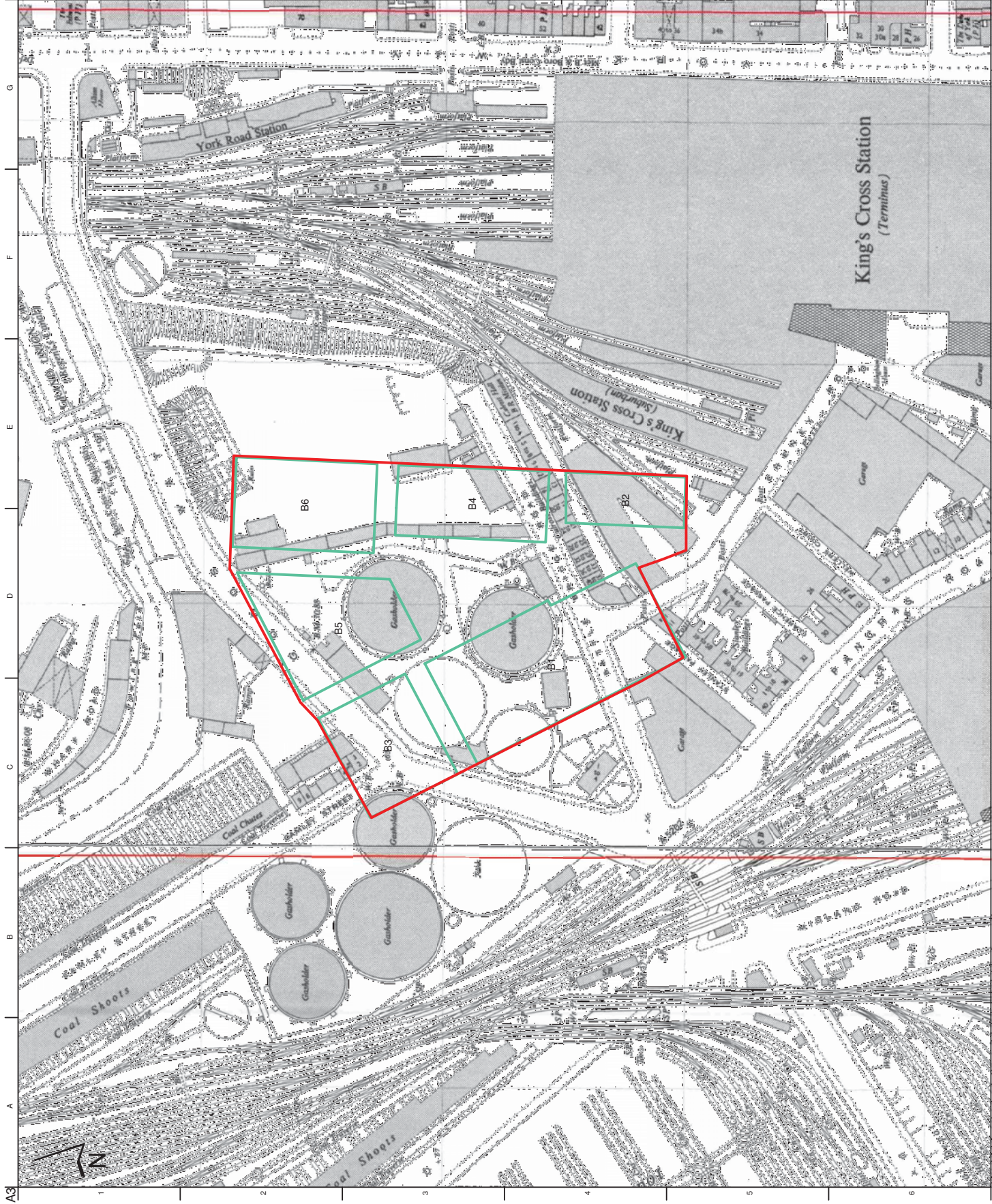




Legend

- ERP boundary
- Zone B building boundaries

02	01-07-11	ML	VC	RO
Issue	Date	By	Checked	Appd

ARUP

15 Filary Street
London W1T 4BQ
Tel +44 (0)20 7636 1531 Fax +44 (0)20 7580 3924
www.arup.com

Client
Kings Cross Central
General Partner Limited

Job Title
KXC Zone B
Earthworks and Remediation Plan

Drawing Title

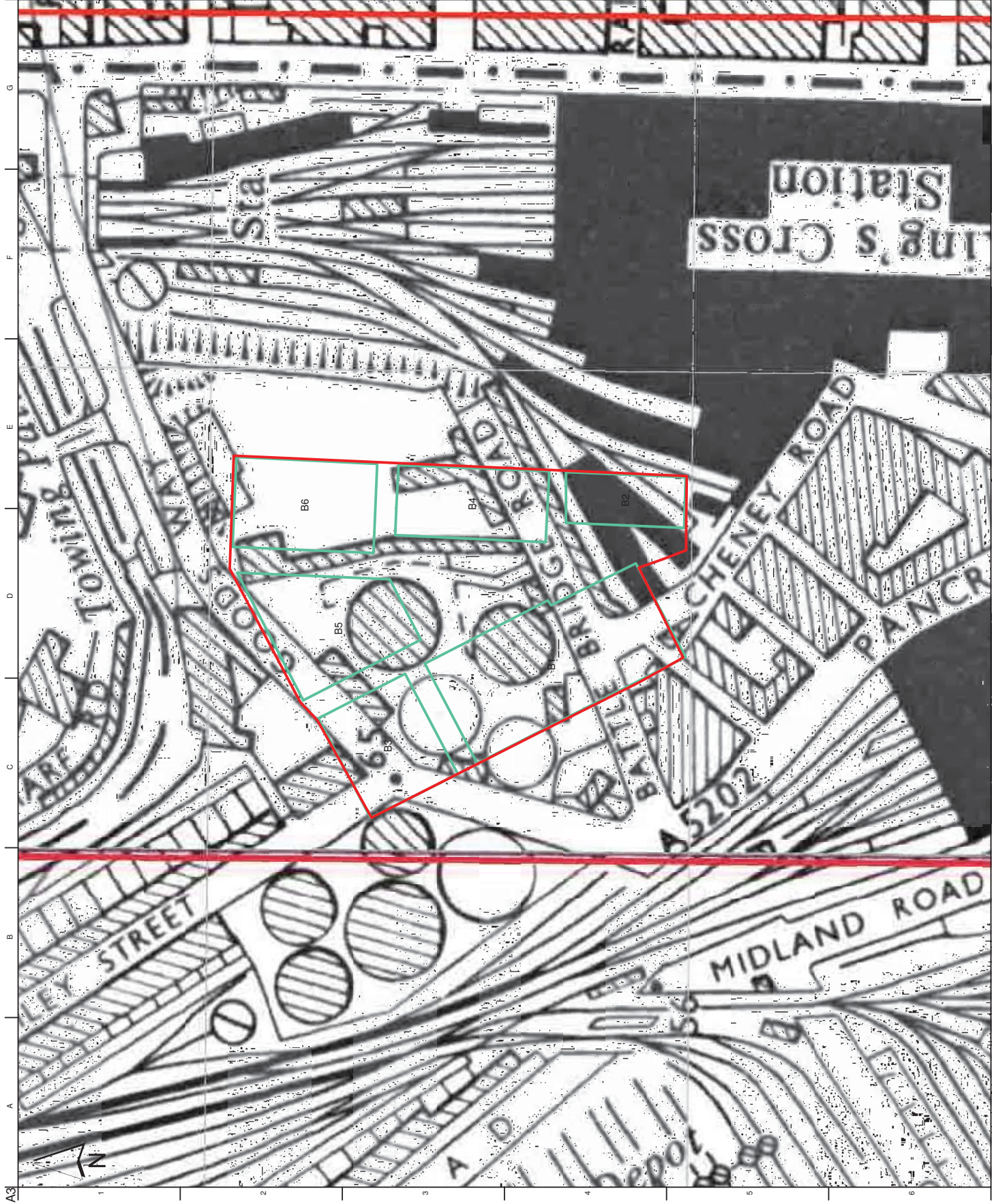
Historical mapping 1952

Scale at A3
1:1 500

Discipline
Environment

Drawing Status

Issue
Job No 216066
Drawing No Appendix A - Drawing 8
Issue 02



Legend

- ERP boundary
- Zone B building boundaries

02	01-07-11	ML	VC	RO
Issue	Date	By	Chkd	Appd

ARUP

15 Filney Street
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Client
Kings Cross Central
General Partner Limited

Job Title
KXC Zone B
Earthworks and Remediation Plan

Drawing Title

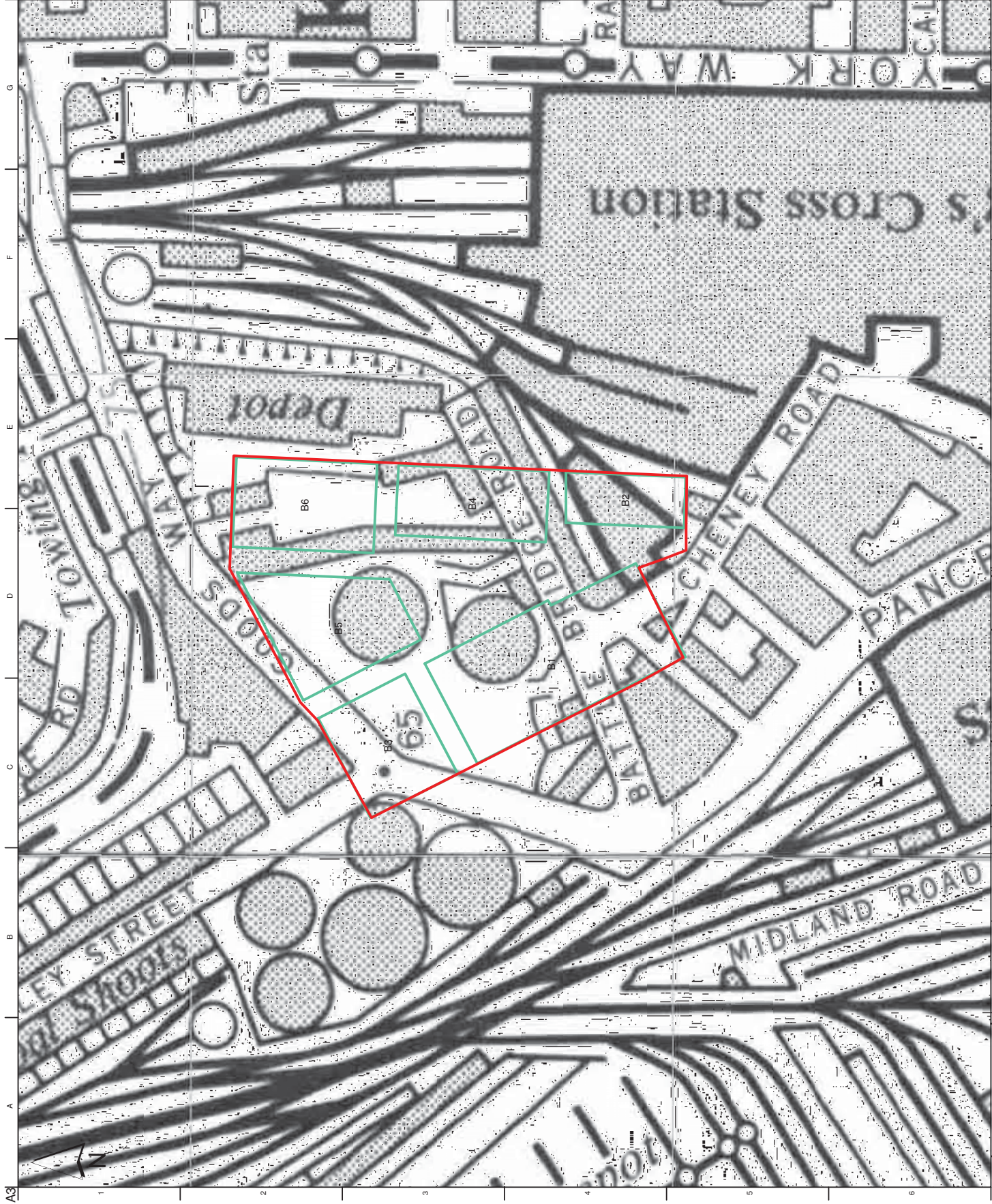
Historical mapping 1957

Scale at A3
1:1 500

Discipline
Environment

Drawing Status

Issue	Drawing No	Appendix A - Drawing 9	Issue
	216066		02



Legend

- ERP boundary
- Zone B building boundaries

Issue	Date	By	VC	RO	Appd
02	01-07-11				

ARUP

19 Filbury Street
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Client
Kings Cross Central
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Job Title
KXC Zone B
Earthworks and Remediation Plan

Drawing Title

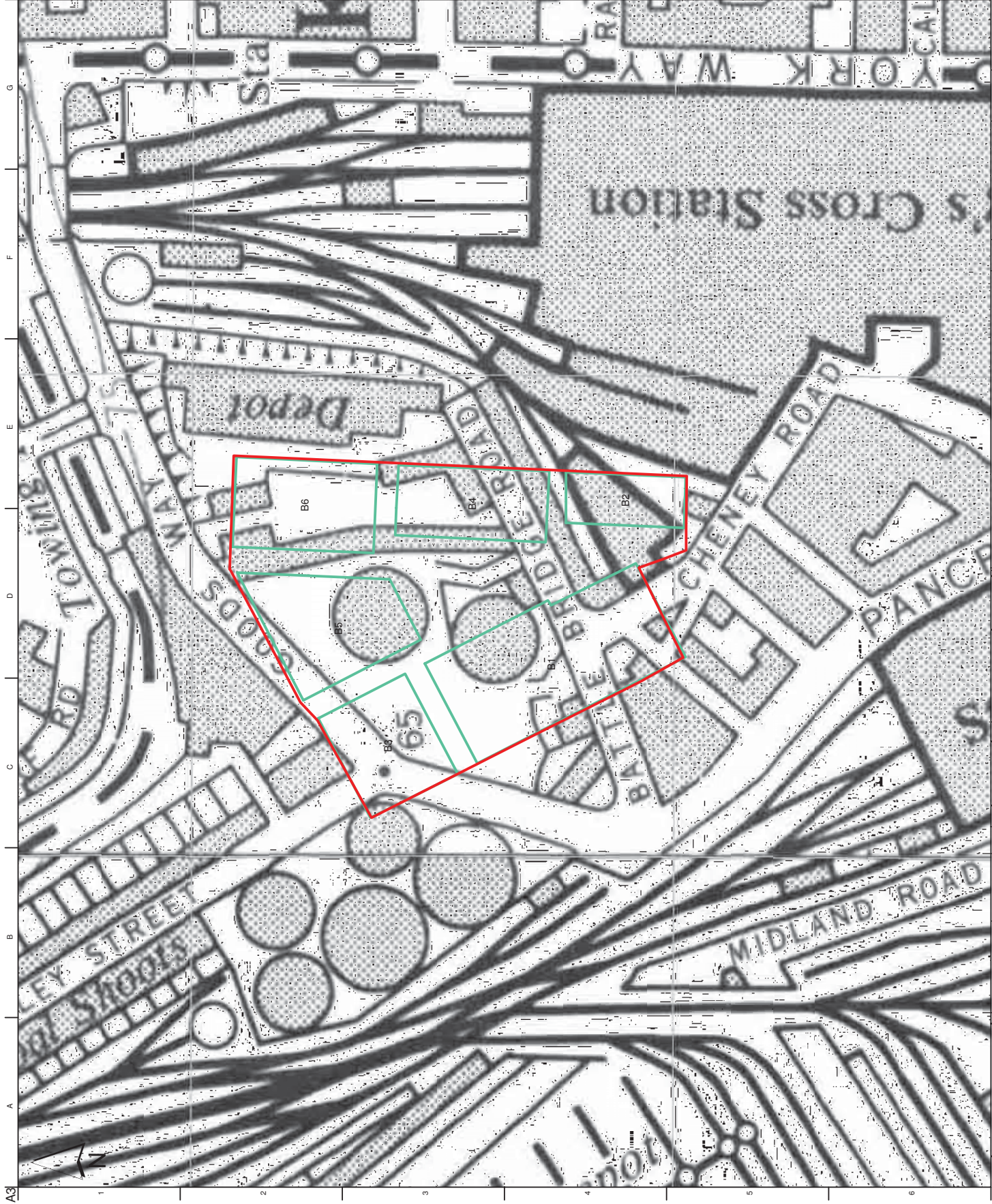
Historical mapping 1965 - 1968

Scale at A3
1:1 500

Discipline
Environment

Drawing Status

Issue	Drawing No	Appendix A - Drawing 10	Issue
	216066		02



Legend

- ERP boundary
- Zone B building boundaries

02	01-07-11	ML	VC	RO
Issue	Date	By	Checked	Approved

ARUP

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Client
Kings Cross Central
General Partner Limited

Job Title
KXC Zone B
Earthworks and Remediation Plan

Drawing Title

Historical mapping 1982 - 1986

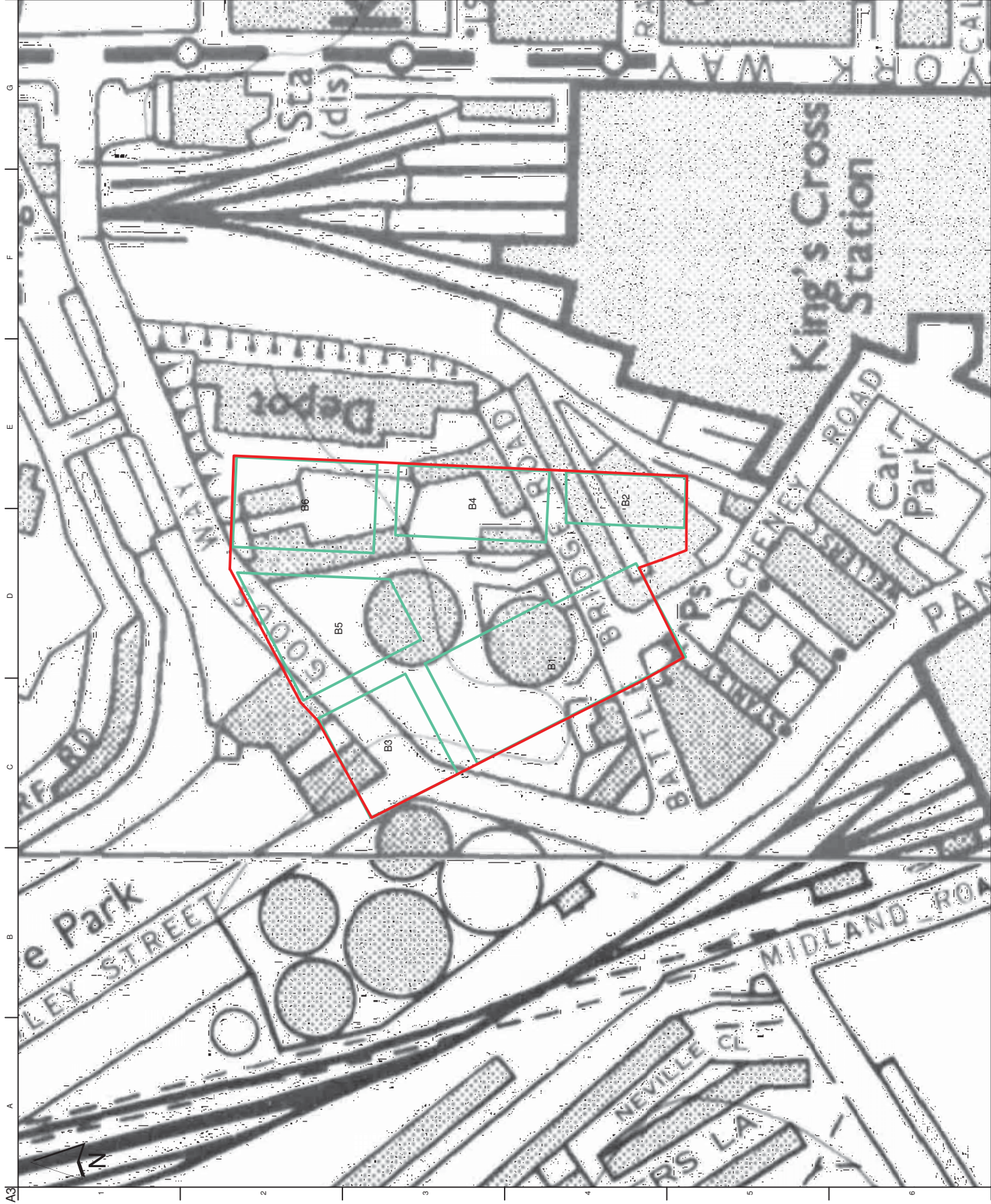
Scale at A3
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Discipline
Environment

Drawing Status

Issue

Job No	Drawing No	Issue
216066	Appendix A - Drawing 11	02



Legend

- ERP boundary
- Zone B building boundaries

Issue	Date	By	VC	RO	Appd
02	01-07-11				

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Client
Kings Cross Central
General Partner Limited

Job Title
KXC Zone B
Earthworks and Remediation Plan

Drawing Title

Historical mapping 1984 - 1989

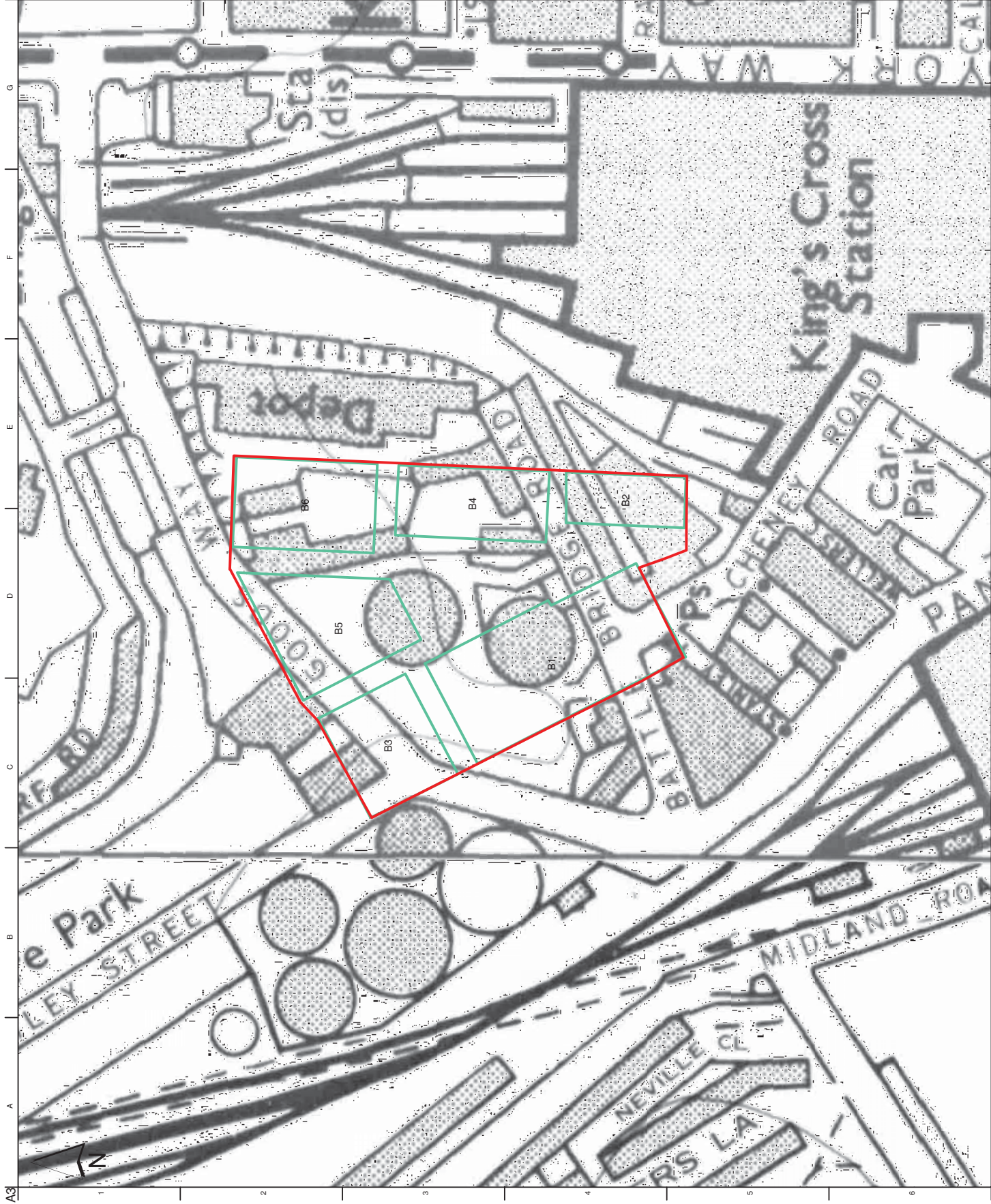
Scale at A3
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Discipline
Environment

Drawing Status

Issue

Job No	Drawing No	Issue
216066	Appendix A - Drawing 12	02



Legend

- ERP boundary
- Zone B building boundaries

02	01-07-11	ML	VC	RO
Issue	Date	By	Checked	Approved

ARUP

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Tel +44 (0)20 7836 1531 Fax +44 (0)20 7580 3924
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Client

Kings Cross Central
General Partner Limited

Job Title

KXC Zone B
Earthworks and Remediation Plan

Drawing Title

Historical mapping 1992 - 1994

Scale at A3
1:1 500

Discipline
Environment

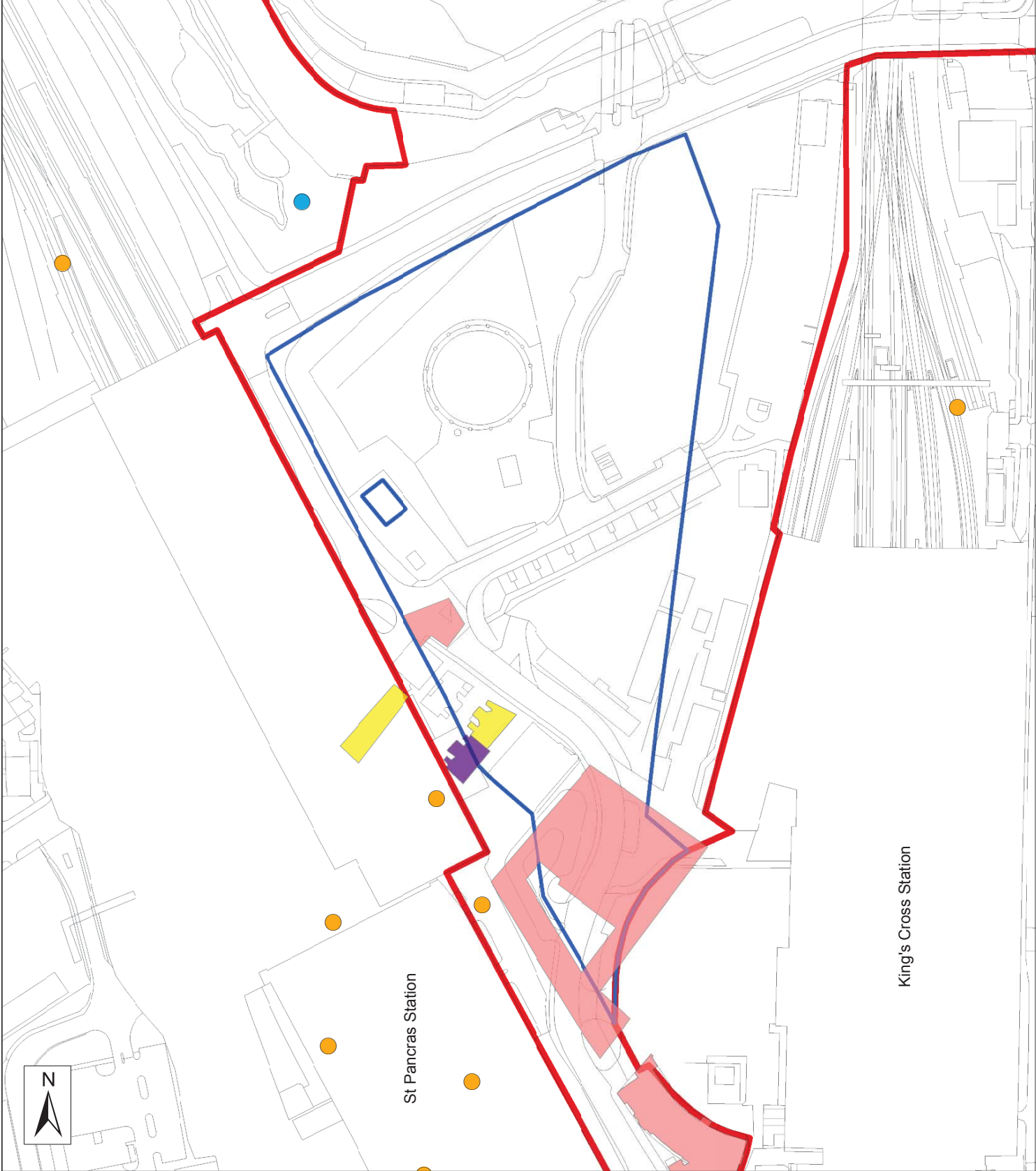
Drawing Status

Issue

Job No	Drawing No	Issue
216066	Appendix A - Drawing 13	01

Appendix B

RPS Unexploded Ordnance Plans



St Pancras Station

King's Cross Station

Legend

- Kings Cross Central Site Boundary
- UXO Area 2

Notes

- Bomb strikes recorded between 7th October 1940 - 28th July 1941
- Night Bomb strikes recorded up to 7th October 1940

War Damage Locations

- Blast Damage, Minor in Nature
- Seriously Damaged, But Repairable at Cost
- Damage Beyond Repair

NOTE: Bomb strike, war damage & historical locations are approximate.

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Data Source: RPS 2007

Status: FINAL



Explosives Engineering Team 185 Park Street London SE1 9DY
T 020 7325 0999 F 020 7325 0708 E info@rpsgroup.com W www.rpsgroup.com

Client: Argent

Project: Kings Cross Central

Title: Summary of UXO and Explosives Risk

UXO Area 2

Scale: A3 @ 1:1,500
0 0.025 0.05 km



Date: 12/06/2007 Datum: OSGB36 Projection: BNG

Drawn: SRM Checked: - Job Ref: JER3699

Drawing No: JER3699-02-003 Revision: -

Appendix C

Ground Investigation Logs and
Laboratory Test Data

Please see enclosed CD

Appendix D

Screening Assessment

D1 Screening Assessment

D1.1 Introduction

To simplify the assessment of ground contamination risks, the UK statutory guidance suggests that generic soil quality guideline values may be used for initial screening of contamination testing results, provided that such guideline values are available and are appropriate to the site circumstances and the potential pollutant linkages in question. If the results from an adequate site investigation are below the scientific and appropriate guidelines then the site can be regarded as uncontaminated. If the results exceed the screening guidelines then more detailed risk assessment is required to determine whether or not there is a need for remediation.

D1.2 Human Health

D1.2.1 Methodology

Generic assessment criteria (GAC) and Soil Guideline Values (SGVs) have been used to assess whether further action is required to break an identified pollutant linkage. Due to the form of the future development, the commercial/industrial GAC and SGVs have been used as the “assessment criteria”. GAC and SGV values have been calculated using the Contaminated Land Exposure Assessment (CLEA) model software (v.106) issued by the EA.

The assessment criteria used have been used as follows:

- SGV for 11 contaminants (arsenic, cadmium, mercury, nickel, selenium, BTEX, phenol and dioxins, furans and dioxin like polychlorinated biphenyls (PCB)) published during 2009 and 2010;
- Land Quality Management (LQM) and the Chartered Institute of Environmental Health (CIEH) GAC for 31 soil contaminants.
- Contaminated Land: Applications In Real Environments (CL:AIRE) has also developed GAC for 35 additional soil contaminants; and
- Arup has developed assessment criteria for determinands that using CLEA software and published toxicology reports in accordance with recommendations by the EA.

The screening criteria are based on the GAC values for a fraction of organic carbon (foc) content of 1%. The reported results give an average foc of 3.8% and therefore the use of 1% is considered to be a conservative assumption.

Collated soil sample laboratory results are included in Section D2.

D1.2.2 Assessment

Three soil samples collected from the backfill of gasholder 1 and gasholder 3 exceeded the assessment criteria. It is noted that one of these samples is a duplicate collected at approximately the same depth for waste acceptance criteria

testing. A summary of the samples collected from inside the gasholders that exceed the assessment criteria is provided overleaf.

Parameter	Units	No of Samples Tested	Range Measured	Assessment Criteria	No of Samples Exceeding Screening Value
Recent Investigation					
Lead	mg/kg	136	13-7,900	7,300	1
Total Cyanides	mg/kg	69	<0.5-130	78	3
Benzo[a]anthracene	mg/kg	200	290-1,000	90	5 (2.5%)
Benzo[a]pyrene	mg/kg	200	21-870	14	16 (8%)
Benzo[b]fluoranthene	mg/kg	200	140-700	100	5 (2.5%)
Benzo[k]fluoranthene	mg/kg	200	170-460	141	4 (2%)
Chrysene	mg/kg	200	290-1,000	137	4 (2%)
Dibenz(a,h)anthracene	mg/kg	200	20-45	13	2 (1%)
Indeno(1,2,3-c,d)pyrene	mg/kg	200	160-500	60	3 (1.5%)
Naphthalene	mg/kg	200	204-6,300	204	6 (3%)
Total TPH	mg/kg	172	7,100-36,000	2,130	3 (1.5%)
Historical Investigation					
Benzo[a]pyrene	mg/kg	29	0.023-17	14	1
Total TPH	mg/kg	129	3,164-51,488	2,130	6
Note: PAH results from the 'recent investigation' are from gas chromatography-mass spectroscopy analysis (GC-MS).					

Chrysotile and amosite asbestos fibres were identified in samples collected from the areas outside of the gasholders on some of the building plots and in the proposed Pancras Square during the BAM Ritchie ground investigation. A summary of the positive identifications of asbestos fibres on Zone B is provided below.

Location on Zone B	Exploratory hole	Depth (m)	Asbestos type	Asbestos proportion by weight (%)
B1	BH2015	0.3	Amosite	0.1
B6	TP2016-A	1.0	Chrysotile	0.007
Pancras Square	TP2018	0.3	Amosite and chrysotile	0.007

The results and assessment of the chemical testing indicate that elevated concentrations of PAH and asbestos fibres are present inside gasholders 3 and 9.

D1.3 Controlled Waters

D1.3.1 Methodology

In accordance with EA advice to third parties, laboratory results from water samples collected within the gasholder bases have been compared with the UK Drinking Water Standards (DWS). Where no DWS are available the results have been compared against the Environmental Quality Standards (EQS). Collated water sample laboratory results are included in Section D3.

D1.3.2 Assessment

Gasholder 1

Four water samples were collected during the BAM Ritchie ground investigation from a standpipe located inside gasholder 1 (BH2006).

Very high concentrations of TPH, PAH (specifically naphthalene) and BTEX (specifically benzene) were reported in some of the water samples as described below.

- TPH concentrations were reported up to 2,800µg/l (compared with an assessment criteria of 10µg/l);
- Naphthalene concentrations were reported up to 380µg/l (compared with an assessment criteria of 2.4µg/l) during sampling rounds 1 and 2, although concentrations were below method detection limits during sampling rounds 3 and 4; and
- Benzene concentrations were reported up to 910µg/l (compared with an assessment criterion of 1µg/l) during sampling rounds 1 and 2, although concentrations were below method detection limits during sampling rounds 3 and 4.

Slight to moderately high concentrations of cyanide, ethylbenzene and toluene were also reported in water samples collected during the monitoring rounds as described below:

- Total cyanide concentrations of up to 0.78mg/l slightly exceeded the assessment criteria of 0.5mg/l during three sampling rounds;
- A fluoranthene concentration of 0.7µg/l exceeded the assessment criteria of 0.1µg/l during sampling round four;
- Ethylbenzene concentrations of up to 60µg/l exceeded the assessment criteria of 20µg/l during sampling rounds one and two, although concentrations were below method detection limits during sampling rounds three and four; and
- Toluene concentrations of up to 110µg/l exceeded the assessment criteria of 50µg/l during sampling rounds one and two, although concentrations were below method detection limits during sampling rounds three and four.

One water sample was collected from gasholder 1 during the historical ground investigations by WYG. Concentrations of contaminants were low compared with the assessment criteria, with the exception of total cyanide which was moderately elevated.

Gasholder 3

Ten water samples were collected during the BAM Ritchie ground investigation from three borehole locations located inside gasholder 1 (BH2007, BH2012 and BH2014). BH2012 and BH2007 were positioned close to the perimeter of the gasholder. BH2007 was located off-site in Pancras square and three water samples were collected from this borehole. BH2012 was positioned in the centre of the gasholder.

Very high concentrations of TPH, PAH (specifically naphthalene and anthracene), BTEX compounds (specifically benzene, toluene and ethylbenzene) and cyanide (total, free and thiocyanate) were reported in some of the water samples as described below:

- TPH concentrations were above the assessment criteria in samples collected from BH2012 during all sampling rounds, which concentrations reported up to 2,900µg/l (compared with an assessment criteria of 10µg/l). Similar concentrations (up to 3,900µg/l) were recorded in samples collected from BH2007. TPH was significantly elevated in water samples collected from the centre of the gasholder (BH2014) with concentrations of up to 44,000µg/l.
- Naphthalene concentrations were generally significantly elevated in all water samples with recorded concentrations of up to 4000µg/l (compared with an assessment criterion of 2.4µg/l). Anthracene concentrations exceeded the assessment criteria in six samples and was particularly elevated in samples collected from the centre of the gasholder (BH2014, concentrations up to 14µg/l compared with an assessment criteria of 0.1µg/l);
- BTEX compounds were elevated above the assessment criteria in the majority of water samples, although concentrations were particularly high in samples collected from the centre of the gasholder (BH2014). Concentrations of benzene were recorded up to 24,000µg/l during sampling round 3 (compared with an assessment criterion of 1µg/l). Elevated concentrations of toluene (up to 4,300µg/l in BH2014) and ethylbenzene (up to 510µg/l in BH2012) were also recorded; and
- Total cyanide exceeded the assessment criteria in all samples, although generally these were not significantly elevated. The cyanide concentration in the sample collected from the centre of the gasholder (BH2014) during the first round of sampling was recorded at 320mg/l (compared with assessment criteria of 0.5mg/l). Free cyanide and thiocyanate also exceeded the assessment criteria in some locations.

Concentrations of heavy metals were also reported in water samples collected during the monitoring rounds as described below:

- Five arsenic concentrations of up to 15µg/l slightly exceeded the assessment criteria of 10µg/l;
- Three mercury concentrations of up to 1.6µg/l slightly exceeded the assessment criteria of 1µg/l;
- Three selenium concentrations of up to 19µg/l slightly exceeded the assessment criteria of 10µg/l; and
- Four fluoranthene concentrations of up to 2.3µg/l slightly exceeded the assessment criteria of 0.1µg/l.

Groundwater samples were not collected from gasholder 3 during the historical ground investigations.

Gasholder 9

Nine water samples were collected during the BAM Ritchie ground investigation from two boreholes located inside gasholder 9 (BH2004 and BH2016). Both boreholes were positioned close to the perimeter of the gasholder. BH2016 is located off-site on plot B3.

Very high concentrations of TPH, PAH (specifically naphthalene), BTEX compounds (specifically benzene, toluene and ethylbenzene) and cyanide (total, free and thiocyanate) were reported in some of the water samples as described below:

- TPH concentrations were above the assessment criteria in approximately half of the samples collected from both boreholes. TPH was significantly elevated in water samples collected from BH2004 during the first round of sampling, with concentrations of up to 310,000µg/l (compared with an assessment criteria of 10µg/l). TPH concentrations decreased during the later sampling rounds and were below detection limits in some instances;
- Naphthalene concentrations were significantly elevated in water samples collected from BH2004 during the first sampling round, with recorded concentrations of up to 5,500µg/l (compared with an assessment criteria of 2.4µg/l). Concentrations reduced to below detection limits during the later rounds of sampling and were also below detection limits in samples collected from BH2016;
- BTEX compounds in water samples collected during the first sampling round from BH2004 were elevated above the assessment criteria, although concentrations decreased in the following sampling rounds and were low in samples collected from BH2016. Concentrations of benzene were recorded up to 1,500µg/l during sampling round one (compared with assessment criteria of 1µg/l). Elevated concentrations of toluene (up to 300µg/l) and ethylbenzene (up to 57µg/l) were also recorded in samples collected from BH2004.

Slight to moderately high concentrations of lead, selenium, cyanide and ethylbenzene were also reported in water samples collected during the monitoring rounds as described below:

- Five lead concentrations of up to 110µg/l exceeded the assessment criteria of 25µg/l;
- Two total cyanide concentrations of up to 0.71mg/l slightly exceeded the assessment criteria of 0.5mg/l during the first sampling round; and
- Two fluoranthene concentrations of up to 0.6µg/l exceeded the assessment criteria of 0.1µg/l.

Samples collected from the northern side of gasholder 9 (off-site on plot B3) generally contained lower concentrations of contaminants, although it is noted that fewer sampling rounds were undertaken from this location.

The water results of the Oscar Faber ground investigation indicated significantly elevated concentrations of heavy metals (notably lead with concentrations up to

830,000µg/l, cadmium with concentrations up to 510µg/l, arsenic with concentrations up to 1350µg/l and mercury up to 210µg/l in samples collected from BH4a). Coal tars and mineral oils were commonly tested for at this time (rather than TPH). Concentrations of coal tars exceeded 9000mg/l which is considered to be a significantly elevated result.

One water sample was collected from gasholder 9 during the historical ground investigations by WYG. Concentrations of contaminants were low compared with the assessment criteria, with the exception of total cyanide which was moderately elevated.

Gasholder 12

Four water samples were collected from BH2001 installed inside gasholder 12 during the BAM Ritchie ground investigation.

Elevated concentrations of TPH, PAH (particularly naphthalene) and BTEX (particularly benzene and toluene) were reported in water samples collected during sampling rounds one, two and three as described below:

- TPH concentrations were reported up to 13,000µg/l (compared with an assessment criteria of 10µg/l);
- Naphthalene concentrations were reported up to 3,600µg/l (compared with an assessment criteria of 2.4µg/l);
- Benzene concentrations were reported up to 440µg/l (compared with an assessment criteria of 1µg/l); and
- Toluene concentrations were reported up to 140µg/l (compared with an assessment criterion of 50µg/l).

Slight to moderately elevated concentrations of PAH (specifically anthracene and fluoranthene), cyanides and BTEX (ethylbenzene) were also reported as described below:

- One anthracene concentration of 0.3µg/l exceeded the assessment criteria of 0.1µg/l;
- Two fluoranthene concentrations of up to 0.6µg/l exceeded the assessment criteria of 0.1µg/l;
- Total cyanide concentrations of up to 8mg/l exceeded the assessment criteria of 0.5mg/l during each monitoring round;
- Two thiocyanate concentrations of up to 1.6mg/l exceeded the assessment criteria of 0.17mg/l; and
- Ethylbenzene concentrations of up to 33µg/l exceeded the assessment criteria of 20µg/l during each monitoring round.

Ammoniacal nitrogen and sulphate concentrations were reported above the assessment criteria in all the water samples collected from gasholder 12. The highest concentrations of ammoniacal nitrogen and sulphate were 17mg/l and 1,400mg/l respectively.

Gasholder B

One water sample was collected from gasholder B during the historical ground investigations by WYG. Concentrations of contaminants were low compared with the assessment criteria, with the exception of total cyanide which was moderately elevated.

Gasholder C

One borehole was installed in BH1009 within gasholder base C. PBA reported elevated concentrations of PAHs in the water sample collected from the borehole.

Gasholders A, D and 8

No groundwater samples were collected from within the bases of former gasholders A, D or 8.

Outside Gasholders

Groundwater samples collected from BH2015 and BH2005C had determinand concentrations below the assessment criteria, with the exception of sulphate and ammoniacal nitrogen. An elevated lead result from BH2015 was reported from one sample.

D1.4 Ground Gas and Vapour

D1.4.1 Methodology

The ground gas/vapour regime has been assessed by considering both the concentrations of landfill gases in the ground, the quantity and variability of surface emission rates (which is related to ongoing biodegradation and further production of gases) and short term variations (especially peaks) in surface emissions.

The following published guidance on the assessment of ground gas has been used:

- The Building Regulations 2000 Approved Document C;
- CIRIA Report C665 Assessing risks posed by hazardous ground gases to buildings;
- BS 8485: Code of practice for the characterisation and remediation from ground gas in affected developments and
- The Local Authority Guide to Ground Gas, CIEH; London, 2008.

4.6.4 Assessment

The gas monitoring results from the historical and recent ground investigations are provided in Section D4. A summary of the results is presented below:

- All gas results from the 2010/11 PBA ground investigation were classified as characteristic situation (CS)1 which is defined as 'very low hazard potential';

- Carbon dioxide did not exceed 5% concentration by volume in any of the monitoring measurements;
- Hydrogen sulphide was at 1% or below detection limits for all monitoring rounds, (where measured); and
- Methane did not exceed 0.2% concentration by volume in any of the monitoring measurements during the 2010/11 PBA or WYG ground investigations.
- One gas sample was collected from BH2003 which is outside of the gasholder bases. Ammonia was reported at a concentration of 0.02mg/m^3 .
- The sample collected from BH2001 in gasholder 12 reported a naphthalene concentration of 2.83mg/m^3 .
- One sample collected from BH2004 in gasholder 9 reported toluene concentrations of 630mg/m^3 and 450mg/m^3 from the shallow and deep monitoring wells respectively.
- Gas samples collected in gasholder 3 (BH2007, BH2012, BH2014) reported concentrations of ammonia (maximum of 0.22mg/m^3) and naphthalene (0.014mg/m^3).
- Gas samples collected from outside of the gasholders (BH2005C, BH2009 and BH2015) reported concentrations of ammonia (0.06mg/m^3 in BH2009), naphthalene (0.029mg/m^3 in BH2005C, 0.002mg/m^3 in BH2009 and 0.003mg/m^3 in BH2015).

Historical Ground Investigations

- Gas monitoring was undertaken from standpipes located inside gasholders 1 and 9. Low concentrations of carbon dioxide and methane were recorded.
- Very high levels of methane were measured during the WYG ground investigation in gasholder B (BH107). These concentrations classify this area as CS3 which is defined as 'moderate hazard potential'. It was reported by WYG that the measured concentrations were 'above the detection limits' of the gas meter. Subsequently it is reported that a 'Transco engineer detected natural gas' at this location. A gas sample collected at this location reported elevated concentrations of methane, ethane, propane and butane. Elevated concentrations of methane (50%) were also detected in a standpipe (BH102) located in the area outside of the gasholders, which classifies this area as CS2 ('low hazard potential'). However no methane was measured at this location after it had been vented for one hour and sealed for a further two hours.
- A value of 4% methane was recorded in gasholder 9 during the Oscar Faber ground investigation. This concentration reduced to 0.5% after a certain amount of dissipation time, the duration of which was not specified in the report.

D2 Soil Screening Tables

		Indicates where the data exceeds the screening criteria

Ground Investigation		Regulator Number		Lab Ref	Date	Expositional Location	Zone & Location	Location on plot gas holder number		Depth (m)	Strata	Screening Criteria		Units	
														Permeant	
														Concentration	
121883	AF10247	AF10248	AF10249	AF10250	AF10251	AF10252	AF10253	AF10254	AF10255	AF10256	AF10257	AF10258	AF10259	14	6.6
														1.4	0.16
														20.0	0.49
														28	1.4
														37	0.21
														48	0.34
														59	0.58
														70	0.90
														81	1.30
														92	1.70
103	2.10														
114	2.50														
125	2.90														
136	3.30														
147	3.70														
158	4.10														
169	4.50														
180	4.90														
191	5.30														
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862	29.70														
873	30.10														
884	30.50														
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Soil Screening Assessment - BAM Nutfall Ground Investigation Data

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Soil Screening Assessment - BAM Nuttall Ground Investigation Data

Soil Screening Assessment - BAM Nuttall Ground Investigation Data

Ground Investigation		Region Number		Lab Ref		Date		Exposure		Lab Location		Zone & Location		Location on plot gas holder number	
Depth (m)	Strata	PBA 2010		PBA 2010		PBA 2010		PBA 2010		PBA 2010		PBA 2010		PBA 2010	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
4m	Outside gasholders	122929	AF61342	AF61341	04/07/2011	AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333
25/01/2011	17/01/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
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AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333	AF61332	AF61331	AF61330	AF61329	AF61328	AF61327
AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333	AF61332	AF61331	AF61330	AF61329	AF61328	AF61327
AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333	AF61332	AF61331	AF61330	AF61329	AF61328	AF61327
AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333	AF61332	AF61331	AF61330	AF61329	AF61328	AF61327
AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333	AF61332	AF61331	AF61330	AF61329	AF61328	AF61327
AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333	AF61332	AF61331	AF61330	AF61329	AF61328	AF61327
AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333	AF61332	AF61331	AF61330	AF61329	AF61328	AF61327
AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333	AF61332	AF61331	AF61330	AF61329	AF61328	AF61327
AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333	AF61332	AF61331	AF61330	AF61329	AF61328	AF61327
AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333	AF61332	AF61331	AF61330	AF61329	AF61328	AF61327
AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333	AF61332	AF61331	AF61330	AF61329	AF61328	AF61327
AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333	AF61332	AF61331	AF61330	AF61329	AF61328	AF61327
AF61342	AF61341	AF61340	AF61339	AF61338	AF61337	AF61336	AF61335	AF61334	AF61333	AF61332	AF61331				

Soil Screening Assessment - BAM Nuttall Ground Investigation Data

D3 Groundwater Screening Tables

Groundwater Screening Assessment - Historical Data

[illegible]

[illegible]

[illegible]

[illegible]

nc = no criteria		Concentration exceeds the assessment criteria															Screening Criteria		Units	Standard															
Ground Investigation Report Number		PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024	PBA 2011 122024							
Lab Ref		AF64184	AF64188	AF64183	AF64182	AF64189	AF64187	AF64185	AF64181	AF64186	AF64180	AF64188	AF64189	AF64187	AF64185	AF64181	AF64186	AF64180	AF64188	AF64182	AF64189	AF64187	AF64185	AF64181	AF64186	AF64180	AF64188	AF64182							
Date		13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011							
Exploratory Hole Location Depth (mbgl)		BH2006 5.0	BH2012 4.6	BH2004 2.5	BH2004 3.0	BH2015 3.2	BH2001 2.5	BH2010 3.0	BH2003 1.8	BH2007 8.0	BH2001 2.5	BH2015 3.2	BH2004 4.6	BH2012 5.0	BH2006 5.0	BH2004 2.5	BH2004 3.0	BH2015 3.2	BH2001 2.5	BH2010 3.0	BH2003 1.8	BH2007 8.0	BH2001 2.5	BH2015 3.2	BH2004 4.6	BH2012 5.0	BH2006 5.0	BH2004 2.5							
Location		Inside GH1 B1	Inside GH3 B1	Inside GH9 B1	Inside GH9 B1	Outside GHs B1	Inside GH2 B3	Outside GHs B3	Outside GHs B5	Outside GHs Pancras Square	Inside GH2 B3	Outside GHs B1	Inside GH9 B1	Inside GH3 B1	Inside GH1 B1	Inside GH9 B1	Inside GH9 B1	Inside GH9 B1	Inside GH2 B3	Outside GHs B3	Outside GHs Pancras Square	Inside GH3 B5	Outside GHs Pancras Square	Inside GH2 B3	Outside GHs B1	Inside GH9 B1	Inside GH3 B1	Inside GH1 B1							
		Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1	Round 1							
Inorganics																																			
Arsenic	10	4.4	28	6.1	4.9	5.5	10	3.3	2.8	7.3	1.9																								
Cadmium	5	0.14	0.16	0.1	0.11	<0.080	0.14	<0.080	<0.080	<0.080	<0.080	0.2																							
Chromium	50	<1.0	6.5	<1.0	2	6.4	<1.0	13	<1.0	1.2	2.9	23																							
Copper	2000	5.2	7.2	3.6	5.9	17	28	5.4	13	20	3.9	<1.0																							
Lead	25	8.4	8	16	40	16	11	<1.0	<1.0	8.4	<1.0	<1.0																							
Mercury	1	<0.50	1.2	0.57	<0.50	<0.50	<0.50	<0.50	<0.50	0.64	<0.50	<0.50																							
Nickel	50	6.8	<1.0	7.6	6.9	8.1	23	7.6	7.3	9.1	11	400																							
Selenium	10	6.2	14	26	3.3	12	8.2	7.7	9.4	7.4	4.7	7																							
Zinc	5000	7.7	32	82	100	67	46	32	80	62	63	7400																							
Miscellaneous																																			
Alkalinity	nc	mg CaCO3 l ⁻¹	89	500	200	180	230	120	87	440	160	400																							
Chloride	nc	mg/l	120	280	200	160	520	110	95	130	130	59	64																						
Sulphate as SO4	250	mg/l	1200	380	1300	1500	740	490	580	1400	680	1000	3100																						
Cyanide total	0.5	mg/l	0.78	320	0.71	0.65	0.35	8	0.11	0.1	3.6	0.07	0.21																						
Cyanide free	0.001	mg/l	<0.05	0.34	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05																						
Thiocyanate	0.17	mg/l	<0.5	7.5	<0.5	<0.5	<0.5	1.6	<0.5	2.2	<0.5	0.91	<0.01																						
Ammoniacal Nitrogen as N	0.39	mg/l	6.6	46	5.3	2.9	0.27	17	0.93	0.16	16	4.4	<0.01																						
pH	nc	pH units	7.7	11.4	7.5	7.6	7.6	8.8	8.9	7.6	11.8	8	5.8																						
Electrical conductivity	nc	µS cm ⁻¹	2800	2400	3400	3500	3600	1700	1900	3100	2400	4100																							
PAH																																			
Acenaphthene	2570	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	0.9	54																						
Acenaphthylene	4010	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	27																						
Anthracene	0.1	ug/l	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	22																						
Benzo(a)anthracene	1	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4.9																						
Benzo(b)pyrene	0.01	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.9																						
Benzo(k)fluoranthene	17	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3																						
Benzo(a)fluoranthene	0.36	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.9																						
Benzo(g,h,i)perylene	0.18	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																						
Chrysene	1.2	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3.1																						
Dibenz(a,h)anthracene	0.83	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																						
Fluoranthene	0.1	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	27																						
Fluorene	nc	ug/l	<0.1	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	65																						
Indeno(1,2,3-cd)pyrene	0.0036	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																						
Naphthalene	2.4	ug/l	37	2800	730	5500	1.4	76	<0.1	<0.1	<0.1	<0.1	8400																						
Phenanthrene	30	ug/l	<0.1	2.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	120																						
Pyrene	106	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	18																						
Total of 16 PAH	nc	ug/l	37	2800	730	5500	<2	76	<2	<0.1	<0.1	<0.1	8700																						
Coronene	nc	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																						
PCB																																			
PCBs as Aroclor 1242	nc	ug/l																																	
TPH																																			
TPH	10	ug/l	1300	3900	2800	310000	<10	1000	<10	5700	170	490000																							
BTEX																																			
Benzene	1	ug/l	910	2500	1500	440	<1	440	<1	3700	<1	3700	<1																						
Ethylbenzene	20	ug/l	65	510	3.8	3.8	<1	29	<1	380	<1	380	<1																						
Toluene	50	ug/l	110	970	300	190	<1	140	<1	620	<1	620	<1																						
m- & p-Xylene	nc	ug/l	35	360	79	240	<1	28	<1	450	<1	450	<1																						
o-Xylene	nc	ug/l	38	230	39	110	<1	20	<1	240	<1	240	<1																						

D4 Gas Monitoring Data

Location	Date	Atmospheric pressure (mbar)	Methane (%)	Carbon dioxide (%)	Gas flow (l/hr)
Oscar Faber					
BH3 located inside GH9 on B1 B3 boundary (initial reading)	10/04/91	Not reported	4	0.04	Not reported
BH3 (dissipated reading)	10/04/91	Not reported	0.5	0.04	Not reported
BH5 (GH1, initial reading)	10/04/91	Not reported	1.3	0.05	Not reported
BH5 (GH1, dissipate reading)	10/04/91	Not reported	0.5	0.05	Not reported
White Young Green					
BH104 located inside GH9 on B1 plot	21/07/99	1009	0.1	0.1	-1.0
	10/08/99	1008	0.0	0.1	-1.5
	07/09/99	1008	0.1	0.0	0.1
BH106 located inside GH1 on B1 plot	21/07/99	1009	0.1	0.2	0.05
	10/08/99	1009	0.1	0.3	3.4
	07/09/99	1010	0.0	1.2	0.5
BH107 located inside GHB on B1 plot	21/07/99	1009	1.0	0.2	0.03
	10/08/99	1006	>150	5.0	0.0
	07/09/99	1009	47.6	1.0	0.2
BH102 located outside gasholders on B1 plot	21/07/99	1010	5.0	0.0	0.05
	10/08/99	1007	49.6	0.2	>4.8
	07/09/99	1010	16	0.1	0.02
BH102C located outside gasholders on B5 plot	21/07/99	1009	0.0	0.0	-0.3
	10/08/99	1008	0.0	9.2	0.56
	07/09/99	1009	0.0	9.7	0.1

Historical Gas Monitoring Data Zone B

Location	Date	Atmospheric pressure (mbar)	Methane (%)	Carbon dioxide (%)	Gas flow (l/hr)
BH103 located outside gasholders between B5 and B6 plots	21/07/99	1009	0.0	0.7	-0.9
	10/08/99	1008	0.0	2.2	-0.16
	07/09/99	1010	0.0	2.3	0.1
BH101 located outside gasholders in Pancras Square	21/07/99	1009	0.0	0.6	-1.8
	10/08/99	1009	0.0	0.1	-0.4
	07/09/99	1010	0.0	0.0	0.0
BH105A located inside gasholder A in Pancras Square	21/07/99	1009	0.2	0.0	-1.0
	10/08/99	1009	0.3	0.6	-24.0
	07/09/99	1009	0.3	0.5	0.2
Peter Brett Associates (monitoring undertaken by Norwest Holst)					
BH1007 located outside gasholders in plot B6	25/09/2008	1026	<0.1	0.0	<0.1
	01/10/2008	999	<0.1	0.0	<0.1
	09/10/2008	1028	<0.1	0.0	<0.1
	16/10/2008	1010	<0.1	0.0	<0.1
	23/10/2008	1019	<0.1	0.0	<0.1
	29/10/2008	1009	<0.1	0.0	<0.1
BH1010 located outside gasholders in Pancras Square	25/09/2008	1026	<0.1	0.0	<0.1
	01/10/2008	999	<0.1	0.0	<0.1
	09/10/2008	1028	<0.1	0.0	<0.1
	16/10/2008	1010	<0.1	0.0	<0.1
	23/10/2008	1019	<0.1	0.0	<0.1
	29/10/2008	1009	<0.1	0.0	<0.1
BH1019 located outside gasholders in plot B2	25/09/2008	1026	<0.1	0.0	<0.1
	01/10/2008	999	<0.1	0.0	<0.1
	09/10/2008	1028	<0.1	0.0	<0.1
	16/10/2008	1010	<0.1	0.0	<0.1
	23/10/2008	1019	<0.1	0.0	<0.1
	30/10/2008	996	<0.1	0.0	<0.1

Historical Gas Monitoring Data Zone B

Location	Date	Atmospheric pressure (mbar)	Methane (%)	Carbon dioxide (%)	Gas flow (l/hr)	Characteristic situation
BH2005C located outside the gasholders on B1 plot	09/12/10	1029	0.1	< 0.01	< 0.01	CS1
	14/12/10	1032	0.1	0.0	< 0.01	CS1
	16/12/10	1004	0.1	0.0	< 0.01	CS1
	06/01/11	997	0.0	0.0	< 0.01	CS1
	11/01/11	1002	0.0	0.2	< 0.01	CS1
	25/01/11	1016	0.0	0.0	0.0	CS1
	09/02/11	1016	0.1	0.0	0.0	CS1
	24/02/11	1020	0.0	0.1	0.0	CS1
	10/03/11	1009	0.0	0.2	0.0	CS1
	24/03/11	1034	0.0	0.0	0.1	CS1
BH2004 shallow standpipe located inside GH9 on B1 plot	14/12/10	1032	0.1	0.0	<0.01	CS1
	16/12/10	1004	0.1	0.0	<0.01	CS1
	06/01/11	997	0.0	0.0	<0.01	CS1
	11/01/11	1003	0.1	0.2	<0.01	CS1
	02/02/11	1006	0.0	0.1	0.0	CS1
	09/02/11	1016	0.0	0.0	0.0	CS1
	24/02/11	1018	0.0	0.3	0.0	CS1
	10/03/11	1006	0.0	0.0	0.0	CS1
	24/03/11	1034	0.0	0.0	0.0	CS1
BH2004 deep standpipe located inside GH9 on B1 plot	14/12/10	1032	0.2	0.0	<0.01	CS1
	16/12/10	1004	0.1	0.0	<0.01	CS1
	06/01/11	997	0.0	0.0	<0.01	CS1
	11/01/11	1003	0.0	0.1	<0.01	CS1
	02/02/11	1006	0.0	0.0	0.0	CS1
	09/02/11	1016	0.0	0.0	0.0	CS1
	24/02/11	1018	0.0	0.2	0.0	CS1
	10/03/11	1006	0.0	0.0	0.0	CS1
	24/03/11	1032	0.0	0.0	0.0	CS1
BH2006 shallow standpipe located inside gasholder 1 on B1 plot	14/12/10	1033	0.1	0.0	< 0.01	CS1
	16/12/10	999	0.1	0.1	< 0.01	CS1
	07/01/11	998	0.0	0.1	< 0.01	CS1
	11/01/11	1003	0.0	0.1	< 0.01	CS1
	02/02/11	1006	0.0	0.0	0.0	CS1
	09/02/11	1016	0.0	0.0	0.2	CS1
	24/02/11	1018	0.0	0.0	0.0	CS1

BAM Ritchie Gas Monitoring Data 2010/2011

Location	Date	Atmospheric pressure (mbar)	Methane (%)	Carbon dioxide (%)	Gas flow (l/hr)	Characteristic situation
	10/03/11	1006	0.0	0.0	0.0	CS1
	24/03/11	1032	0.0	0.0	0.0	CS1
BH2006 deep standpipe located inside gasholder 1 on B1 plot	14/12/10	1033	0.1	0.0	< 0.01	CS1
	16/12/10	999	0.1	0.1	< 0.01	CS1
	07/01/11	998	0.0	0.1	< 0.01	CS1
	11/01/11	1003	0.0	0.0	< 0.01	CS1
	02/02/11	1006	0.0	0.0	0.0	CS1
	09/02/11	1016	0.0	0.0	0.0	CS1
	24/02/11	1018	0.0	0.0	0.0	CS1
	10/03/11	1006	0.0	0.0	0.0	CS1
	24/03/11	1034	0.0	0.0	0.0	CS1
BH2012 located inside gasholder 3 on B1 plot	16/12/10	1006	0.1	0.0	< 0.01	CS1
	06/01/11	998	0.0	0.0	< 0.01	CS1
	11/01/11	1000	0.0	0.0	< 0.01	CS1
	24/01/11	1029	0.0	0.0	0.0	CS1
	09/02/11	1016	0.0	0.0	0.0	CS1
	24/02/11	1020	0.0	0.0	0.0	CS1
	10/03/11	1009	0.0	0.0	0.0	CS1
	24/03/11	1034	0.0	0.0	0.0	CS1
BH2014 located inside gasholder 3 on B1 plot	24/01/11	1029	0.0	0.0	0.0	CS1
	09/02/11	1016	0.7	0.0	-0.5	CS1
	24/02/11	1020	0.0	0.0	0.0	CS1
	10/03/11	1009	0.0	0.0	0.0	CS1
	24/03/11	1034	0.0	0.0	0.0	CS1
BH2009 located outside gasholders on B1plot	11/01/11	1001	0.1	0.1	< 0.01	CS1
	26/01/11	1006	0.0	0.0	0.0	CS1
	09/02/11	1016	0.0	0.0	0.0	CS1
	24/02/11	1020	0.0	0.2	0.0	CS1
	10/03/11	1006	0.0	0.0	0.0	CS1
	24/03/11	1034	0.0	0.0	0.0	CS1
BH2001 located inside GH12 on B3 plot	16/12/10	999	0.1	0.1	<0.01	CS1
	07/01/11	998	0.0	0.1	<0.01	CS1
	11/01/11	1003	0.2	0.0	<0.01	CS1
	25/01/11	1016	0.0	0.0	<0.01	CS1
	09/02/11	1013	0.0	0.0	<0.01	CS1

BAM Ritchie Gas Monitoring Data 2010/2011

Location	Date	Atmospheric pressure (mbar)	Methane (%)	Carbon dioxide (%)	Gas flow (l/hr)	Characteristic situation
	24/02/11	1018	0.0	0.0	<0.01	CS1
	10/03/11	1006	0.0	0.0	0.0	CS1
	24/03/11	1032	0.0	0.1	0.0	CS1
BH2003 located outside the gasholders on B3 plot	14/12/10	1033	0.1	0.1	<0.01	CS1
	16/12/10	999	0.1	0.1	<0.01	CS1
	07/01/11	998	0.0	0.1	<0.01	CS1
	11/01/11	1003	0.2	0.0	<0.01	CS1
	24/01/11	1029	0.0	0.0	<0.01	CS1
	09/02/11	1013	0.7	0.7	<0.01	CS1
	24/02/11	1018	0.0	0.0	<0.01	CS1
	10/03/11	1006	0.0	0.1	0.0	CS1
	24/03/11	1032	0.0	0.0	0.0	CS1
BH2002 located outside the gasholders on B3 plot	26/01/11	1006	0.0	0.0	0.0	CS1
	09/02/11	1013	0.0	0.9	0.0	CS1
	24/02/11	1020	0.0	0.1	0.0	CS1
	10/03/11	1006	0.0	0.0	0.0	CS1
	24/03/11	1032	0.0	0.0	0.0	CS1
BH2016 shallow standpipe located outside the gasholders on B3 plot	02/02/11	1006	0.0	0.4	0.0	CS1
	24/02/11	1018	0.0	0.0	0.0	CS1
	10/03/11	1006	0.0	0.2	0.0	CS1
	24/03/11	1032	0.0	0.5	0.1	CS1
BH2016 deep standpipe located outside the gasholders on B3 plot	02/02/11	1006	0.0	0.0	0.0	CS1
	24/02/11	1018	0.0	0.3	0.0	CS1
	10/03/11	1006	-0.3	0.0	0.0	CS1
	24/03/11	1032	0.0	0.0	0.0	CS1



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