green coarse GRAVEL and COBBLE sized flint fragments with some dark grey silty fine and medium sand and occasional pockets (<20mm diameter) of dark green slightly sandy glauconiticclay.:(BULLHEAD BEDS)		
			0	0		-26.31	(0.30) 51.15			
51.50	100.00	100.00	100.00	0				White slightly weathered CHALK; weak; medium density with some light grey marly chalk wisps. Fractures 70 to 90 degrees; irregular; smooth; with some black speckling. Parallel incipient fractures very closely spaced (25/40/50).:(UPPER CHALK - GRADE II/III?; Medium density; A3?);From 51.15m to 51.50m; non intact; possibly due to incipient fractures. Recovered as angular gravel sized fragments of whiteslightly weathered weak chalk with some silt size comminuted chalk.;At 51.40m; 50mm rinded flint.;At 52.15m; 70mm thick cored rinded flint.;Below 52.40m; fractures closely and medium spaced; 10 to30 degrees; planar; smooth and clean.;At 52.44m; 100mm thick cored fragmented rinded flint.;At 53.19m; 50mm rinded flint.;At 53.33m; 80mm fragmented rinded flint.;At 53.65m; cobble sized rinded flint fragments.;At55.47m; 400mm thick cored rinded flint.		
52.15			0	0						
52.40	100.00	100.00	100.00	0						
52.85	29.00	24.00	0	0			(3.20)			
53.65	100.00	100.00	100.00	0						
54.35						-29.51	54.35	White fresh CHALK; moderately weak; high density; with some light grey marly chalk wisps. Fractures medium spaced; 5 to 10 degrees; planar; smooth and clean occasionally lightly stained grey.:(UPPERCHALK - GRADE II; High density; A2);At 55.43mc 40mm rinded flint.;At 56.55m; 80mm nodular rinded flint.		
	89.00	89.00	89.00	0			(2.41)			
55.85						-31.92	56.76	Complete at 56.76m		

Sample / Tests		Casing Depth (m)	Water Depth (m)
11.00	D40		
12.00	D41		
13.00	D42		
14.00	D43		
15.00	D44		
16.00	D45		
17.00	D46		
18.00	D47		
19.00	D48		
20.00	D49		
21.00	D50		
22.00	D51		
23.00	D52		
24.00	D53		
25.00	D54		
26.00	D55		
27.00	D56		
28.00	D57		

Remarks

Scale (approx)	Logged By
1:50	SRJ/N

Figure No.

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site	Borehole Number
CTRL GI DATA - Entire NDATA19 data set	SR3758

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion		24.84	UR/LCE	Issue 1
	Location	**Dates**	**Engineer**	**Sheet**
	529858 E 183430 N	18/10/1995	RLE	7/7

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
29.00	D58								
30.00	D59								
31.00	D60								
32.00	D61								
33.00	D62								
34.00	D63								
35.00	D64								
36.00	D65								
37.00	D66								
38.00	D67								
39.00	D68								
40.00	D69								
41.00	D70								
42.30	D71								
42.80	D72								
43.70	D73								
44.20	D74								
45.20	D75								
45.40	D75								
46.00	D76								
47.20	D77								
48.20	D78								
49.20	D79								
50.20	D80								
51.00	D81								
51.45	D82								
52.25	D83								
52.85-53.10	D84								
54.30	D85								
54.50	D86								
55.17	D86								
55.85-56.17	D87								
56.30	D88								

Remarks

Scale (approx)	Logged By
1:50	SRJ/N

Figure No.

Institute of Geological Sciences

RECORD OF SHAFT OR BOREHOLE

6-inch or 1:10 000 Map Registration No.

TQ/28SE/9

Name and Number of Shaft or Borehole:

National Grid Reference

29389 83895

For whom made

Town or Village *County* London.

1-in or 1:50 000 New Series Map No. 256

Enter 'C' if Confidential

Exact site (reference to a fixed point on 1-in or 1:50 000 Map)

Idris & Co. Junction of St. Pancras Way. and Pratt St. Camden Town.

Purpose for which made

Ground level at shaft/bore relative to O.D. ——— *m. If not ground level give O.D. of beginning of shaft/bore* ——— *m.*

Made by *Date of sinking*

Information from L C C. *Examined by*

Specimen Numbers and Additional Notes

Geological Classification	Description of Strata	Thickness metres	Depth metres
	Yellow clay.	4.42	4.42
LC	Blue clay.		29.26
WRB	Mottled clay.		35.36
	Sandy Loam.		38.40
	Greensand.		42.06
TAB	Grey sand.		46.03
	Chalk and Flints.		53.34
	Chalk.		59.13
CK	Chalk and Flints.		110.95
	Chalk Boulders.		118.26
	Hard Chalk.		125.20
	Steel lining tubes driven 24 feet into the Chalk.		
	Water pumped from a depth of 233 ft. 6 inches.		

IGS 2439 (1789) 10 000 2/79

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(*For Survey use only*)
6-inch Map Registered No.
TQ 28 SE/10

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: St. Pancras Borough Baths.

Nat. Grid Reference 29280. 83586

1" N.S.Map No.	1" O.S.Map No.	Confidential or not
256		

For whom made

Town or Village St. Pancras. County London

Exact site { Attach a tracing from a map, or a sketch-map, if possible.

Purpose for which made

Ground Level at shaft / bore relative to O.D. If not ground level give O.D. of beginning of shaft / bore

Made by Date of sinking 1901

Information from Date received

Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(*For Survey use only*) GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS Ft.	THICKNESS In.	DEPTH Ft.	DEPTH In.
	London wells pp 141-142			400	Ret. 32 m

1. ST. PANCRAS BOROUGH BATHS. King Street.
85 feet above Ordnance Datum. (25.91 m.)
Made by MESSRS. LE GRAND & SUTCLIFF in 1901; Communicated by W. W. BLAIR, Esq., Borough Engineer. (22.56)
Diameter of bore 11¼ inches. Water-level 74 feet below O.D. Supply 8,000 to 9,000 gallons an hour. Water-level 108 feet below O.D. in 1910. (32.92 m.)
London Map 7, N.W. (d. 4.).

		Thickness. Feet.		Depth. Feet.	
[London Clay.]	Made ground (0.91)	3		3	(0.91)
	Yellow Clay (6.71)	22		25	(7.62)
	Blue clay (0.91)	3		28	(8.53)
	Claystones (0.30)	1		29	(8.84)
	Blue clay (19.20)	63		92	(28.04)
[Woolwich Beds.]	Mottled clay (12.80)	41		133	(40.54)
	Sandy green clay (2.74)	9		142	(43.28)
[Thanet.]	Grey sand (5.49)	19		161	(49.07)
	Flints ... (0.30)	1		162	(49.38)
	Chalk and flints	238		400	(121.92)
	(72.54)				

(5412). Wt.23937/PS.154. 2m. 10/04. G.W.B.Ltd. Gp.863

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(*For Survey use only*)
6-inch Map Registered No.
TQ28SE/11

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: Workhouse St. Pancras (hospital)

Nat. Grid Reference 29641. 83582

For whom made

Town or Village St. Pancras. County London.

Exact site

Attach a tracing from a map, or a sketch-map, if possible.

Purpose for which made Water

1" N.S.Map No.	1" O.S.Map No.	Confidential or not
265		

Ground Level at shaft bore relative to O.D. If not ground level give O.D. of beginning of shaft bore

Made by Date of sinking 1809

Information from Date received

Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(*For Survey use only*) GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS Ft.	THICKNESS In.	DEPTH Ft.	DEPTH In.
	London wells p. 68. abstract. (19.81m)			221	6736 m
	c ST. PANCRAS. King's Rd., The Workhouse. Lond. 7 NW (d. 4). (29.62) Well O.D. 65. Depth 221. Made 1809. Water—180. Shaft throughout. Yield 8,000. Information 1911.				

(5412) Wt.32837/PS.154 Jm. 10/64 G.W.B.Ltd. Gp.863

C 37.

SW Hampstead 400 yards

WELL BORING at N. of St Pancras Town Hall County

Geol. map 1 in. map New Series 6 in. map 7. N.W.

Made by TQ 28 SE Date 1907-10. TQ28SE/34

Sunk feet. Bored feet. 2457.8378

256

Communicated by H.C.C.

Height above Ordnance Datum 70·824. Rest level of water

Yield (21.59m)

Quality (with copy of analysis on separate sheet)

GEOLOGICAL FORMATION	NATURE OF STRATA	THICKNESS		DEPTH	
		Feet	Inches	Feet	Inches
	Macadam & Made Ground.	2	—	2	0 (0.6m)
	Brown Clay.	21	3	23	3 (7.05m)
	Blue Clay	Unbottomed			

GEOLOGICAL SURVEY AND MUSEUM,
JERMYN STREET, LONDON, S.W.1.

(50478X) Wt. W39733/0131 2,500 4/31 H. J. R. & L., Ltd. Gp. 616

NGRC
BOREHOLE RECORDS
ADJUSTMENT FORM

QUARTER SHEET TQ 28SE

BH REGISTRATION NUMBER 1426 — 1598.

RECORDS ENTERED AND HELD BY WALLINGFORD

BH REGISTRATION NUMBER(S)

L.C.C. Chief Engineer's Dept. County Hall

Institution:- St. Pancras Hospital, Pancras Road, N.W.1.

TQ 28/54 (Thames) C.

(B) UNDERGROUND WATER—WELLS AND BORINGS.

(In each case please state whether a well and/or boring is in question.)

I. GENERAL.

1. Exact site of well or boring ... ... (A map or sketch showing position would be useful.)	Situated in Engine Room R Block in front of Boiler House. Well and boring.
2. Surface level of ground above Ordnance Datum	ft.
3. Date of construction	Before 1871. Cast iron lining tube in sections bolted together 3'10" dia. to a depth of 130ft in 1871.

WELLS.

4. Depth of well from surface level of ground (*i.e.*, 2 above). If top of well is below the surface level of the ground (*i.e.*, 2 above) state how much	248 ft. 3 ft.
5. Depth of floor of galleries at site of well: also dimension and direction of galleries	ft.

BORINGS.

6. Depth of boring from surface level of ground (*i.e.*, 2 above). If boring is in bottom of well, state depth of well	454 ft.
7. (*a*) Diameter of top of boring	12 in.
(*b*) Diameter of bottom of boring...	12 in.
8. Tubed from top of boring to	Not tubed ft.
9. Lining tubes perforated at depths of	- ft.
10. Water struck during boring at depths of	Not known ft.
11. What was rest level on completion of boring?	Not known

WELLS AND BORINGS.

12. Is the water raised by pump or air lift?	By Pump
13. Depth from top of well or boring to bottom of suction pipe ...	310ft.

(68)

II. If systematic measurements of water levels are made, state whether these include :—

(*a*) Pumping levels.....(*b*) Rest levels ... ...

(*c*) Time of recovery to rest level on cessation of pumping ... ...

(*d*) Changes in pumping level, if rate of pumping is altered. ... ...

Also state : (*e*) at what intervals records are taken (*i.e.*, daily, weekly, etc.) ... ... When foot valve is lifted only.

Please furnish a specimen graph of records taken over as long a period as available (up to 1 year).

III. If measurements are made only occasionally, please indicate what is, or has been, done in this respect and furnish examples of any graphs or figures available.

Water levels 1914 212ft. 1927 238'9"
1915 217ft. 1929 249'5"
1923 232ft. 1931 252'9"
1925 235ft.

IV. YIELDS.

(1) Number of gallons pumped per hour 8,000

(2) Is pumping continuous? ... ... No.

(3) If not, how many hours pumping per day? 9

(4) Maximum daily yields available ... ... Not known

Estimated ... ...

Based on actual tests .....80,000.....
Average hourly yield remained constant during this period.

V. If a section or record of strata can be given please attach to this form. Sketch showing strata enclosed, also further data.

VI. (1) If a chemical analysis can be given please attach.

(2) If not state hardness ... ...

(3) For what purpose is the water used? ... ...

(1)

SURVEY OF DEEP WELL. ST. PANCRAS INSTITUTION. 7/1/32.

Date	Water Level.	Fall in Water Level.	Remarks.
1871	Not known		Well lined with Iron Cylinder.
1872.	Not known	15" in 15 yrs.	
1881.	Not known	8' in 9 yrs.	
1893	Not known	(6' in 1½ (years (and 20'	Pumps lowered and Well altered and widened.
1901	Not known	(in 7 yrs.	Engineer recommended pumps to be lowered to draw from 190' level.
1902.	Not known		Ashley Pumps fixed.
1903.	Not known		Well deepened by Batchelor.
1912.	Not known		Well deepened to 375'
1913.	Not known		Well deepened by Isler to 454 ft.
1914.	212 ft.		Ashley Pumps scrapped converted to Artesian Pump
1915.	217 ft.	5ft.	
1923.	232 ft.	15ft.	
1925.	235 ft. 6 ins.	3'6"	
1927.	238' 9"	3'3"	Rising Main renewed by Isler.
1929.	249' 5"	10'8"	
1931.	252' 9"	3'4"	

Depths taken from Pump Room Floor.	Strata as shewn by Geological Survey at Pratt Street. 400 yds. distant.	Survey as shown by Ward's Plan 1874 on site.	Depths taken from Pump Room Floor.	Engineer's Remarks.
4"	Made ground.			
20'0"	Brown Clay.	Gravel.	20 ft.	
		Blue Clay	50 ft.	
107'4"	Blue Clay.			
		Sand.	41 ft.	
2'0"	Reading Beds.			
7'0"	Thanet Sands.			
5'0"	Chalk.	Chalk.		Personal Survey from this level (Approx.150') to a depth of 45' shews Chalk and Flint Strata. Present water level 49'3" above foot Valve.
1"	Flint.			
5'0"	Chalk.			
1"	Flint.	Chalk.		
Continuation of Chalk and Flint Beds.		Chalk.		

St. Pancras Hospital 7/1/32

Foot Valve has not been raised since 1931 and present water level is not available. The yield from well keeps fairly constant. (Sgd.) J.W.Spence. 10/4/35.

C/30

256/422

TQ28/54

J. Kear-Colwell, F.I.C.

4

29th April, 1938.

REPORT upon two samples of WATER collected by Mr.C.H.Wordsworth from the St. Pancras Hospital, Kings Road, N.W.1. The samples were marked No.1 UNCHLORINATED. No.2 CHLORINATED, and were taken on the 21st April, 1938.

CHEMICAL ANALYSIS

	Parts per 100,000	
	No.1.	No.2.
Saline Ammonia	0.0388	0.0136
Albuminoid Ammonia	0.0004	0.0004
Oxygen absorbed in 4 hours at 80°F.	0.040	0.050
Nitrogen as Nitrates	0.058	0.076
Nitrites	nil	nil
Chlorine	9.2	10.1
Hardness Total	8.0	5.0
Do. Permanent	3.0	2.5
Total Solids	66.0	66.0

A microscopic examination revealed the presence of a few mineral and vegetable fragments in each sample.

Both samples were clear and free from smell.

BACTERIOLOGICAL EXAMINATION.

Number of organisms per c.c. growing on gelatine at room temperature in 4 days (20°C.)	18	13
Liquefying organisms	absent from 1 c.c.	absent from 1 c.c.
Number of organisms per c.c. growing on agar at blood heat in 48 hours (37°C.)	2	absent from 1 c.c.
Bacillus Coli	present in 10 c.c. absent from 5 c.c.	absent from 100 c.c.

OPINION.

The unchlorinated sample from the Well still exhibits evidence of considerable contamination and the Source should be investigated.

After chlorination the supply is satisfactory.

Free Chlorine in sample No.2. 0.1 parts per million.

TQ28/54

256/422

J. Kear Caldwell. F.I.C.

3

5th April, 1938.

REPORT upon a sample of WATER collected by Mr. C.H. Wordsworth from St. Pancras Hospital, Kings Road, N.W.1. The sample was taken on the 28th March, 1938.

CHEMICAL ANALYSIS	Parts per 100,000.
Saline Ammonia	0.0308
Albuminoid Ammonia	0.0004
Oxygen absorbed in 4 hours at 80°F.	0.053
Nitrogen as Nitrates	trace only
Nitrites	nil
Chlorine	10.3
Hardness Total	5.0
Do. Permanent	2.5
Total Solids	66.0

The sample was clear and free from smell.

A microscopic examination revealed the presence of some mineral and vegetable debris.

BACTERIOLOGICAL EXAMINATION.

Number of organisms per c.c. growing on gelatine at room temperature in 4 days (20°C.)	6
Liquefying organisms	absent from 1 c.c.
Number of organisms per c.c. growing on agar at blood heat in 48 hours (37°C.)	3
Bacillus Coli	present in 1 c.c.

OPINION.

In its present condition this water is quite unsuitable for dietetic use without efficient chlorination.

TQ28/54

258/422

	ft.	ins
Drift	20	0
London Clay	50	0
Woolwich & Reading Beds	81	0
Thanet Sand		
Upper Chalk	303	0

Swanscombe 1976

St. Pancras Hospital, (formerly The Workhouse,
Pancras Rd., NW1. Pancras Rd.)

G/30 256/422

TQ 28/54

6" London N 5 NW M.L.R.L.W. p: 68

NGR TQ 2968 8362

Additional Information from L.C.C. Chief Engineers Dept. County Hall. per. M.O.H. 15th Oct. 1935.

Exact site: Engine Room R. Block in front of Boiler House.

Construction: Cast iron lining tubes in sections bolted together 3'10" diameter to a depth of 130 ft. in 1870.

Depth 248 ft. from surface. Well 3 ft. below surface. 71·6
" 14 ft. " " 82·6

Depth to bottom of bore 454 ft.

Diameter top 12" bottom 12"

Depth from top of well to bottom of suction pipe 310 ft.

Water levels.

1914	212 ft.	1927	238' 9"
1915	217	1929	249' 5"
1923	232	1931	252' 9"
1925	235		

Yield. 8000 gph. for 9 hours.

Estimated 80,000 gp day.

Visited — Pump is sealed off & not in use.

S.M.A. 19.11.51

Gravel	20
Blue Clay	50
Yellow Clay	40
Sand	41
Chalk	303
	454

Site visited 1 Aug. 1946.
Temp. out of us. Building bombed & not likely that well will be opened up.
Well top 12' below ground level.

pB. 15:10:35 Cat. H. 18

9509/11

[signature] Aug 1946

8.

256/430

Authority. L.C.C.

Site of Well or Bore St Pancras Hostel N.W.1

Date 4.4.45.

Physical Characters (appearance, etc.) TQ28/54

CHEMICAL ANALYSIS	Parts per 100,000
Reaction	7.8.
Total Solids	13.6
Chlorides/Chlorine	9.3
Nitrogen as Nitrates	.108
Nitrogen as Nitrites	Nil
Saline and free Ammonia (Amm. Nitrogen)	.028
Organic Ammonia (Album. Nitrogen)	Nil
Oxygen absorbed in 4 hrs. @ 27°C	.012
~~Poisonous Metals~~ Alkalinity	28.0
Iron	
Temporary hardness	
Permanent hardness	
Total hardness	12.0

ANALYST'S REMARKS

BACTERIOLOGICAL ANALYSIS

Total Colonies at 37°C in ..... hrs. ..... per c.c.

No. of B.Coli ..... per ..... c.c.

REMARKS Received from L.C.C. 23.6.48 (W.M. fl.)

TQ28/54

6/30

St. Pancras Hospital

Camden Road NW1.

256/422 continued

	Water level	Fall in Water level.	Remarks.
1871	-		Well lined with iron cylinders.
1872	-	15" in 15 years	-
1881	-	8' " 9 "	-
1893	-	6' in 1½ years	Pumps lowered & well altered & widened.
1901	-	20' in 7 years	Pumps lowered to draw from 190'
1902	-	-	Ashley Pumps fixed.
1903	-	-	Well deepened by Batchelor.
1912	-	-	Well deepened to 375
1913	-	-	Well deepened by Isles to 454
1914	212 -147		Ashley pumps scrapped converted to Artesian Pump.
1915	217 -152	5'	" "
1923	232 -167	15'	"
1925	235½ -170½	3½	"
1927	238 3/4 -173 3/4	3 1/4	Rising main renewed by Isles.
1929	249 5/12 -184 5/12	10 2/3	"
1931	252 3/4 -187 3/4	3 1/3	"

SB
15:10:35

9509/11

Appendix D Background to Legislation on Contaminated Land

Legislative Framework

The contaminated land regime in Part 2A of the Environment Protection Act 1990 was introduced to specifically address the historical legacy of land contamination. Part 2A of the Environmental Protection Act 1990 (Amended April 2012) has introduced the following statutory definition for "contaminated land":

> *"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 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."*

Part 2A provides a means of dealing with unacceptable risks posed by land contamination to human health and the environment. Enforcing authorities are required to identify and deal with such land but Part 2A is only to be used by the Enforcing Authority where no appropriate alternative solution exists.

The Process of Risk Assessment

The assessment of contaminated land can be seen as a two phase risk based process, comprising:

1. A qualitative assessment of the likelihood of plausible contaminant linkages, i.e. there must not only be a source of contamination, but a pathway and a receptor; and
2. A quantitative element which will seek to determine the degree of harm and the significance of such harm on a receptor.

A "contaminant" is a substance which is in, on or under the land and which has the potential to cause significant harm to a receptor or to cause significant pollution of controlled waters.

A "pathway" is a route by which a receptor is or might be affected by a contaminant.

A "receptor" is something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, property or controlled waters.

The term "contaminant linkage" indicates that all three elements (i.e. a contaminant, a pathway and a receptor) have been identified. The term "significant contaminant linkage" means a contaminant linkage which gives rise to a level of risk sufficient to justify a piece of land being determined as contaminated land (in other words, there is unacceptable risks posed by the land contamination to human health and or the environment). The term "significant contaminant" means the contaminant which forms part of a significant contaminant linkage.

Significant Harm to Human Health

The following health effects constitute significant harm: death, life threatening diseases (cancers), other diseases likely to have a serious impact on health, serious injury, birth defects and impairment of reproductive functions.

Significant Possibility of Significant Harm to Human Health
In deciding whether or not land is contaminated land on the grounds of a significant possibility of significant harm to human health, the local authority uses the following categorisations:

Category 1: Human Health
Land should be deemed to be a Category 1: Human Health case where:

(a) the authority is aware that similar land or situations are known, or are strongly suspected on the basis of robust evidence, to have caused such harm before in the United Kingdom or elsewhere; or

(b) the authority is aware that similar degrees of exposure (via any medium) to the contaminant(s) in question are known, or strongly suspected on the basis of robust evidence, to have caused such harm before in the United Kingdom, or elsewhere;

(c) the authority considers that significant harm may already have been caused by contaminants in, on or under land, and that there is an unacceptable risk that it may continue or occur again if no action is taken.

Category 2: Human Health
Land should be placed into Category 2 if the authority concludes, on the basis that there is a strong case for considering that the risks from the land are of sufficient concern, that the land poses a significant possibility of significant harm. Category 2 may include land where there is little or no direct evidence that similar land, situations or levels of exposure have caused harm before, but nonetheless the authority considers on the basis of the available evidence, including expert opinion, that there is a strong case for taking action under Part 2A on a precautionary basis.

Category 3: Human Health
Land should be placed into Category 3 if the authority concludes that the strong case of Category 2 does not exist. Category 3 may include land where risks are not low, but nonetheless the authority considers that regulatory intervention under Part 2A is not warranted. This recognises that placing land in Category 3 would not stop others, such as the owner or occupier of the land, from taking action to reduce risks outside of the Part 2A regime if they choose.

Category 4: Human Health
The local authority should consider that the following types of land should be placed into Category 4: Human Health:

(a) Land where no relevant contaminant linkage has been established.

(b) Land where there are only normal levels of contaminants in the soil.

(c) Land that has been excluded from the need for further inspection and assessment because contaminant levels do not exceed generic assessment criteria.

(d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed in the normal course of their lives).

"Normal" Presence of Contaminants
"Normal" levels of contaminants in soils should not be considered to cause land to qualify as contaminated land, unless there is particular reason to consider otherwise. "Normal" levels of contaminants in soils may result from:

(a) The natural presence of contaminants (e.g. caused by underlying geology) at levels that might reasonably be considered typical in an area and have not been shown to pose an unacceptable risk.

(b) The presence of contaminants caused by low level diffuse pollution, and common human activity. For example, this would include diffuse pollution from historic use of leaded petrol and the presence of benzo(a)pyrene from vehicle exhausts and the spreading of domestic ash in gardens that might reasonably be considered typical.

Significant Pollution of Controlled Waters
Pollution of controlled water means the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter. The term "controlled water" is as defined in Part 3 of the Water Resources Act 1991, except that ground waters does not include waters contained in underground strata but above the saturation zone (i.e. perched water).

The following criteria are used to establish whether significant pollution of controlled waters has occurred:

(a) Pollution equivalent to "environmental damage" to surface water or groundwater as defined by The Environmental Damage (Prevention and Remediation) Regulations 2009.

(b) Inputs resulting in the deterioration of the quality of water abstracted, or intended to be used in the future.

(c) A breach of a statutory surface water Environmental Quality Standard, either directly or via a groundwater pathway.

(d) Input of a substance into groundwater resulting in a significant and sustained upward trend in concentration of contaminants.

The following categories are adopted in relation to determining the significant possibility of significant pollution of controlled waters.

Category 1: Water
This covers land where the authority considers that there is a strong and compelling case for considering that a significant possibility of significant pollution of controlled waters exists. In particular, this would include cases where there is robust science-based evidence for considering that it is likely that high impact pollution would occur if nothing were done to stop it.

Category 2: Water
This covers land where:

(a) The authority considers the strength of evidence to put the land into Category 1 does not exist; but

(b) Nonetheless, on the basis of the available scientific evidence and expert option, the authority considers that the risks posed by the land are of sufficient concern that the land should be considered to pose a significant possibility of significant pollution of controlled waters on a precautionary basis, with all that this might

involve (e.g. likely remediation requirements, and the benefits, costs and other impacts of regulatory intervention). Among other things, this category might include land where there is a relatively low likelihood that the most serious types of significant pollution might occur.

Category 3: Water
This covers land where the authority concludes that the risks are such that (whilst the authority and others might prefer they did not exist) the tests set out in Categories 1 and 2 are not met, and therefore regulatory intervention under Part 2A is not warranted. This category should include land where the authority considers that it is very unlikely that serious pollution would occur; or where there is a low likelihood that less serious types of significant pollution might occur.

Category 4: Water
This covers land where the local authority concludes that there is no risk, or that the level of risk posed is low. In particular, the authority should consider that this is the case where:

(a) No contaminant linkage has been established in which controlled waters are the receptor in the linkage; or

(b) the possibility only relates to type of pollution that should not be considered to be significant pollution; or

(c) The possibility of water pollution similar to that which might be caused by "background" contamination.

Terminology
The term 'Contaminated Land' is used to mean land which meets the Part 2A definition. Other terms, such as 'land affected by contamination' or 'land contamination' are used to describe much broader categories of land where contaminants are present but usually not at sufficient level of risk to be Contaminated Land.

Planning Policy and Land Contamination
The National Planning Policy Framework (NPPF), which was last updated in 2019, sets out Government planning policy for England and how this is expected to be applied to development.

Paragraphs 178 and 179 of Section 15 – Conserving and enhancing the natural environment – of the NPPF relate to ground conditions including land contaminated land matters and state the following:

"Planning policies and decisions should ensure that:

(a) a site is suitable for its proposed use taking account of the ground conditions and any risks arising from land stability and contamination. This includes risks arising from natural hazards of former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);

(b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and

(c) adequate site investigation information, prepared by a competent person, is available to inform these assessments.

(d) Where a *site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner."*

The term "site investigation information" is defined by the document as including *"a risk assessment of land potentially affected by contamination, or ground stability and slope stability reports, as appropriate. All investigations of land potentially affected by contamination should be carried out in accordance with established procedures (such as BS 10175 Investigation of Potentially Contaminated Sites – Code of Practice)".*

Appendix E Assessment of Plausible Contaminant Linkages

Table E-1 Qualitative Risk Assessment of Land Potentially Affected by Contamination Assuming Current Site Conditions

Plausible Contaminant Linkages Assuming Current Conditions

No.	Source	Pathway	Receptor	Con-sequence	Probability	Risk	Justification
Hazards to Human Health							
1	Non-volatile contamination in soils	Direct contact/ ingestion	Current site users	Medium	Unlikely	Low Risk	Historical / existing potential sources of contamination on/off site / Hardcover restricts contaminant linkage
2	Volatile contamination in soils	Inhalation	Current site users	Medium	Unlikely	Low Risk	Historical / existing potential sources of contamination on/off site / Hardcover restricts contaminant linkage
3	Contamination in soils	Direct contact/ ingestion/ Inhalation	Maintenance works	Medium	Unlikely	Low Risk	Historical / existing potential sources of contamination on/off site / Hardcover restricts contaminant linkage
4	Groundwater contamination	Direct contact / ingestion (via on-site abstractions)	Current site users	Severe	Unlikely	Moderate/ Low Risk	Historical / existing potential sources of contamination on/off site
5	Ground gas	Inhalation / asphyxiation	Current site users	Severe	Unlikely	Moderate/ Low Risk	Historical / existing potential sources of contamination on/off site
6	Ground Gas	Explosion	Current site users	Severe	Unlikely	Moderate/ Low Risk	Historical / existing potential sources of contamination on/off site

Plausible Contaminant Linkages Assuming Current Conditions

No.	Source	Pathway	Receptor	Con-sequence	Probability	Risk	Justification
7	Ground gas	Inhalation / asphyxiation / explosion	Maintenance works	Severe	Unlikely	Moderate/ Low Risk	Historical / existing potential sources of contamination on/off site
Hazards to the Water Environment							
8	Contamination in soils	Leachable contamination	Unproductive Strata	Minor	Unlikely	Very Low Risk	Historical / existing potential sources of contamination on/off site/ Hardcover restricts contaminant linkage
9	Contamination in soils	Leachable contamination	Secondary Aquifer	Mild	Not Possible	No Risk	No plausible contaminant linkage
10	Contamination in soils	Leachable contamination	Principal Aquifer	Medium	Not Possible	No Risk	No plausible contaminant linkage
11	Groundwater contamination	Aquifer	Secondary Aquifer	Mild	Not Possible	No Risk	No plausible contaminant linkage
12	Groundwater contamination	Aquifer	Principal Aquifer	Medium	Not Possible	No Risk	No plausible contaminant linkage
13	Groundwater contamination	Aquifer	Surface water	Severe	Unlikely	Moderate/Low Risk	Historical potential sources of contamination off site
14	Groundwater contamination	Aquifer	Water supply well(s)	Severe	Unlikely	Moderate/Low Risk	Historical potential sources of contamination off site
Hazards to Flora and Fauna							

Plausible Contaminant Linkages Assuming Current Conditions

No.	Source	Pathway	Receptor	Con-sequence	Probability	Risk	Justification
14	Contamination in Soils	Plant uptake	Plants and soft landscaping	Minor	Unlikely	Very Low Risk	No significant sources of contamination identified
15	Ground gas / low oxygen	Plant uptake	Plants and soft landscaping	Minor	Unlikely	Very Low Risk	No significant sources of contamination identified
Hazards to Building Structure and Services							
16	Contamination in soils	Direct contact with subsurface	Buried concrete	Mild	Low Likelihood	Low Risk	Historical / existing potential sources of contamination on/off site
17	Contamination in soils	Direct contact with subsurface	Plastic water supply pipes	Mild	Low Likelihood	Low Risk	Historical / existing potential sources of contamination on/off site
18	Groundwater contamination	Direct contact with pipes (via on-site abstraction)	Pipes etc in contact with pumped groundwater	Medium	Unlikely	Low Risk	Historical potential sources of contamination off site
19	Ground gas	Explosion	Building structure	Severe	Unlikely	Moderate/Low Risk	Historical / existing potential sources of contamination on/off site

Table E-2. Qualitative Risk Assessment of Land Potentially Affected by Contamination assuming Future Conditions (with the Proposed Development)

Plausible Contaminant Linkages Assuming Future Proposed Development

No.	Source	Pathway	Receptor	Consequence	Probability	Risk	Justification
Hazards to Human Health							
1	Non-volatile contamination in soils	Direct contact / ingestion	Future site users	Medium	Unlikely	Low Risk	Risks to be mitigated through design/remediation
2	Volatile contamination in soils	Inhalation	Future site users	Medium	Unlikely	Low Risk	Risks to be mitigated through design/remediation
3	Contamination in soils	Direct contact / ingestion / Inhalation	Maintenance works	Medium	Unlikely	Low Risk	Risks to be mitigated through design/remediation
4	Ground gas	Inhalation / asphyxiation	Future site users	Severe	Unlikely	Moderate/Low Risk	Risks to be mitigated through design/remediation
5	Groundwater contamination	Direct contact / ingestion (via on-site abstractions)	Future site users	Severe	Unlikely	Moderate/ Low Risk	Risks to be mitigated through design / remediation
6	Ground Gas	Explosion	Future site users	Severe	Unlikely	Moderate/Low Risk	Risks to be mitigated through design/remediation
7	Ground gas	Inhalation / asphyxiation / explosion	Maintenance works	Severe	Unlikely	Moderate/Low Risk	Risks to be mitigated through design/remediation

Plausible Contaminant Linkages Assuming Future Proposed Development

No.	Source	Pathway	Receptor	Consequence	Probability	Risk	Justification
Hazards to the Water Environment							
8	Contamination in soils	Leachable contamination	Unproductive Strata	Minor	Unlikely	Very Low Risk	Risks to be mitigated through design/remediation
9	Contamination in soils	Leachable contamination	Secondary Aquifer	Mild	Not Possible	No Risk	No plausible contaminant linkage
10	Contamination in soils	Leachable contamination	Principal Aquifer	Medium	Not Possible	No Risk	No plausible contaminant linkage
11	Groundwater contamination	Aquifer	Secondary Aquifer	Mild	Not Possible	No Risk	No plausible contaminant linkage
12	Groundwater contamination	Aquifer	Principal Aquifer	Medium	Not Possible	No Risk	No plausible contaminant linkage
13	Groundwater contamination	Aquifer	Surface water	Severe	Unlikely	Moderate/Low Risk	Historical potential sources of contamination off site
14	Groundwater contamination	Aquifer	Water supply well(s)	Severe	Unlikely	Moderate/Low Risk	Historical potential sources of contamination off site
Hazards to Flora and Fauna							
14	Contamination in Soils	Plant uptake	Plants and soft landscaping	Minor	Unlikely	Very Low Risk	Residual risks
15	Ground gas / low oxygen	Plant uptake	Plants and soft landscaping	Minor	Unlikely	Very Low Risk	Residual risks

Plausible Contaminant Linkages Assuming Future Proposed Development

No.	Source	Pathway	Receptor	Consequence	Probability	Risk	Justification
Hazards to Building Structure and Services							
16	Contamination in soils	Direct contact with subsurface	Buried concrete	Mild	Low Likelihood	Low Risk	Risks to be mitigated through design/remediation
17	Contamination in soils	Direct contact with subsurface	Plastic water supply pipes	Mild	Unlikely	Very Low Risk	Risks to be mitigated through design/remediation
18	Groundwater contamination	Direct contact with pipes (via on-site abstractions)	Pipes etc in contact with pumped groundwater	Medium	Unlikely	Low Risk	Risks to be mitigated through design / remediation
19	Ground gas	Explosion	Building structure	Severe	Unlikely	Moderate/Low Risk	Risks to be mitigated through design/remediation

Notes:

In preparing the above tables the following assumptions have been made:

1. The Proposed Development comprises a healthcare and research facility with mainly hardstanding and impermeable areas.
2. Clean topsoil cover will be provided in landscaped areas when necessary.
3. The final foundation design is not confirmed and may be influenced by a need to ensure that no preferential pathways are created between any potential sources of contamination and underlying natural strata.
4. Risks to construction workers, members of the public and the environment during the demolition and construction stage will be mitigated through the use of best industry practice and the adoption of appropriate health and safety precautions including the use of PPE.
5. Public access to the Site will not be permitted during construction works .
6. Future site users include patients, staff and visitors to the wider St. Pancras Hospital.

Classification of Consequence

The classifications of consequence (severity) are taken from R&D Publication 66 (NHBC and Environment Agency, 2008) (Ref. 37). AECOM has chosen to apply the classifications to a broad range of development scenarios.

It should be noted that the categories of pollution incident have no relation to the categories of significant possibility of significant harm to human health or significant possibility of significant pollution of controlled waters in respect of the Part 2A Statutory Guidance.

Table E-3 Classification of Consequence

Classification	Definition
Severe	Highly elevated concentrations likely to result in “significant harm” to human health as defined by the EPA 1990, Part 2A, if exposure occurs. Equivalent to Environment Agency Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce. Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Catastrophic damage to crops, buildings or property.
Medium	Elevated concentrations which could result in “significant harm” to human health as defined by the EPA 1990, Part 2A if exposure occurs. Equivalent to Environment Agency Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce. Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Significant damage to crops, buildings or property.
Mild	Exposure to human health unlikely to lead to “significant harm”. Equivalent to Environment Agency Category 3 pollution incident including minimal or short lived effect on water quality; marginal effect on amenity value, agriculture or commerce. Minor or short lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population. Minor damage to crops, buildings or property.
Minor	No measurable effect on humans. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects of damage to buildings, structure and services.

Classification of Probability

The classifications of probability are taken from R&D Publication 66 (NHBC and Environment Agency, 2008) (Ref. 37). AECOM has chosen to apply the classifications to a broad range of development scenarios.

It should be noted that the categories of pollution incident have no relation to the categories of significant possibility of significant harm to human health or significant possibility of significant pollution of controlled waters in respect of the Part 2A Statutory Guidance (Ref. 10). Also, in the Part 2A Statutory Guidance "pollutant linkage" is now termed "contaminant linkage", although it is noted that the terms are effectively synonymous.

Table E-4 Classification of Probability

Category	Definition
High Likelihood	There is pollutant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.
Likely	There is pollutant linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.
Low likelihood	There is pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place, and is less likely in the shorter term.
Unlikely	There is pollutant linkage but circumstances are such that it is improbably that an event would occur even in the very long-term.

Table E-5 Categorisation of Risk

		Consequence (Severity)			
		Severe	Medium	Mild	Minor
Probability (Likelihood)	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

Table E-6 Description of Risk Levels and Likely Action Required

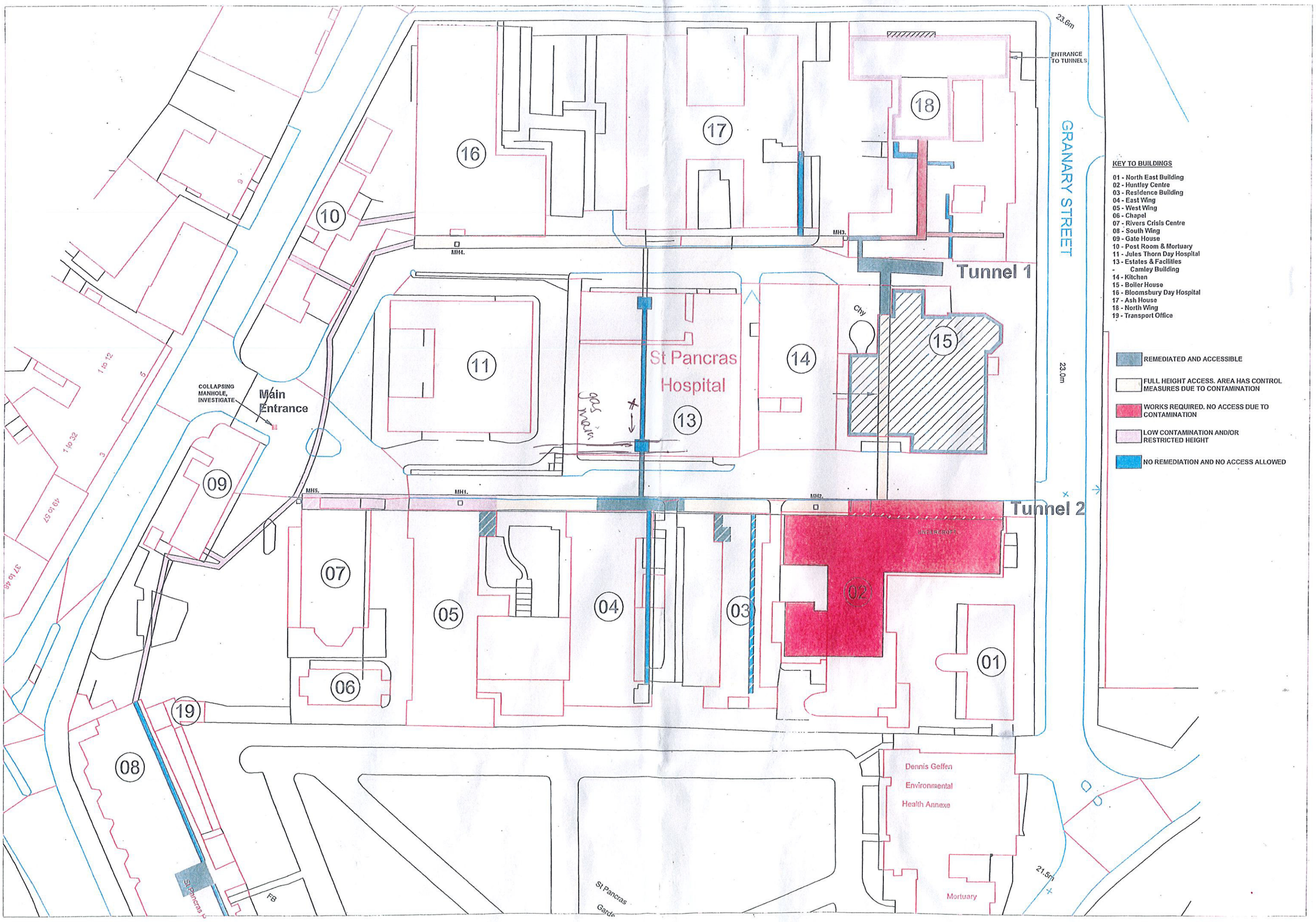
Term	Description
Very high risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remediation action or there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.
High risk	Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remediation action. Realisation of the risk is likely to present a substantial liability to the site owner or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.
Moderate risk	It is possible that without appropriate remediation action, harm would arise to a designated receptor. It is relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.
Low risk	It is possible that harm could arise to a designated receptor from identified hazard. It is likely that, at worst, if any harm was realised any effects would be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Very low risk	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.
No potential risk	There is no potential risk if no pollutant linkage has been established.

Table E-7 Summary of Definitions

Term	Description
Hazard	A property or situation which in certain circumstances could lead to harm. (The properties of different hazards must be assessed in relation to their potential to affect the various different receptors).
Consequences	The adverse effects (or harm) arising from a defined hazard which impairs the quality of the environment or human health in the short or longer term.
Probability	The mathematical expression of the chance of a particular event in a given period of time (e.g. probability of 0.2 is equivalent to 20% or a 1 in 5 chance).
Likelihood	Probability; the state of being probable.
Risk	A combination of the probability or frequency of the occurrences of a defined hazard AND the magnitude of the consequences of that occurrence.

Term	Description
Contaminant linkage	An identified pathway is capable of exposing a receptor to a contaminant and that contaminant is capable of harming the receptor. In the Part 2A Statutory Guidance the terms “contaminant”, “pollutant” and “substance” have the same meaning, and some non-statutory technical guidance relevant to land contamination uses alternative terms such as “pollutant”, “substance” and associated terms in effect to mean the same thing.

Appendix F Map of Service Tunnels Beneath the Site


23.6m
ENTRANCE TO TUNNELS
GRANARY STREET
23.0m
21.5m
KEY TO BUILDINGS
01 - North East Building
02 - Huntley Centre
03 - Residence Building
04 - East Wing
05 - West Wing
06 - Chapel
07 - Rivers Crisis Centre
08 - South Wing
09 - Gate House
10 - Post Room & Mortuary
11 - Jules Thorn Day Hospital
13 - Estates & Facilities
- Camley Building
14 - Kitchen
15 - Boiler House
16 - Bloomsbury Day Hospital
17 - Ash House
18 - North Wing
19 - Transport Office
REMEDIATED AND ACCESSIBLE
FULL HEIGHT ACCESS. AREA HAS CONTROL MEASURES DUE TO CONTAMINATION
WORKS REQUIRED. NO ACCESS DUE TO CONTAMINATION
LOW CONTAMINATION AND/OR RESTRICTED HEIGHT
NO REMEDIATION AND NO ACCESS ALLOWED
Tunnel 1
Tunnel 2
St Pancras Hospital
Main Entrance
COLLAPSING MANHOLE, INVESTIGATE
gas main
Chy
MH1.
MH2.
MH3.
MH4.
MH5.
Dennis Geffen
Environmental
Health Annexe
Mortuary
St Pancras
Gardens
FB
1 to 12
3
5
1 to 32
37 to 45
47 to 57
9

\

Oriel
Creating the centre for advancing eye health

Oriel-london.org.uk

Moorfields Eye Hospital NHS Foundation Trust

NHS

Moorfields Eye Charity

UCL INSTITUTE OF OPHTHALMOLOGY