

Sample Selection for Chemical Analysis

- 6.10 Soil samples were taken at one metre intervals with additional samples taken when a different stratum or specific evidence of contamination was encountered. Each borehole was developed by purging three well volumes after the monitoring well was installed, and then a further three well volumes, prior to groundwater sampling on 9th June 2000.
- 6.11 All of the water samples collected and 73 out of 74 soil samples recovered from the exploratory holes and excavations were selected for analysis on the following basis:
- all visually or olfactory contaminated soil samples were analysed for the current Lattice Property Holdings (LPH) soils analytical suite (Table 6.2).
 - generally, when visually contaminated soil was encountered, a sample from the underlying, relatively less contaminated soil was analysed to confirm the vertical extent of the contamination;
 - a selection of visually and olfactory less contaminated soil samples, both from the made ground and from the natural ground, were analysed;
 - ten soil samples from a selection of geological strata were tested for total organic matter;
 - eight soil samples were scheduled for leachate testing; the resulting leachate was tested for the current LPH analytical suite for leachates (Table 6.2);
 - asbestos analysis was only scheduled if visually evident. In the event, no asbestos was visible;
 - eleven groundwater samples were scheduled for the current LPH analytical suite for waters (Table 6.2).

Sampling and Analysis

- 6.12 Analysis of samples was carried out by TES Bretby, a UKAS accredited and Lattice Property Holdings approved laboratory. The results are given in Appendix C. Samples of soil and water were tested for the analytical suites specified in Table 6.2. Laboratory analytical quality control standard charts are attached in Appendix E.

Table 6.2. : Analytical Suites

Package 1 - Soils (42 Samples)	
pH	Phenols - total
Moisture Content	Polycyclic Aromatic Hydrocarbons
Loss on ignition	(PAH) - total of 16 priority PAHs
Easily Liberatable Cyanide	Elemental Sulphur
Total Cyanide	Water Soluble Sulphate
Complex Cyanide	Water Soluble Chloride
Mercury	Exchangeable Ammonia
Arsenic	Selenium
Cadmium	Chromium
Lead	Total Organic Carbon
Package 2 - Soils and Waters (as required)	
BTEX	
TPH (Total Petroleum Hydrocarbons)	
Poly-Chlorinated Biphenyls	
Package 3 - Waters (11 samples)	
pH	PAH - individual data for 16 priority pollutants
Electrical Conductivity	Sulphate
Total Ammonium	Sulphide
Total Cyanide	Metals
Easily Liberatable Cyanide	Total Organic Carbon
Total Phenols	Phenols
Thiocyanate	Nitrate
Chloride	Total Suspended Solids
Package 4 - Leach Tests (8 samples)	
(as per Waters minus Total Suspended Solids)	
Assumed Sampling Rate	
Trial Pits/Trench locations – analyse - 4 x soil and 1 x water (if encountered) per location	
Boreholes - analyse - 6 x soil and 1 x water per location	

Water Level Monitoring

6.13 Water level monitoring was undertaken at the time of collection of groundwater samples on 9th June 2000. The results are presented in Appendix D.

Quality Assessment**Management, Design, Specification and Site Supervision**

- 6.14 The site investigation was designed, specified and supervised by competent staff of WS Atkins Consultants Ltd (WSA), maintaining BSI EN ISO 9001: 1994 Registered status. Quality assured procedures for ensuring quality both in specification, procurement and in site supervision have been in place prior to and during the investigation.

Quality Assessment and Assurance

- 6.15 Continuous quality assessment was provided by site inspection and testing data throughout the duration of the site investigation. The Environmental Assessment Site Investigation Report in itself provides the final Quality Assessment and evidence of Quality Assurance of the site investigation.

Competent Contractors

- 6.16 The intrusive works were awarded to Quality Assured contractors, Environmental Sampling Ltd. (ESL), and Method Statements relating to all aspects of the works were prepared by the Contractor, and approved by WSA. The implementation of the Method Statements was controlled by ESL and continuously monitored by WSA.

Testing Regime

- 6.17 Samples were regularly collected during the site investigation and were appropriately stored, transported and tested after the site investigation.

Site Quality Control, Monitoring and Audit

- 6.18 The site investigation was supervised by sufficient and competent staff working for the Engineer (WSA), and similarly for the Contractor (ESL).

7. SITE INVESTIGATION RESULTS

Physical Ground Conditions

Made ground

- 7.1 The majority of the study site surface is covered by a loose light brown gravel fill, (placed as a cover layer), tarmac and concrete, with the exception of the southern boundary which is covered by vegetation or wood chippings.
- 7.2 Made ground varied in thickness across the site ranging from 0 to 2.0m below ground level (bgl), with the greatest depths in the areas that formerly contained holders and pipes. Made ground is therefore principally located to the centre and north of the study site with natural ground at the surface along the southern eastern and south-western boundaries. The made ground generally comprised a loose black silty sand or sandy silt with coal, bricks, clinker, scrap metal, chalk and some reworked natural ground in TP5, TP7, TP8, TP9, TP14, TT1 and TT2. In addition TP8 contained very small quantities of spent oxide.

Underground structures

Pipes

- 7.3 300mm (OD) cast iron pipes were encountered in TP5 and TP8 at depths of between 0.7 and 1.2m below ground level (bgl). In TP8 the pipes reduce in depth as they extend away from the adjacent governors.
- 7.4 A dry 200mm clay land drainage pipe (breached by the excavation), a 400mm concrete pipe (integrity intact) and a 0.5m² brick manhole were encountered at TP10, at approximately 1.2m bgl. The latter drain is considered to be the old drain running across the site from the former iron works, the location of which is shown in Figures 1a and 1b.

Foundations

- 7.5 Brick and concrete foundations were encountered in TT1, TT2 and TP5 at depths of between 0.2 and 0.4m bgl, these occur in the area which formerly contained the gas works buildings. The trial trenches were constructed to the depth of the underlying

foundations, with deeper excavations in the areas between these (TT1A, B and TT2A, B), to investigate the possible presence of tanks. These excavations did not reveal the presence of any tanks. However, tarry contamination was encountered in TP5. However, the complete absence of tanks can not be confirmed due to the limited nature of the excavations and because the depth of most of these was limited due to obstructions. Full investigation of this area would have involved removing the top 0.5m of made ground, exposing the foundations and breaking out selected areas. This was considered to be beyond the scope of the current investigation.

Gas holders

- 7.6 The base slabs of the gas holders in the western and southern corners of the site were encountered between 0.6 and 1.5m bgl in TP3, TP4, TP10 and TP11. The bases of the other two holders located along the north eastern boundary were not encountered in either TP1 or TP2. However, pieces of broken concrete were observed in TP2.
- 7.7 The holder base in the western corner of the site consisted of a integral 200mm thick mass concrete slab at 1.2m bgl, which visually appeared to contain a small quantity of black stained material just above it. This holder and the two holders north east of this have been backfilled with chalk at their eastern ends. However at their western ends the fill comprised loose light brown or orange sandy silt with gravel, mixed with a variety of waste materials (wood, timber, brick, scrap metal, plastic, steel pipes, steel drums, car parts, glass bottles, coal, railway lines and cast iron) and pockets of reworked natural ground. Pockets of this material exhibited a slight 'gasworks odour'.
- 7.8 The holder base in the southern corner consisted of a broken pink–light red 200mm thick mass concrete slab, underlain by 300mm of loose grey sand and tarmac. This was underlain by a grey integral 300mm thick mass concrete slab at a depth of 0.9m bgl. The holder has been backfilled with a soft dark brown-black silty clay with ash, gravel, coal, brick and timber, overlain by loose light brown clayey top soil.
- 7.9 All holder bases encountered were founded directed on the soft orange-brown clay alluvium (natural ground), which did not appear to have any visual or olfactory contamination.

Former tanks

- 7.10 TP 14 was excavated in the eastern corner of the site to the east of a potential former tank base slab. The base slab was a 150mm thick integral mass concrete slab present at the ground surface, underlain by two rows of red bricks. The tank base was underlain by made ground as described above and a concrete foundation at 1.15m bgl. Unfortunately it was impossible to break through the slab at this depth or find the edge due to the tight working space.

Natural Strata

- 7.11 The top of the natural strata occurred between ground level (TP6, TP12 and TP13) and approximately 2.0m bgl. The natural strata comprised a soft dark brown silty clay or clayey silt with gravel and rootlets, underlain by a light brown-orange clay with flint gravel and bands of stiff red-brown silty sand, gravel rich bands, brown clay with and without sand, and occasional chalk in light brown-grey layers. This was underlain by a soft white to light grey weathered chalk with occasional grey staining, stones and flinty gravel.

Groundwater

- 7.12 Groundwater extracted from the Chalk aquifer was chalky and odourless with no visual signs of contamination. The site was revisited on 19th July 2000 and the normalised groundwater levels were recorded in Table 8.1 below. See Appendix D for further details.

Table 7.1 Groundwater Levels (19/07/2000)

Borehole	Water Depth (mbgl)	Standing Groundwater Level (mAOD)
BH1	3.900	0.070
BH2	3.465	0.245
BH3	3.115	0.475
BH4	2.435	0.435
BH5	2.855	0.045

- 7.13 Surface water levels in the drainage ditch to the north east of the site (controlled by a sluice gate) and the River Arun (tidal) were not surveyed during the site works.

Perched Water

- 7.14 Perched water ingress was encountered in TPs 1, 2, 5, 8 and 12 and is described in Table 8.2 below.

Table 7.2 Perched Groundwater Observations

Trial Pit and Depth	Trial Pit Elevation (mAOD)	Perched Water Elevation (mAOD)	Visual and Olfactory Observations
TP1 @ 1.4m	3.60	2.20	Clean appearance, with a slight organic odour.
TP2 @ 1.8m	3.71	1.91	Dark brown with a brown foam and a tarry odour.
TP5 @ 1.2m	3.35	2.15	Dark brown with a tarry odour and an oily/ tarry sheen.
TP8 @ 1.2m	2.94	1.94	Dark brown/ green with a phenol/ oily odour and a sheen on the water surface.
TP12 @ 1.3m	2.43	1.13	Clean appearance, with no odour.

Gas Emissions

- 7.15 Gas monitoring was not undertaken during this investigation.

Laboratory Analysis Results

- 7.16 Laboratory data for soil chemistry, including leachate testing, are provided in Appendix C.
- 7.17 Samples of perched water and groundwater from the underlying chalk aquifer were analysed and the data are provided in Appendix C. This also includes the results for a surface water sample taken from the drainage ditch running parallel to the site and into the River Arun.

8. REFERENCES

1. Guidance for Assessing and Managing Potential Contamination on Former Gasworks and Associated Sites. BG plc Property Division, May 1999, Version 2.4.
2. SI Draft for Development. Code of Practice for the Identification of Potentially Contaminated Land and its Investigation. DD175 (1988), British Standards Institution (under revision).
3. British Standard 5930. Code of Practice for Site Investigation (Annex F) 1999.
4. Problems Arising from the Redevelopment of Gasworks and Similar Sites. Department of the Environment, 1987.
5. Interdepartmental Committee on the Redevelopment of Contaminated Land (ICRCL). Guidance on the assessment and redevelopment of contaminated land, Central Directorate on Environmental Protection, Department of the Environment, London, 1987 Second Edition, ICRCL 59/83.
6. Interdepartmental Committee on the Redevelopment of Contaminated Land (ICRCL). Notes on the redevelopment of gasworks sites, Central Directorate on Environmental Protection, Department of the Environment, London, 1986 Fifth Edition, ICRCL 18/79.
7. BRE Digest 363. Sulphate and acid resistance of concrete in the ground. Building Research Establishment, July 1991.
8. VROM (Dutch Ministry of Housing, Spatial planning and Environment), 4th February 2000, Circular on Target and Intervention Values for Soil Remediation, Annexes A – D; Doc. Ref. DBO/1999226863.
9. Interim Guidance on the Disposal of ‘Contaminated Soils’, Environment Agency, 2nd Edition, 1/5/97.
10. Protection of Workers and the General Public during the Development of Contaminated Land, HMSO, London, 1991.
11. A Guide to Safe Working Practices for Contaminated Sites. Prepared under contract to CIRIA by WS Atkins Environment, CIRIA, 1995.
12. Water Supply (Water Quality) Regulations 1989, HMSO, No. 1147.

Figures

Appendix A
Selected factual exerts from WS Atkins Environmental Liability
Assessment Report, Arundel, Ford Road (Ref SE12), 1994

Appendix A :

WS Atkins Environmental Liability Assessment Report, Arundel, Ford Road (Ref SE12), 1994 :

Factual exerts included:

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Appendix B : Ordnance Survey Maps

Appendix E : Service Plans

Appendix F : Desk Study Report by Harrison & Company 1988.

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WS Atkins Environmental Liability Assessment Report, Arundel, Ford Road (Ref SE12), 1994 :

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BRITISH GAS PROPERTIES

E5347/1994/APRIL

**ARUNDEL, FORD ROAD
(Ref SE12)
ENVIRONMENTAL LIABILITY
ASSESSMENT REPORT**

WS Atkins Environment
Woodcote Grove
Ashley Road
Epsom
Surrey
KT18 5BW



Client: British Gas Properties
Project: British Gas Environmental Liability Assessment Report
Title: Arundel, Ford Road (Ref SE12)

Job No: E5347 **Copy No:**
Document Reference: E5347/LR860.NL/gp

0	Client Issue	N Legg	JE Steeds	DJ Nancarrow	JE Steeds		
							Client
Revision	Purpose Description	Originated	Checked	Reviewed	Authorised (PM)	Date	
		WS Atkins					

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3 GEOLOGY AND GROUND CONDITIONS

Geology

- 3.1 The general geology in the vicinity of the site is shown on the British Geological Survey (BGS) 1:625,000 scale geological map No. 2. Other information was obtained from BGS Well Records Nos 21 and 88.
- 3.2 The solid geology of the study site is chalk overlain by sandy silty clay alluvium associated with the River Arun. The BGS borehole records indicate depths of alluvial material of 19m and 24m some 200m to the north east of the site. However, a site investigation by Harrison and Company of Thornton Heath in 1988 (see Chapter 5) indicated that less than 5m of alluvial material overlay the chalk (assuming the trial pits did not extend beyond 5m). Both BGS borehole records indicate the presence of groundwater in the Alluvium at approximately 2m depth. The deposits overlying the chalk are likely to be relatively permeable.

Hydrogeology

- 3.3 An NRA groundwater vulnerability map is not yet available for this area and similarly NRA Source Protection Zones are not yet completed for the region. The Southern Region's Appendix to the NRA's Policy and Practice for the Protection of Groundwater (Ref 6) indicates that under the former Southern Region Aquifer Protection Policy, the chalk is classified as Zone 1 in this area. [REDACTED]
- [REDACTED]
- [REDACTED] The NRA have no records of any significant pollution incidents associated with the site.

- 3.4 [REDACTED]
- [REDACTED]
- [REDACTED] A total of four groundwater abstractions are located within 2km of the study site. These are shown in Table 3.1. There may, in addition, be other unlicensed abstractions for which the NRA have no information.

Hydrology

- 3.5 The NRA indicated that the tidal stretch of the River Arun adjacent to the site is classed as Estuary Class A (Good Quality) based on an assessment of biological, aesthetic and water quality.
- 3.6 The NRA have no records of any licensed abstractions from the River Arun itself within 2km of the study site. However, their records indicate that there are four abstractions within that distance from other smaller watercourses that are part of its catchment. These abstractions are also shown in Table 3.1.

Table 3.1 : Water Abstraction Data

Grid No.	Details	Source	Annual Quantity Abstracted (m ³)
TQ 00250526	Private water undertaking	Chalk	4550.0
TQ 01870794	Wild Fowl and Wetlands Trust	Chalk	1991148.0
TQ 00890742	Fish Farm	Chalk	318220.0
TQ 01800778	Public water supply	Chalk	1647000.0
TQ 0126 0533	Spray irrigation	Surface	13636.2
TQ 99460563	Spray irrigation	Surface	2500.0
TQ 02250503	Fish Farm	Surface	332000.0
TQ 01510567	Spray irrigation	Surface	24999.7

4 SITE HISTORY AND POTENTIAL CONTAMINANTS

Site History

Introduction

- 4.1 The site history has been assessed using all available plans, records and anecdotal information (see Appendix A). Relevant Ordnance Survey maps are given in Appendix B and anecdotal information is given in Appendix C. The information has been summarized in Table 4.1 and Figure 3. All processes and activities which are likely to have, or are known to have, resulted in contamination have been included in Table 4.1. Each feature described in Table 4.1 is given a reference number which can be used to identify it on Figure 3. The history of adjacent land uses is presented in a similar manner in Table 4.2.

Information from Statutory Authorities

- 4.2 The Environment, Tourism and Leisure Department of Arun District Council have limited records of a landfilling operation in the area immediately to the south west of the study site. This was essentially infilling of the former baths in the 1950s and 1960s. Materials used included bottles, timber, ash and pottery. The Council's records do not state the exact depth or volumes of wastes involved but it is believed that the maximum depth of waste is approximately 3.0m. This area and the land further south west (the site of Tortington Ironworks between 1899 and the early 1960s) has since been developed for 40 houses with gardens. The Council stated that a site investigation was carried out prior to development. A total of 500m³ of topsoil was removed owing to the presence of copper, nickel, lead and zinc. The site investigation report concluded that there was "no major contamination threat".
- 4.3 West Sussex County Council Trading Standards Department have stated that a closed landfill site ("Canada Road Tip") is located within 250m of the site, to the north west. The landfill predates licensing regulations and the Council have no records of the depth or volume of waste involved. They believe, however, that the landfill received household waste and that tipping ceased in 1973 at the latest.

Potential Contaminants

Introduction

- 4.4 The following sections outline the principal forms of ground contamination which may be present on the site based on the previous industrial use and surrounding industries.

4.5

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

4.6

The various activities which are thought likely to have resulted in ground or water resource contamination on this site are listed below in Table 4.3. [REDACTED]

[REDACTED] The areas can again be identified using the reference numbers which correspond to those given in Figure 3.

4.7

The potential contaminants from adjacent site uses are presented in a similar manner in Table 4.4.

Table 4.1 : Historical Data Summary Sheet : Site Uses

Ref	Use/Feature	1875 OS	1899 OS	1912 OS	1914 OS	1933 OS	1937 OS	1946 OS	1961 OS	1971 OS	1994 SVI
1	Gasholder	North east of operational area	x	x	x	x	x	x	x	x	x
2	Drainage ditch	Through north of site and along western boundary	—	—	—	—	x	x	x	x	x
3	Buildings	South-western corner of site	—	—	—	—	—	—	—	—	x
4	Small circular structure (tank?)	North corner of operational area	x	x	x	x	x	x	x	x	x
5	Buildings	Operational area	—	—	—	—	—	Only two in north corner remained	—	x	x
6	Gasholder	*	North west corner of operational area							x	x
7	Gasholder		North of operational area						x	x	x
8	Small circular structure (tank?)	*	*	North east of operational area	?	?		?	?	x	x
9	Gasholder	*	*	*	*	*	Centre of site				x
10	Electricity sub station	*	*	*	*	*	*	*	*	North-east boundary	
11	Above ground tank	*	*	*	*	*	*	*	*	North-east boundary	Concrete base remaining
12	Valve pits	*	*	*	*	*	*	*	*	Centre of site	
13	Toilet	*	*	*	*	*	*	*	*	North-east boundary	

KEY	
?	Plan does not show this area or does not provide information
	Feature still present
x	Feature demolished/no longer present
OS	Ordnance Survey Map
BGP	British Gas Plan
AI	Anecdotal information from ex-employee
SVI	Site visit information
*	Feature not present

Notes:

- 1.
- 2.

Table 4.2 : Historical Data Summary Sheet : Adjacent Site Uses

Boundary	1875 OS	1899 OS	1912 OS	1914 OS	1933 OS	1937 OS	1946 OS	1961 OS	1971 OS	1994 SVI
North west	Greenfield	Cemetery beyond road	–	–	–	–	–	–	–	–
North east	Drainage ditch with greenfield beyond	–	–	–	–	–	–	–	–	–
South east	Drainage ditch with River Arun beyond	–	–	–	–	–	–	–	–	–
South west	Baths and "Works"	Baths, iron works and sewage works					Ironworks buildings labelled as "works"		Agricultural engineering works, boat builders, sewage works and fire station	New housing estate
West	Greenfield	Terraced houses with gardens	–	–	–	–	–	–	–	–

KEY	
?	Plan does not show this area or does not provide information
	Feature still present
x	Feature demolished/no longer present
OS	Ordnance Survey Map
BGP	British Gas Plan
AI	Anecdotal information from ex-employee
SVI	Site visit information
*	Feature not present

Notes:

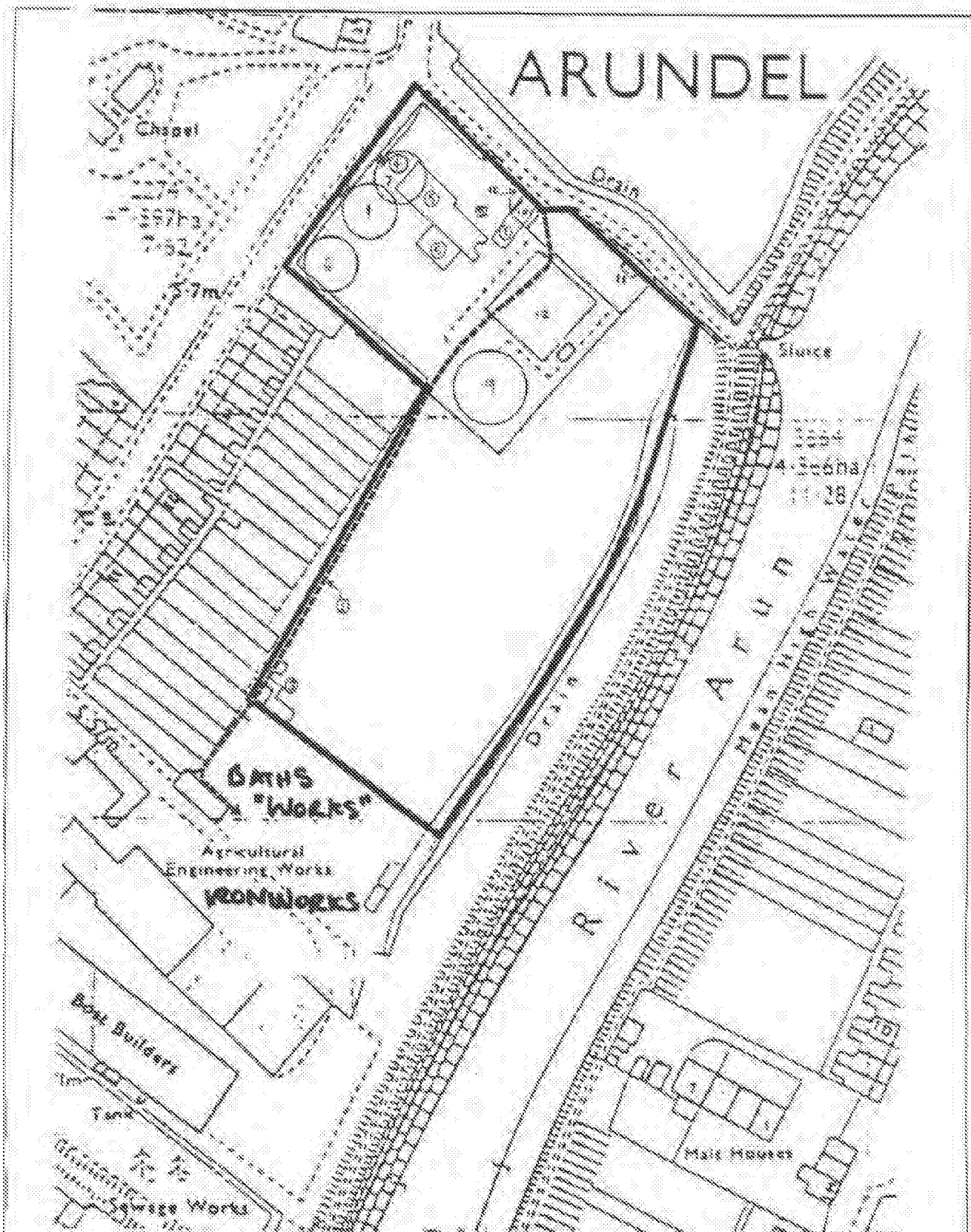
1. 
2. The baths on the perimeter of the south-western boundary were infilled in the 1950s and 1960s (see paragraph 4.3).
3. A closed landfill is situated within 250m of the north-west boundary of the site (see paragraph 4.3).



Table 4.3 : Potential Contaminants : Site Uses







Title Arundel, Ford Road (Ref SE12) Previous Process Activity Locations					WS Atkins Environment a division of WS Atkins Consultants Ltd. Woodcote Grove, Ashley Road, Epsom, Surrey, KT18 6BW Tel. (0372) 725140 Fax. (0372) 740555	
Date 13/4/94	Drawn NL	Checked ES	Approved JES	Scale NTS	Drawing Number Figure 3	Reference E5347

APPENDIX A

INFORMATION SOURCES

**Table A.1 : British Gas Interpretative Reports
Information Sources Summary Sheet**

Study Site Name: Arundel, Ford Road (Ref SE12)

Type	Source	Data Sought (Date)	Data Obtained/ Copied (Date)
Ordnance Survey Maps	West Sussex Records Office Chichester	7/3/94	11/3/94
British Gas Archive Plans	British Gas North Thames 2nd Floor Elizabeth House c/o North Thames House London Road Staines Middlesex TW18 4AE The London Gas Museum British Gas Plc (North Thames) Twelve Trees Crescent Bromley-by-Bow London E3 3JH	25/2/94	None available
		6/4/94	None available
Service Plans	Regional Wayleave Officer British Gas South-Eastern Regional Headquarters Croydon Surrey The Drawing Office Southern Electric Lower Drayton Lane Cosham Portsmouth Hampshire PO6 2HF Development Services Southern Water Ltd	14/3/94	16/3/94
Gas			
Electricity		14/3/94	7/3/94
Water Supply		21/3/94	25/3/94

Type	Source	Data Sought (Date)	Data Obtained/ Copied (Date)
	Southern House Lewes Road Falmer Brighton BM9 9PI		
Sewer	Development Services Southern Water Ltd Southern House Lewes Road Falmer Brighton BM9 9PI	21/3/94	25/3/94
BT	BT Tunbridge Wells Kent	14/3/94	28/3/94
Mercury Communications	Utilities Manager Mercury Communications Mercury House Waterside Park Langshotts Lane Bracknell, Berkshire	14/3/94	21/3/94
NRA Information			
	Pollution Control Officer NRA Sussex Region Rivers House 3 Liverpool Gardens Worthing West Sussex	21/3/94	20/4/94
Pre-1974 waste disposal information, contamination and pollution information	Mr J Green Environmental Health Department Arun District Council Civic Centre Maltravers Road Littlehampton West Sussex Matthew Thompson Waste Regulation Department Trading Department West Sussex County Council The Tannery Westgate, Chichester	21/3/94 21/3/94	30/3/94 31/3/94
Geological information	British Geological Survey	24/3/94	27/3/94

Type	Source	Data Sought (Date)	Data Obtained/ Copied (Date)
Hydrogeological information	British Geological Survey - Hydrology Group	24/3/94	27/3/94
Site investigation data	British Gas North Thames 2nd Floor Elizabeth House c/o North Thames House London Road Staines Middlesex TW18 4AE	25/2/94	16/3/94
Anecdotal information from present or ex- employees (see Site Visit Record Sheet II)	Name: None available Position: Dates of employment:		

Table A.2 : Library Visit Record Sheet

Study Site Name:

Arundel, Ford Road (Ref SE12)

Date:

11/3/94

Library Name:

West Sussex Records Office

Signature:

Kika Mitchell

Chichester

Date	Edition	Scale	Ref No.	Copied
1875	-		LX III/1	—
1899	-		LX III/NW	—
1912	-		LX III/1	—
1914	-		LX III NW	—
1933	-		LX III/NW	—
1937	-		LX III/1	—
1938	Rev of 1909-10		LX III/NW	—
1946	Rev of 1909-10		LX III/NW	—
1961	-		TQ 100/NW	—

1971	-		TQ 0006/0106	-

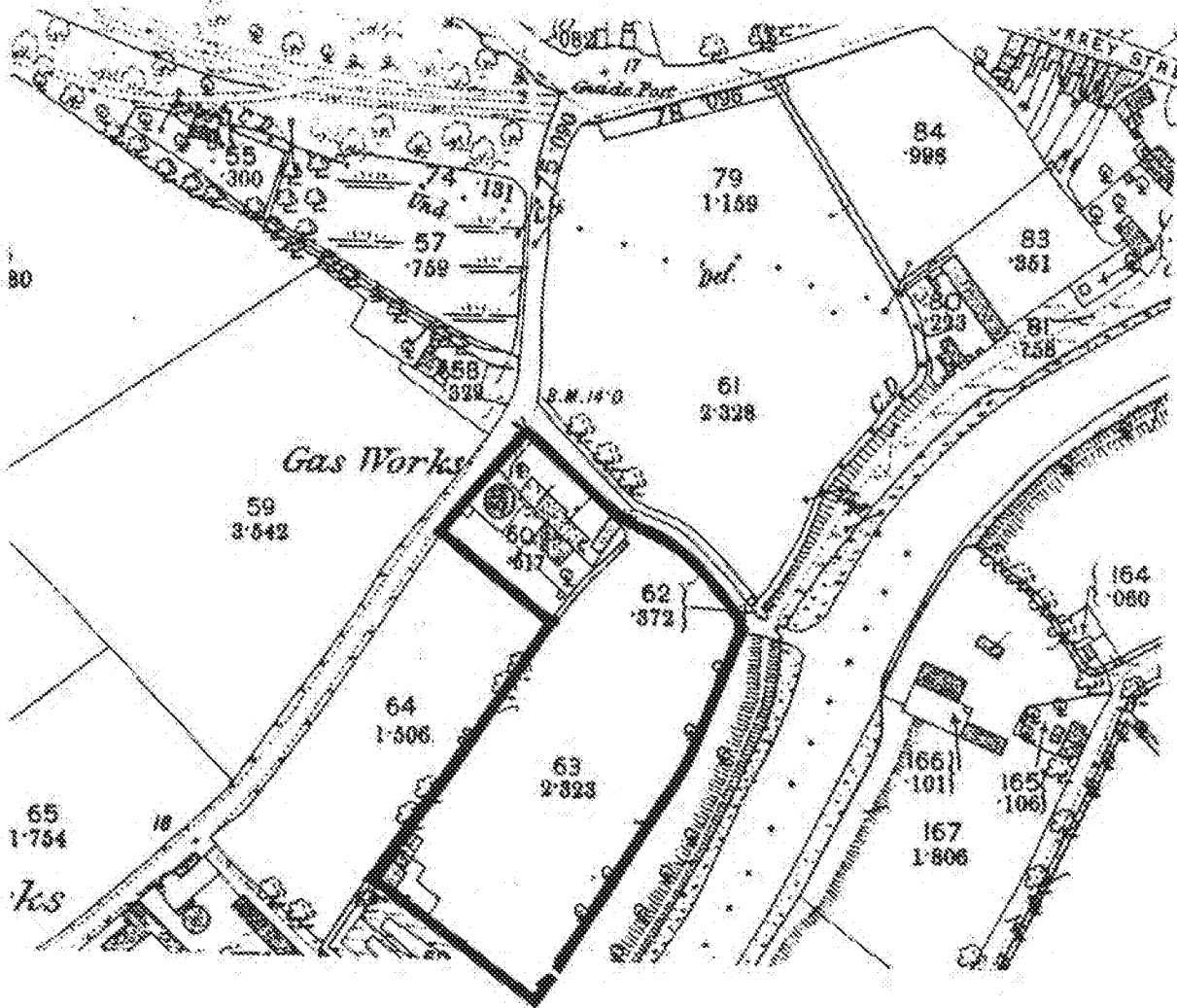
Table A.3 : Archive Visit Record Sheet

Study Site Name: Arundel, Ford Road (Ref SE12) Date: March 1994
 Archive Name:
 Contact Name: John Beer

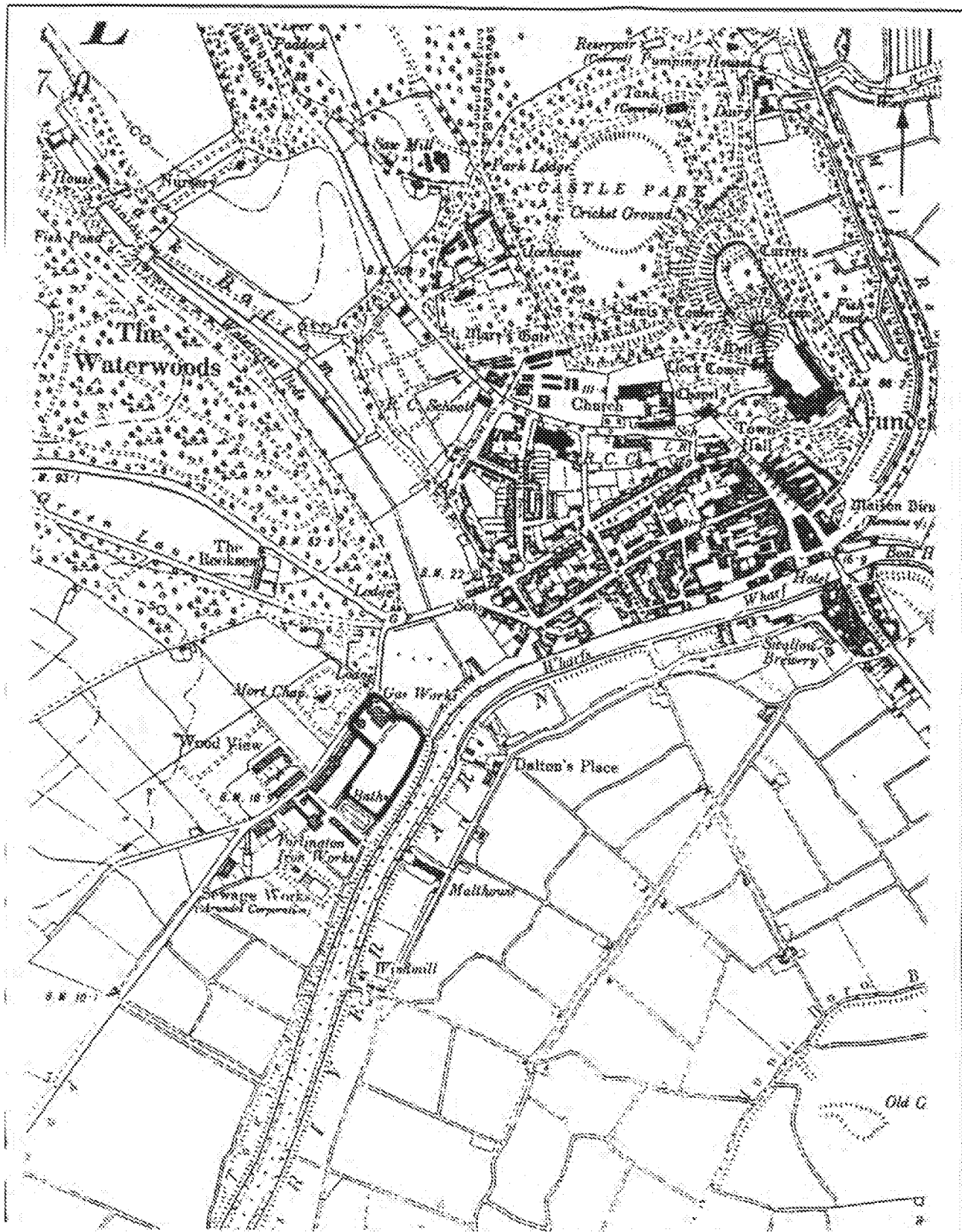
Plan/Record	Title	Date	Ref No.	Copied
Plan	Arundel Holder Station - mains layout	July 1976	DE/SX/4/200	—
Report	Desk study on a disused gasworks at Ford Road, Arundel	July 1993	C604A	—

APPENDIX B

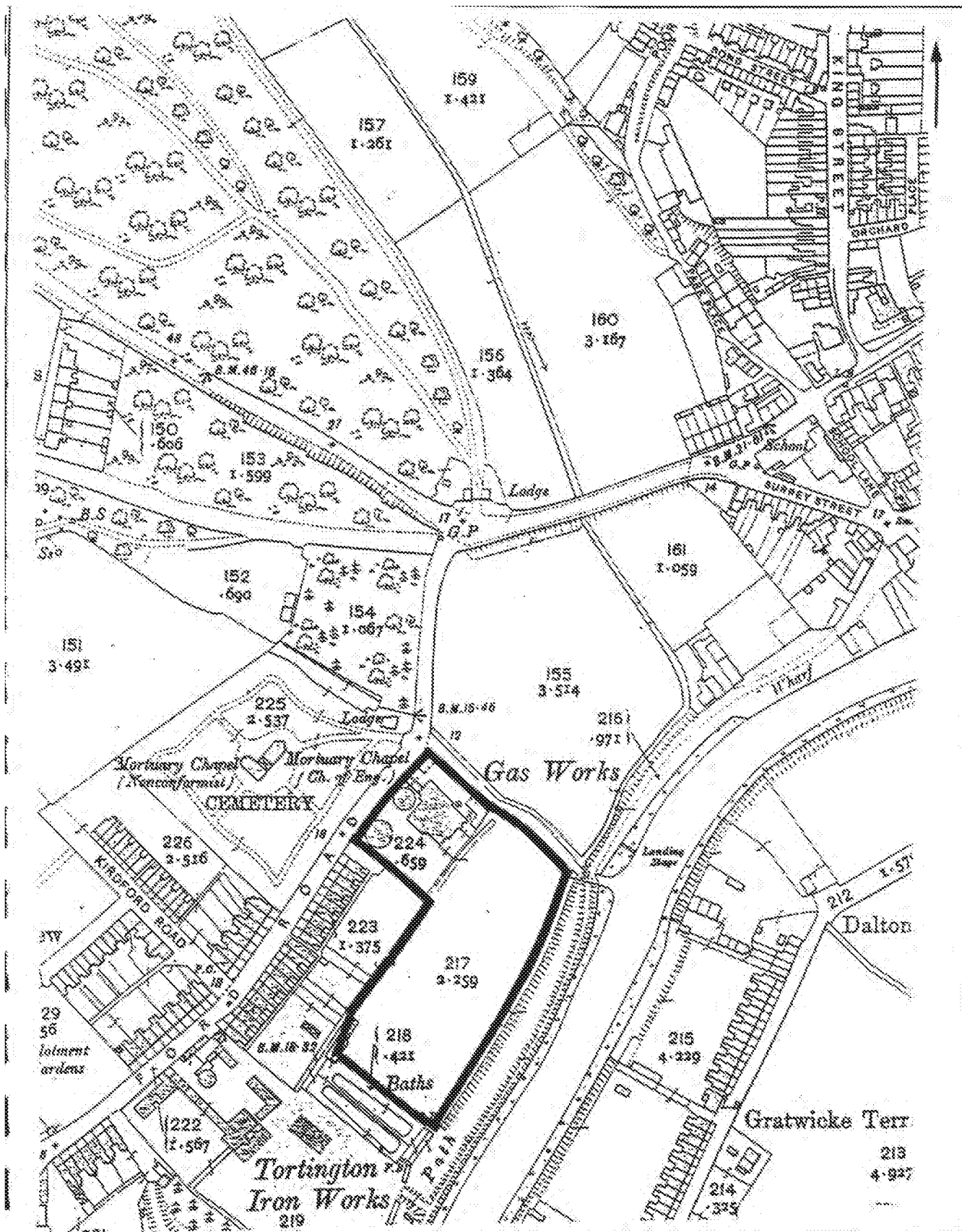
Ordnance Survey Maps



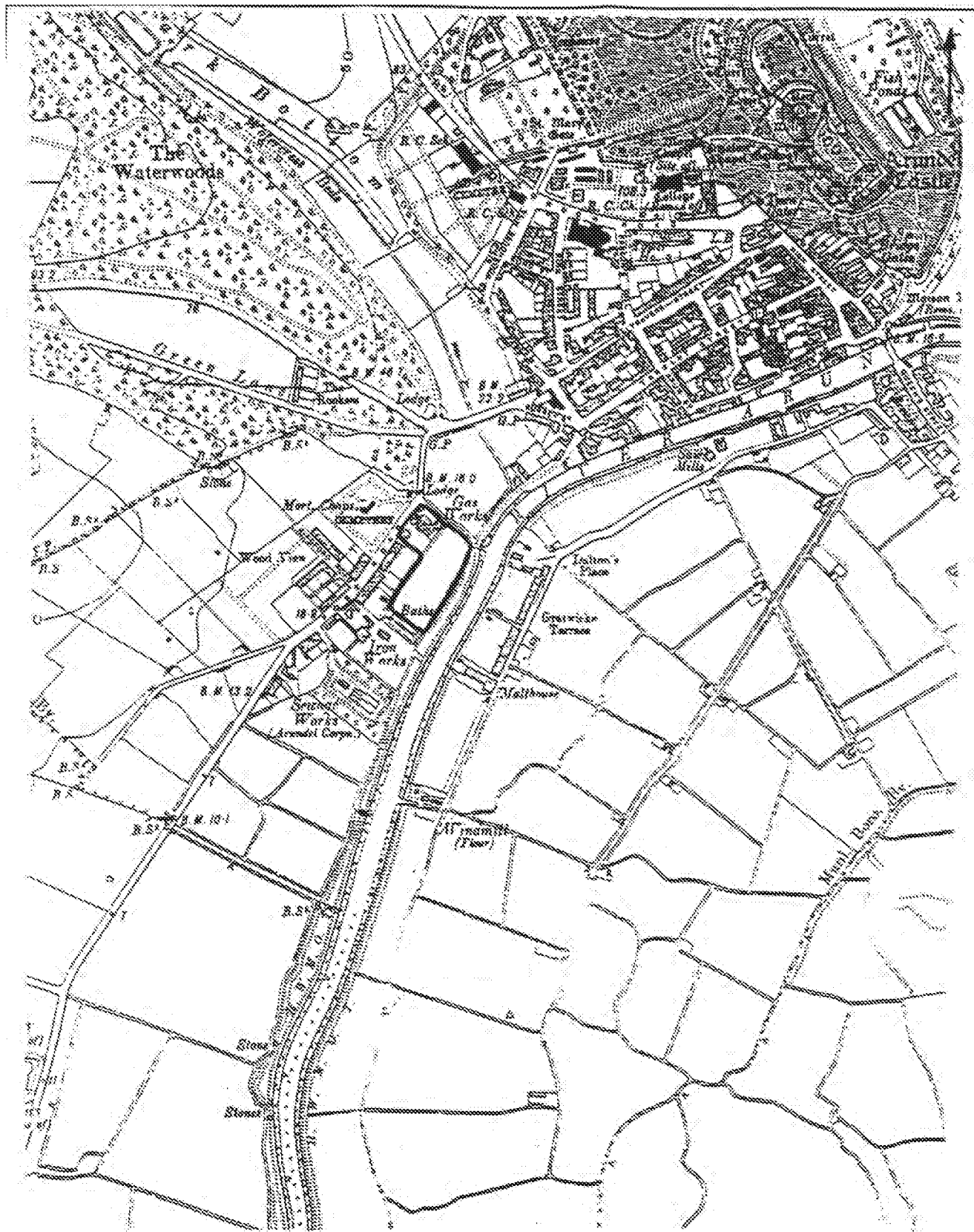
Site Arundel, Ford Road (Ref SE12) 1875 Ordnance Survey Map					WS Atkins Environment a division of WS Atkins Consultants Ltd. Woodcote Grove, Ashley Road, Epsom, Surrey, KT18 5BW Tel. (0372) 726140 Fax. (0372) 740055	
Date 22/8/04	Drawn KMK	Checked NTH	Approved JRC	Scale 1:2500	Drawing Number R 1	Reference F5347



Title Arundel, Ford Road (Ref SE12) 1899 Ordnance Survey Map					WS Atkins Environment a division of WS Atkins Consultants Ltd. Woodcote Grove, Ashley Road. Epsom, Surrey. KT18 5BW Tel. (0372) 726140 Fax. (0372) 740055	
Date 23/3/94	Drawn KM	Checked N.I.L.	Approved JES	Scale N.T.S.	Drawing Number B.2	Reference E5347



Title Arundel, Ford Road (Ref SE12) 1912 Ordnance Survey Map					WS Atkins Environment a division of WS Atkins Consultants Ltd. Woodcote Grove, Ashley Road. Epsom, Surrey, KT16 5BW Tel. (0372) 726140 Fax. (0372) 740055	
Date 23/3/04	Drawn KM	Checked NJL	Approved JES	Scale 1:2500	Drawing Number B.3	Reference E5347



Title

Arundel, Ford Road (Ref SE12)
1914 Ordnance Survey Map

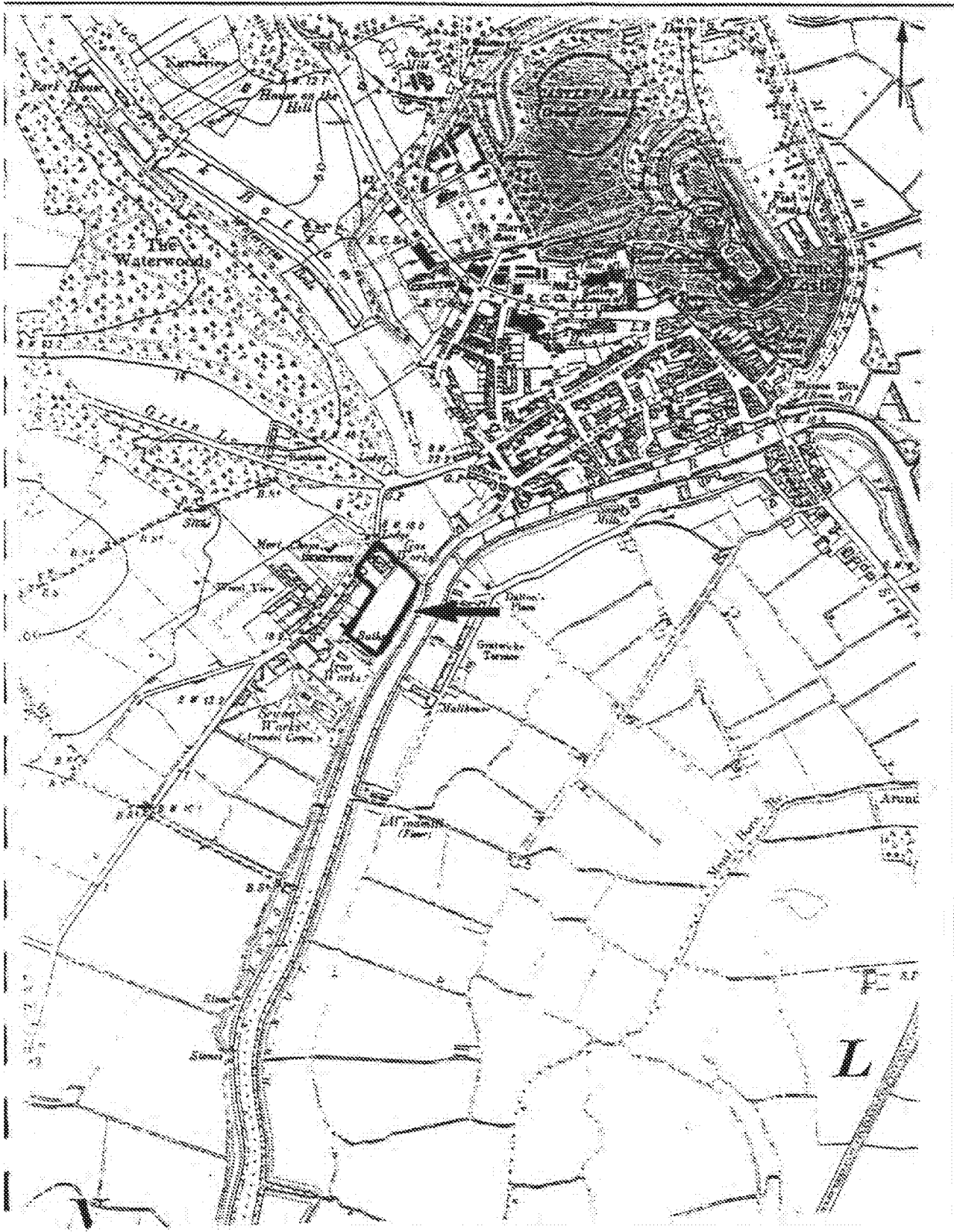
WS Atkins Environment

a division of WS Atkins Consultants Ltd.

Woodcote Grove, Ashley Road,
Epsom, Surrey, KT18 5BW

Tel. (0372) 726140
Fax. (0372) 740055

Date	Drawn	Checked	Approved	Scale	Drawing Number	Reference
23/3/94	KM	N.I.L.	JES	N T S	B. 4	E5947



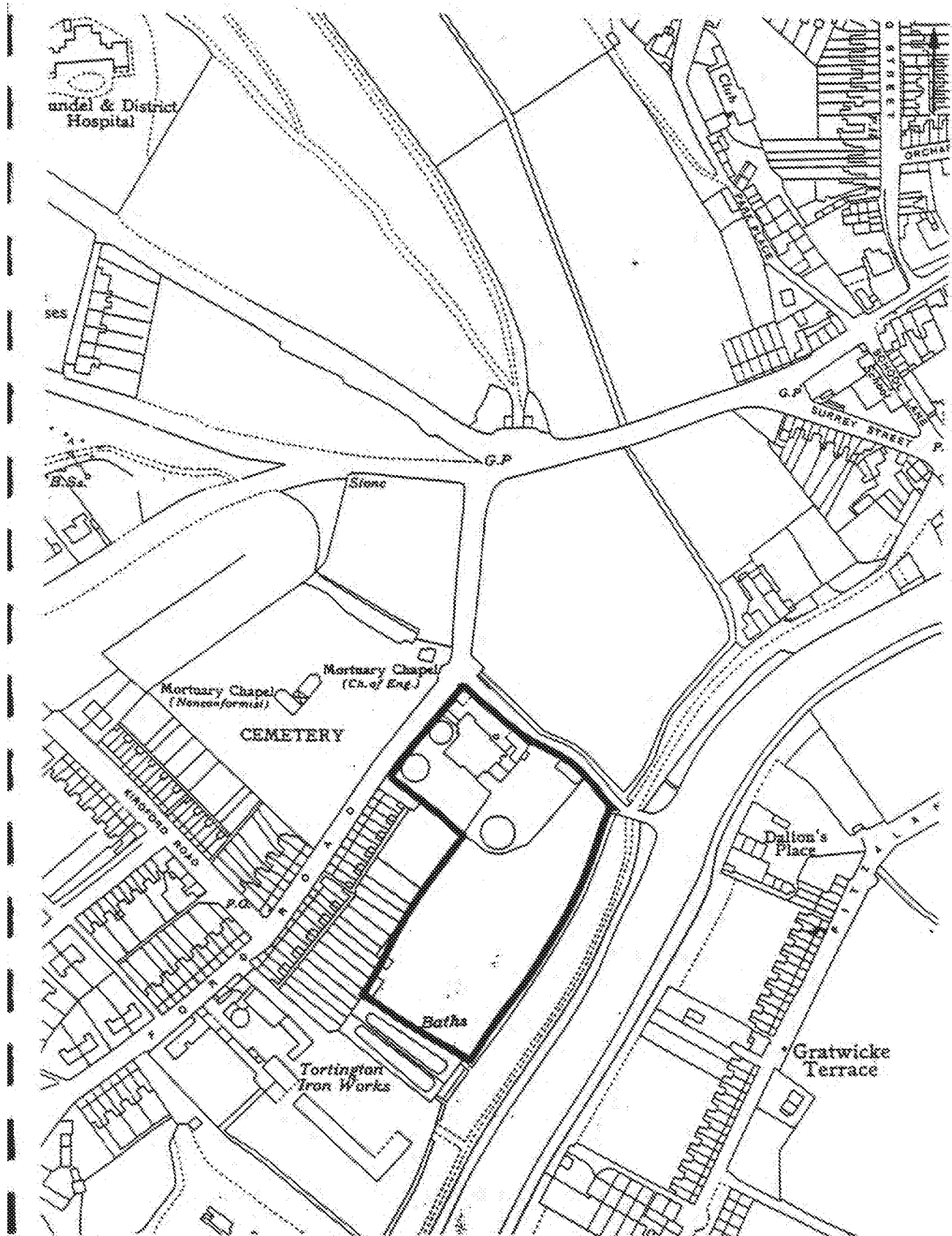
File
 Arundel, Ford Road (Ref SE12)
 1933 Ordnance Survey Map

WS Atkins Environment
 a division of WS Atkins Consultants Ltd.

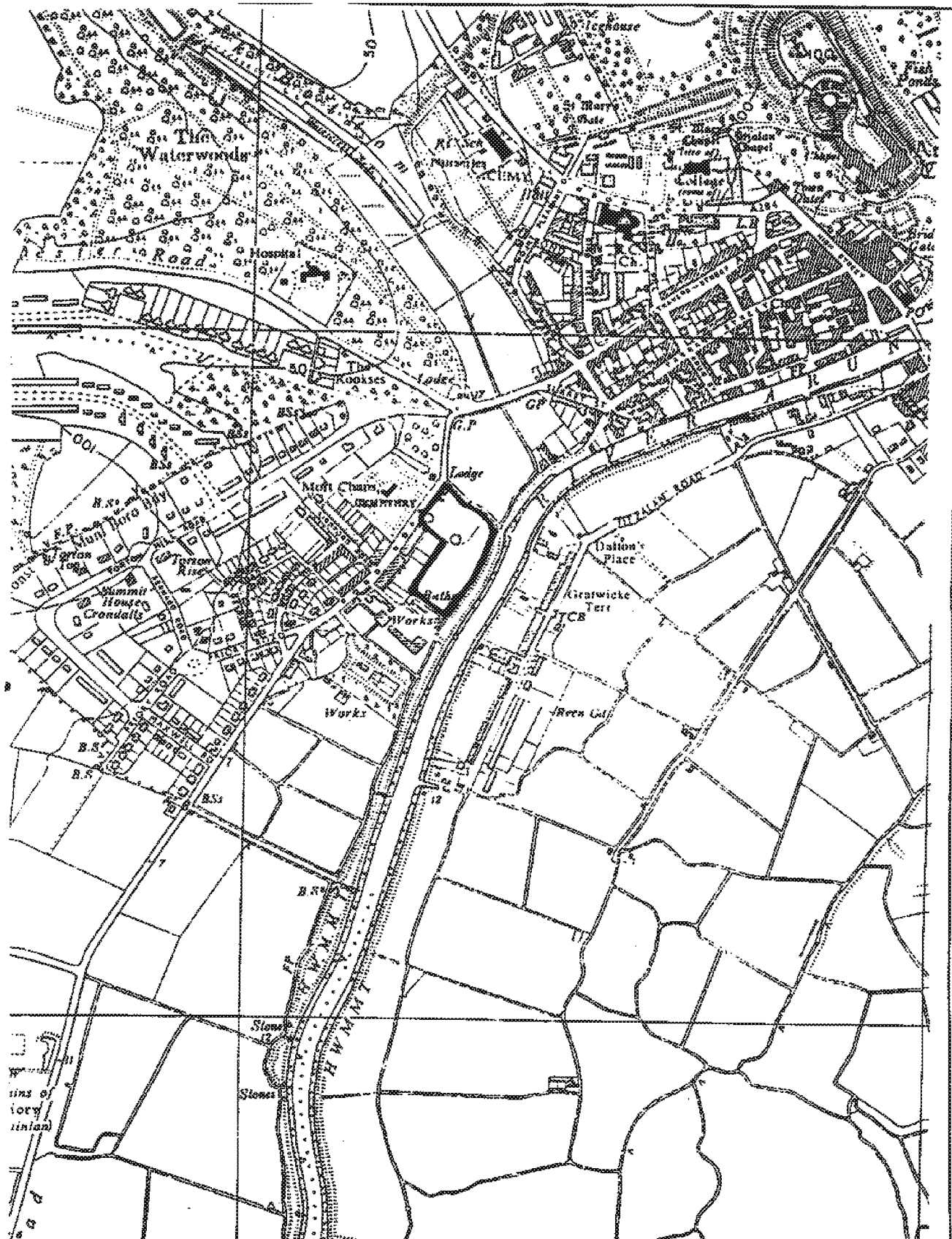
Woodcote Grove, Ashley Road,
 Epsom, Surrey, KT18 5BW

Tel. (0372) 726140
 Fax. (0372) 740055

Date	Drawn	Checked	Approved	Scale	Drawing Number	Reference
23/3/94	KM	N.J.L.	JES	NT 5	B.5	E5347



Arundel, Ford Road (Ref SE12) 1937 Ordnance Survey Map					WS Atkins Environment a division of WS Atkins Consultants Ltd. Woodcote Grove, Ashley Road. Epsom, Surrey, KT16 5BW Tel. (0372) 726140 Fax. (0372) 740056	
Date	Drawn	Checked	Approved	Scale	Drawing Number	Reference
03/09/04	KM	N.H.	JES	1:250	B.6	E5347



Arundel, Ford Road (Ref SE12):
1961 Ordnance Survey Map

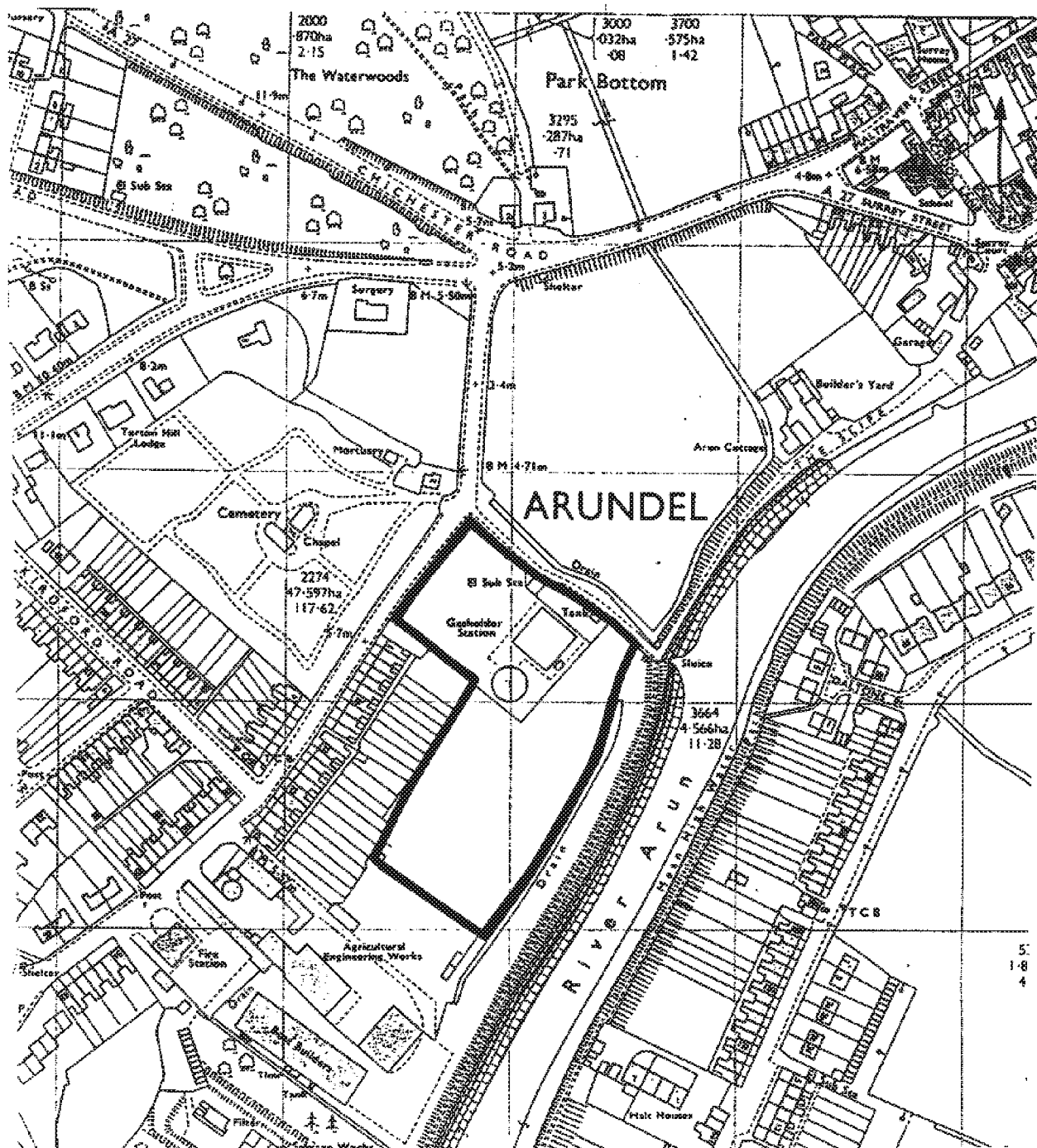
WS Atkins Environment

a division of WS Atkins Consultants Ltd.

Woodcote Grove, Ashley Road,
Epsom, Surrey. KT18 5BW

Tel. (0372) 726140
Fax. (0372) 740055

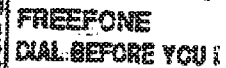
Date	Drawn	Checked	Approved	Scale	Drawing Number	Reference
3/94	KM	NJL	JES	NTS	B.S	E5347



File Arundel, Ford Road (Ref SE12): 1971 Ordnance Survey Map					WS Atkins Environment a division of WS Atkins Consultants Ltd. Woodcote Grove, Ashley Road. Epsom, Surrey. KT18 5BW Tel. (0372) 726140 Fax. (0372) 740055	
Date 3/3/94	Drawn KM	Checked NJL	Approved JES	Scale 1:2500	Drawing Number B.9	Reference E5347

APPENDIX E

Service Plans



DATE: 23. 3. 96

You Ref :

Dear Sir/Madam,

ROADS AND STREET WORKS ACT 1991 - SECTIONS 83 & 84.

PROPOSED WORKS AT... ACQUA'S COLLECTIONS

Thank you for you Preliminary Enquiry dated... 9.2.77...
regarding the above works

It would appear from your proposals that alterations to existing BT apparatus may be necessary. I am returning one copy of your drawing marked up showing the approximate positions of BT apparatus.

Please contact our Plant Protection office by dialling 100 and asking for Freephone Dial-Before-You-Dig, well in advance of your start date. This will provide you with free on-site marking of any BT apparatus.

Finally, please quote our reference in all correspondence

Yours Faithfully

pp P.L.Richards
Network Maintenance Centre Manager
PC Division Southern Home Counties East.

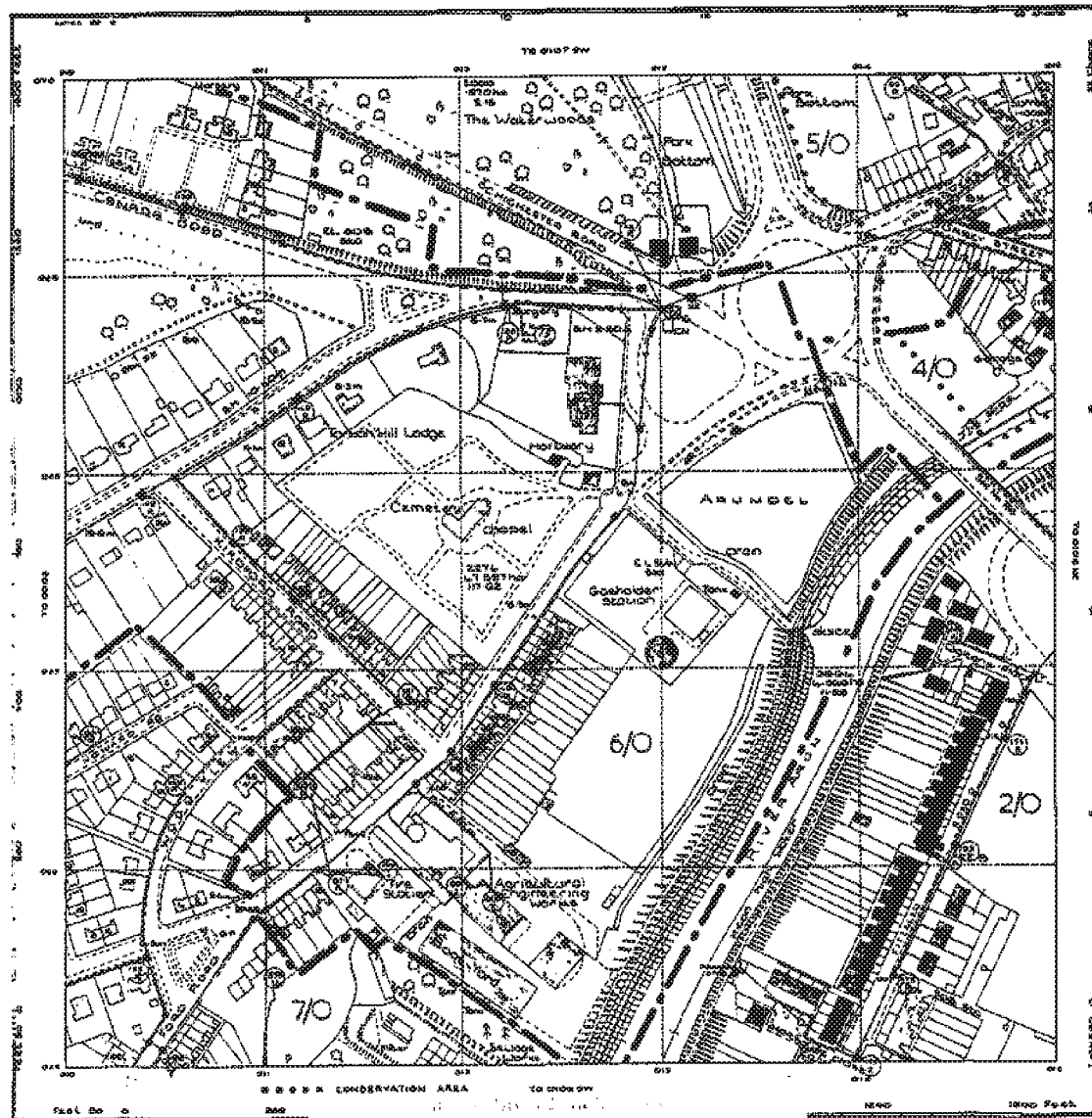
August 7
Berlin

6.0 ORDNANCE SURVEY

SCALE 1:250 OF 80:800 (INCHES TO 1 MILE)

TO OIG6 NK

TO OCS NW



IMPORTANT WARNING

Information concerning the location of British Telecommunications plc apparatus is given for your assistance and is intended for general guidance only, no guarantee is given of its accuracy. As British Telecommunications plc apparatus may exist at various depths and its routes may deviate within and in the vicinity of the highlighted area this information must not be relied upon in the event of excavations or other works made within or near the highlighted area.

For free on-site apparatus location and marking service call the exchange operator and ask for:-

FREEPHONE • DIAL BEFORE YOU DIG

Please ensure your Contractor is aware of this Reference Number:

BT REFERENCE NUMBER X195/94

EXCHANGE AREA 22 ALCANTARA

OS MAP FEE 0.06

DAN. 44-1 CKD 100-7

DATE 5-26

Telecommunications apparatus shown thus:

KEY TO LINE PLANT SYMBOLS

	EXISTING	PROPOSED	NO RECORDED PLANT EXISTS
OH			
UG			
If this plan is correct please ensure that this information is also observed			

If this plan is approved please provide a "YES" answer on the attached "YES/NO" form.

Eng Ma Telecommunications plc.
Registered in England No. 1800000

[illegible]

**Dial 100 and ask for
Freefone Dial Before You Dig.**

BT

ARUNDEL TG 0106 NW

TD 0106 NSW

WHEAT WAS THE MAIN
CASH CROP OF THE DISTRICT AND THE
COUNTRY WAS THE MAIN MARKET FOR THE
WHEAT.

86/567X

Mercury Communications Ltd.

Mercury House
Waterside Park
Longshot Lane, Bracknell
Berkshire RG12 1XL

Switchboard:
Facsimile:
Telex:

Direct Line:



Your Ref: 5347

When telephoning please ask for:
Doreen Rudland (0344-713919)

Our Ref: US/JG/PE/DR/3

16th March 1994

WS Atkins - Environment
Woodcote Grove
Ashley Road
Epsom
Surrey KT18 5BW

For the Attention of Ms N Legg

Dear Madam

SERVICES INFORMATION REQUEST

We are in receipt of your faxes dated 9th March 1994, reference your proposed works as per attached list.

Your works will not affect us at present as we have no apparatus in the area concerned. However, please continue to forward notices for major works in the area, as our future expansion plans may be affected.

Yours faithfully



9729

D K NORRIS
Senior Utilities Officer
NETWORK PROVISIONING SERVICES

NB: When sending plant enquiries can you please use GRID references for locations outside of large/major towns.

Please use our Utilities Department fax number 0344-713211.

1-

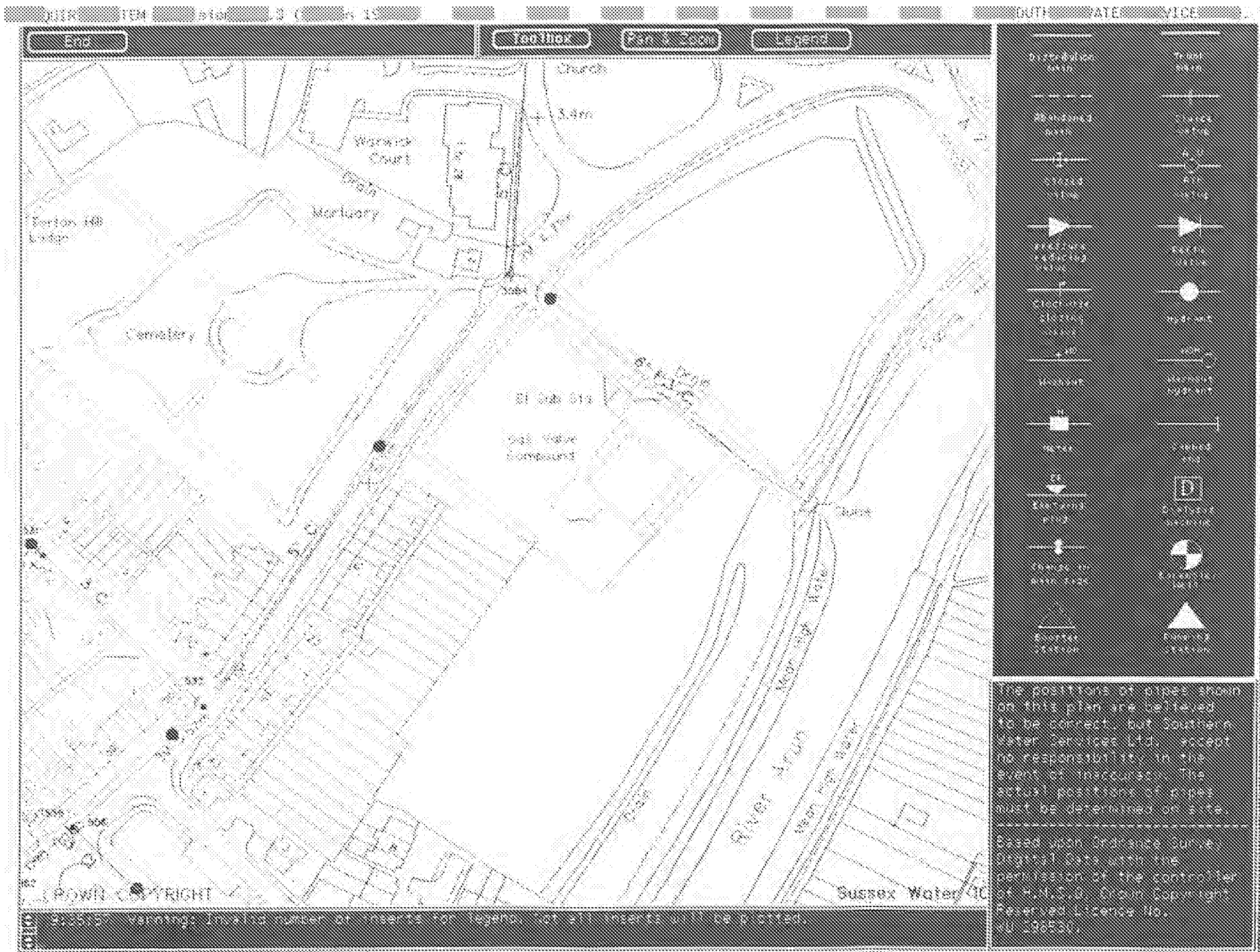
- SE40 Tunberyard Lane, Lewes, E Sussex
- SE50 Ghyll Road, Heathfield, E Sussex
- SE11 Uckfield, E Sussex
- SE45 Bushypark Road, Hampton Wick, Surrey
- SE47 Lowerham Road, Kingston, Surrey
- SE10 Kingston Road, Leatherhead, Surrey
- SE13 Cranleigh Common, Cranleigh, Surrey
- SE12 Ford Road, Arundel, W Sussex
- SE92 Broadstairs, Kent
- SE41 Linksfield Road, Westgate-on-Sea, Kent
- SE19 Gas Road, Murston, Kent
- SE16 Gas Road, Milton Regis, Kent
- SE14 Marden Road, Staplehurst, Kent

1

~3: When sending plant enquiries can you please use GRID references for locations outside of large/major towns.

Please use our Utilities Department fax number 0344 713211.

1



Your reference

5347

In any reply please quote

DO/MP/7/3



**SOUTHERN
ELECTRIC**

Solent Division

Lower Drayton Lane
Cosham
Portsmouth
Hampshire PO6 2HF

Telephone:

Facsimile:

Mr. R. Youas
W. S. Atkins
Woodcote Grove
Ashley Road
Epsom, Surrey, KT18 5BW

Dear Sir/Madam

Cable Records (as at 7 March 1994)

Thank you for your letter/enquiry of the 7 March 1994 regarding Routes of electricity cables at: The Wells, Ford Road, Arundel.

Copies of the Company's Cable Records Plans, detailed below, are enclosed.

The plans show dimensions and normal depths for the buried cables, etc, when they were installed. It must be stressed, however, that alterations to road alignments, surface levels and buildings may have been made subsequent to the records being taken.

*It has not been possible to transfer our cable record on to your plan. Please note that the plans supplied are based on the location/map information provided by yourselves and, therefore, you are advised to satisfy yourself that the enclosed Cable Records Plans adequately cover the area of your proposed work.

The following general guidance is given.

Avoidance of DANGER from BURIED CABLES

For more information, consult the Health and Safety Executive booklet HS(G)47 obtainable from HMSO. Guidance Notes are contained in Southern Electric "Watch It" leaflet, which sets out various "do's and don'ts" when digging near buried cables; a copy is enclosed.

I would particularly draw your attention to the need to take out trial holes to determine the exact position and depth of cables to avoid the risk of injury to staff or damage to cables.

Avoidance of DANGER from OVERHEAD LINES

For more information, consult the Health and Safety Guidance Note GS.6 obtainable from HMSO. A second Southern Electric "Watch It" leaflet outlining precautions to be taken is enclosed.

If in any doubt about safety aspects of working in the vicinity of overhead lines, please do not hesitate to contact our Operations and Maintenance Section.



continued/...(page 2)

Cable Records - Service Connections

The location of connection cables to individual houses, street furniture, traffic signs, bus shelters and telephone kiosks installed before 1st October 1988 are not shown on the enclosed cable records, but these records can be inspected in our Drawing Office.

General Advice

- (a) Please ensure, where appropriate, your CONTRACTORS have a copy of this letter and enclosed Plan(s).
- (b) Please note that the costs of any repairs or claims made against Southern Electric as a result of your works will be invoiced to you or your Contractors.
- (c) Southern Electric retains the rights to its property, including disconnected cables and recovered materials.

If you would like any further information, please do not hesitate in contacting me.

Yours faithfully,


M. R. J. Parker
Drawing Office

Enc. Sheets:

H.V. TQ 0106N

L.V. TQ 0106N

Watch It for digging near U/G cables. 00-884-0 ✓

~~*Watch It* for working near O/W cables. 00 728-5~~

*To be deleted if not appropriate.

engl67_pg2

FOR OFFICIAL USE ONLY (To be completed by person compiling record)

MAINS RECORD PROFORMA

Please delete as appropriate.

LV Records	YES/NO
HV Records	YES/NO
Other Records	YES/NO

Signature: 

ALWAYS REMEMBER THAT:

- If effective measures are not adopted to protect their equipment, Southern Electric will take steps to recover the cost of any damage caused. Promptness in reporting an incident will minimise costs.
- In most cases it is not practicable to make cables dead without interrupting supplies to Southern Electric's customers.
- Persons causing damage resulting in loss of supply to Southern Electric customers can be held legally responsible for any damage to the plant or equipment of these customers.
- Given adequate notice Southern Electric will, wherever possible, give advice regarding special precautions which may be necessary on any site where particular problems are likely to be encountered. The right is reserved to make a charge for this service.
- Electricity cables can exist anywhere - under paths or roads, in gardens or driveways, on new housing or industrial development sites or even farmland.

FOR YOUR INFORMATION

This leaflet is intended to help all those who have to excavate ground. Having located danger areas, employers are asked to ensure that their operatives are fully instructed in the correct procedures.

The Health and Safety Executive have produced a document entitled 'Avoiding Danger from Underground Services', and Appendix 1 deals specifically with electric cables. Copies are available from HMSO's Accredited Agents and good booksellers, Ref HS (G)47, ISBN 0118854923.

IN SITUATIONS OF DANGER, WHERE THE ADVICE CONTAINED IN THIS LEAFLET CANNOT BE FOLLOWED, CONSULT SOUTHERN ELECTRIC IMMEDIATELY, PREFERABLY AT THE LOCAL DIVISIONAL OFFICE.

SOUTHERN ELECTRIC plc

00-804-0(11/90)

Designed by McBride's Design Consultants

**SOUTHERN
ELECTRIC**



WATCH IT

*when digging in the vicinity of
underground electric cables*

British Gas

South Eastern

General Manager
Colin Stevens

Our Ref: KL/ESM/TG/M27/581/M114/LCH

16th March 1994

WS Atkins Environment
Woodcote Grove
Ashley Road
Epsom
Surrey
KT18 5BW

DAY	DATE
eq. No.	4762
Job No.	
RECEIVED	Please reply to: Steve Knight 16 11 1994 Ext 2146
File No.	British Gas plc (South Eastern)
Attend to	Crawley District
Action	Central Court
	Station Way
	Crawley
	West Sussex RH10 1YA



Dear Sir,

RE: Ford Road, Arundel

In reply to your letter of 8th March 1994, please find the enclosed plan upon which is indicated the approximate location of British Gas apparatus in the vicinity of your proposed work.

Positions of consumers service pipes are not shown, but their presence should be anticipated.

Should your proposed work necessitate crossing or working within close proximity to the mains shown, then it is advised that the work is carried out by hand only. The exact position and cover over the apparatus should be verified by a hand dug trial hole prior to your work commencing.

If you would kindly contact the Engineering Operations Manager, Mr Simon Fairman on the above telephone number, extension 9305 he will be pleased to make arrangements for the exact location of the mains and services to be indicated to you on site.

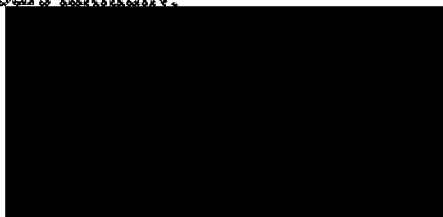
I have also included a document covering the precautionary measures which must be adopted when working in close proximity to live gas apparatus.

Continued.....

It must be noted that any costs incurred by British Gas PLC, for the repair or diversion of any mains and services as a result of your work, will be charged to yourselves on a Time and Material basis.

I trust the enclosed meets with your requirements.

Yours faithfully,



for Keith Linzner
Engineering Support Manager
Crawley

enc

CRAWLEY DISTRICT

Requirements for Works undertaken by Promoting Authorities and Statutory Undertakers

- 1.1 Certain information has been indicated on our enclosed plan but as a general guide only in relation to your proposed work, and its accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability is accepted for any discrepancy, omission or deviation, and you are advised to verify and establish the actual position of mains and services on site before any mechanical excavating plant is used. It must be stressed that both direct and consequential damages to gas apparatus can be dangerous both for your employees and to the public. This factor should always be taken into consideration when working near gas apparatus. If during your work you uncover any plant which you suspect to belong to British Gas please contact the following-

Mr Simon Fairman
at Park Road, Worthing Tel. No. 0293-517788 Ext 9305

- 2.1 The following protective measures must be applied when excavating in the vicinity of British Gas Apparatus

- 2.2 Access to British Gas plant and facilities for inspection by British Gas staff must not be restricted. Notice is hereby given that under Section 69 (and 122) of the New Roads & Street Works Act 1991, British Gas require that the attached protective measures be taken when planning to excavate in the vicinity of its apparatus.
- 2.3 All gas plant must be located by hand digging prior to any mechanical excavation. After the plant has been located, mechanical excavation must not be carried out within 500mm of British Gas plant. The position and line of British Gas plant and apparatus should be marked with suitable markers. British Gas must be notified at least three days in advance if the following activities are to be carried out in the vicinity of British Gas apparatus:

Excavation deeper than 1.5m within 8m of apparatus.
Excavation within 10m of any above ground or below ground installation.
Excavation adjacent to any pressure control kiosk.

- 2.4 A minimum clearance of 1.5 times the diameter of the pipe being laid, or 250mm whichever is the greater, should be allowed between any plant being installed and an existing gas main to facilitate repair, whether the adjacent plant be parallel to or crossing the gas pipe. No plant should be laid over and along the line of a gas pipe irrespective of clearance.
- 2.5 No manhole, cover or other structure shall be built over, around or under a gas pipe and no work should be carried out which results in a reduction of cover or protection over a pipe, without prior consultation and agreement. Where excavations adjacent to any pipe affect its support, the pipe must be adequately protected to the satisfaction of British Gas.
- 2.6 Explosives shall not be used within 30m of British Gas Distribution plant without prior consultation and agreement.
- 2.7 No piling or boring shall be carried out within 15m of British Gas Distribution plant without prior consultation and agreement.
- 2.8 When gas plant has been exposed, welding or other hot works involving naked flames should only be carried out in close proximity to British Gas Distribution plant if great care is taken to avoid damage to plastic gas pipes or to the protective coatings of other pipes.
- 2.9 At no time should vehicles or construction equipment be used or placed over British Gas unprotected plant; suitably reinforced crossing points must be constructed. These crossing points should be clearly indicated and crossing at other places should be prevented. This is particularly important where reductions in side supports or ground cover are planned.
- 2.10 Material used for the surround backfill of British Gas plant must conform to the following requirements:
- If sand, it must be well-graded to BS 582, Table 5 additional grading C.
 - It must not contain any sharp particles nor any particles greater than 18mm nominal size.
 - Foamed concrete should not be used.
 - It must be laid to a minimum depth of 100mm above the crown of the apparatus.
- 2.11 No power compaction should take place until 300mm of selected finefill has been suitably compacted.

- 2.12 Plant found when carrying out excavations must be adequately supported and concrete thrust blocks and the consolidated ground behind the thrust blocks must not be disturbed.
- 2.13 Shuttering shall be constructed so as to prevent fresh concrete encasing British Gas Distribution plant and to maintain the stated clearances. No concrete or other hard material must be placed or left under or adjacent to any gas pipe as this can cause fracture of a pipe at a later date. Concrete backfill should not be used closer than 300mm to a gas pipe.
- 2.14 British Gas has important plant in the vicinity of your works and any damage to it could have very serious and far-reaching consequences. In view of this and in the interest of safety, a meeting should be arranged before the commencement of the work on site between the representatives of the promoting authority and British Gas plc, including the contractors and any other interest parties. At this meeting the suggested programme of site works and plant safety should be discussed. Please arrange to convene a meeting well in advance of commencement on site.
- 2.15 Every possible precaution must be taken to avoid causing damage to British Gas plant during the progress of the works. All the costs incurred by British Gas for the repair of direct or consequential damage to the gas plant will be recharged to yourselves. Any damage to British Gas apparatus, including damage to wrapping or sleeving must be notified to the contact address and must be repaired before backfill.
- 2.16 British Gas plc reserves the right to divert any affected apparatus if proved necessary during the course of your works, the cost of which would be rechargeable to yourselves.
- 2.17 With regard to general safety of site works, reference should be made to HSE Guidance Note HS(G)47 'Avoiding danger from underground services' and in publication No. 7 of the National Joint Utilities Group (NJUG7). Please ensure that a copy of these publications is read by your Site Manager.

IF LEAKAGE IS CAUSED OR AN ESCAPE OF GAS IS SUSPECTED THE FOLLOWING ACTION SHOULD BE TAKEN AT ONCE

Remove all personnel and public from the immediate vicinity of the escape. Remember that if service to a building has been damaged, particularly if it has been pulled by an excavator, it may cause build-up of gas within the building due to gas travelling along the space around the pipe or due to unseen damage to the service within the building. Warn the occupants of the building and any adjoining buildings to leave until it has been established that it is safe for them to return. Inform the local British Gas Region by telephone on 0293-517788. Prevent any approach by the public, prohibit smoking, extinguish all naked flames and other sources of ignition within at least 15m from the leakage. Assist British Gas personnel, Police or Fire Services as requested.

The above requirements do not relieve you of the responsibility for taking all precautions necessary to safeguard British Gas Distribution plant and to avoid risk to persons and property. Should you require any further information or assistance, change your proposals or plans or starting data, please contact the Engineering Support Manager, Extension 2214.

NOTES OF IMPORTANCE

3. Reference to Para 2.3

The dimension of 500mm will generally apply to low pressure gas mains, services and plant, but it should be noted that this dimension (i.e 500mm) may be increased for gas mains, services and plant operating at gas pressures in excess of 75 millibars.

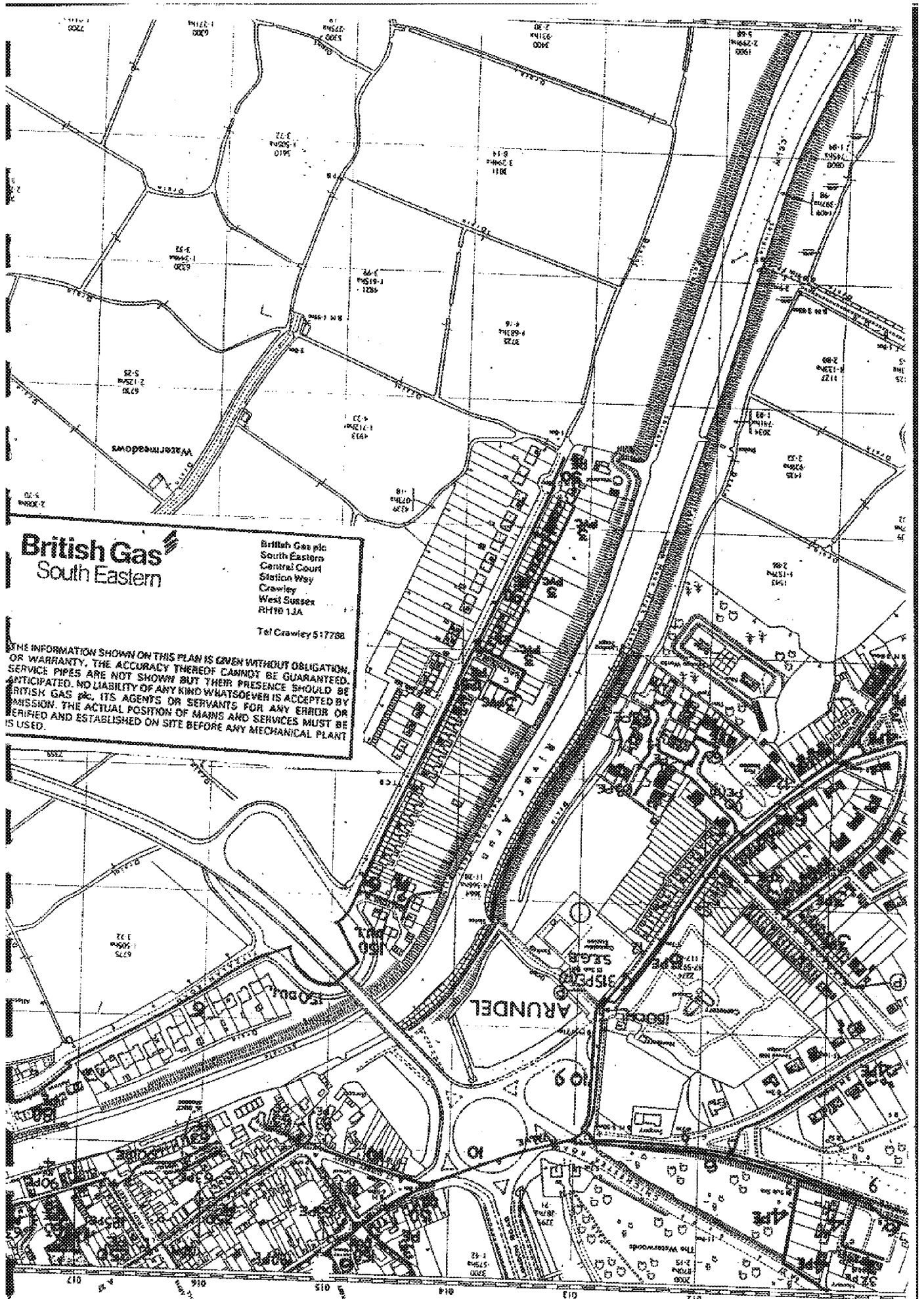
4. The requirements set out under Sector 1 and 2 only apply to mains, services and other gas plant under jurisdiction of the Engineering Manager.

Where High Pressure Steel Transmission Mains and plant with operating pressures up to 500 p.s.i. are affected, more stringent requirements are necessary. The Region's Officer responsible for the mains and plant is:

Transmission Engineer, British Gas plc, Katharine Street, Croydon, Surrey.

Where High Pressure Steel Transmission Mains and Plant are affected by your proposed works, the above Officer will decide and provide the necessary requirements to safeguard his mains, plant and equipment.

British Gas plc Registered Office: Rivemill House, 152 Grosvenor Road, London SW1V 3JL. Reg No. 2006000

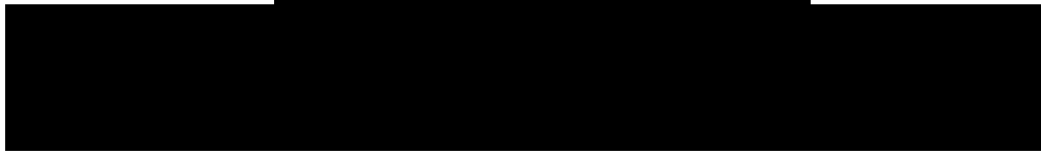


APPENDIX F

Desk Study Report by Harrison and Company (1988)

HARRISON & COMPANY

(Soils and Foundation Engineers) Limited.
117 Beulah Road, Thornton Heath, Surrey CR7 8JL.

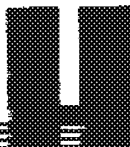


REPORT No. : C604A

DATE : July 1993.

LOCATION : British Gas Site, Ford Road, Arundel, West Sussex.

CLIENT : British Gas plc (South-eastern)



**DESK STUDY
ON A
DISUSED GAS WORKS
AT
FORD ROAD, ARUNDEL, WEST SUSSEX
FOR
BRITISH GAS (South Eastern) plc**

1 INTRODUCTION

The desk study covered by this report was carried out by Harrison & Company (Soils and Foundation Engineers) Limited, to the instructions of the Client, British Gas (South Eastern) plc., under their Order No. Wo13664, dated 6th July 1993.

The site under consideration was located between Ford Road and the River Arun, Arundel, West Sussex. The investigation was undertaken to ascertain past and recent land use purposes. In addition, former site boundaries and whether the site had contained other buildings or structures together with their approximate locations, have been investigated. Details of buildings and processes within the current British Gas works have not been investigated at this time. Harrison and Company have previously carried out a site investigation of this site in 1988. Full details of this investigation are given in our report, No. C604, and are discussed in section 3.7 below. The scope of the investigation was limited to the information available at the West Sussex County Records office. It should be noted that additional information concerning the site may be available from other sources, and that this study should not be considered to be exhaustive.

2 GEOLOGY

Reference to the British Geological Survey 1:50,000 sheet No. 217, Chichester, shows the site to be underlain by Alluvium overlying Upper Chalk in the north-eastern half of the site and Reading Beds in the south-western half of the site.

3 DESK STUDY

The desk study involved the collection and review of the historical information concerning the site available from the map room of the West Sussex Record Office. In addition a brief visit was made to site to assess its current condition.

Included in the appendix to this report are copies of one Tithe Map and four Ordnance Survey County Series Sheets together with a recent plan obtained from the archives at British Gas of the site. The outline of the current site is shown on all the plans with a dashed line. For the period between 1841 and the present day, the maps revealed the following information :

3.1 Tortington Tithe Map (Published 1841), TD/W128 MS84. (Scale 1:2500)

This shows that by 1841 the northern corner of the site, adjacent to Ford Road, was already occupied by a small gas works consisting of a single circular holder, a medium sized works building and a small cottage. To the north-east of the gas works were a lane and drainage ditch, running between Ford Road and a sluice gate on the River Arun. Beyond the lane and ditch was pasture land. Beyond Ford Road, to the north-west of the gas works, was more pasture land, and to the south and south-east between the gas works and the river embankment was an area of water meadow. The river bank was marked by a flood defence embankment, behind which was a drainage ditch which ran parallel to the river. When this ditch reached the lane and sluice gate it turned north-westwards and ran along the south-western edge of the lane as far as the corner of the gas works. To the south-west of the original gas works, and running parallel to Ford Road was a garden nursery which was bounded to the south-east by a drainage ditch connected to the River Arun. According to the county records the gas works was owned by an unnamed gas company and there was no information available as to when the gas works was first constructed. However, given that in 1840 Arundel was a relatively small city and that coal gas distilling was a relatively new process, then it seems likely that the 1841 gas works was the first to occupy the site and was probably less than twenty years old when surveyed. Prior to its construction the site was probably occupied by pasture land. (Drawing No. C604A/1)

3.2 O.S. County Series Map, West Sussex Sheet LXIII \I (Published 1877), 1st. Edition. (Scale 1:2500)

This map indicates that between 1841 and 1877 the gas works expanded slightly towards the south-west into the area once occupied by the nursery garden. This expansion consisted of two more holders and a rectangular building adjacent to the main works. The drainage ditch along the south-eastern boundary of the nursery gardens was extended and marked the south-eastern boundary of the gas works. The drainage ditch along the north-eastern side of the lane adjacent to the north-eastern boundary of the gas works was extended to run from the river sluice gate to Ford Road. To the south of the gas works within the water meadows between the river and Ford Road a public baths was constructed, consisting of an unspecified building and two rectangular ponds. The baths were bounded on three sides by drainage ditches, and lay along the south-western boundary of the current site. The river embankment was armoured against erosion using stone blocks.(Drawing No. C604A/2).

3.3 O.S. County Series Map, West Sussex Sheet LXIII/I (Published 1910), (Scale 1:2500)

This shows that by 1910 the gas works had doubled in size by expanding south-westwards into the area once occupied by the nursery garden. The expanded gas works now contained two large circular holders and an expanded works building. In addition an unspecified building was built in the northern corner of the gas works. The rest of the nursery garden was replaced by two rows of terrace houses and their adjacent gardens. The south-eastern boundary of both the gas works and the gardens was still marked by a drainage ditch although this no longer appeared to be connected to the river. To the north-west of the site the pasture land across Ford Road was converted into a cemetery containing a mortuary chapel and a lodge house. To the south-west of the cemetery Kirdford Road was constructed along with some terrace housing. (Drawing No. C604A/3).

3.4 O.S. County Series Map, West Sussex Sheet LXIII/I (1937 Revision), (Scale 1:2500)

Between 1910 and 1937 the area around the gas works remained much the same, with some additional housing present along Kirdford Rd. However the gas works expanded south-eastwards into the water meadows adjacent to the river. By 1937 the drainage ditch that originally marked the south-eastern boundaries of the gas works and Ford Road houses was gone, presumably having been infilled. Within the new area occupied by the gas works was a large circular tank or holder and a small building. (Drawing No. C604A/4).

3.50 O.S. National Grid. Sheet No. TQ0006-01066 (Revision of 1971) (Scale 1:2500)

This shows that between 1937 and 1971, the area around the gas works appeared to have remained much the same, with the exception of the public baths which were demolished and backfilled. The area occupied by the gas works is the same as in 1937, but by 1971 contained only a large circular holder or tank, an electricity sub station, a square tank and a buried pressure reducing station. The north-western half of the site appeared to be empty. (Drawing No. C604A/5).

3.6 British Gas Corporation (South-eastern Region) Plan, Drawing No. DE/Sx/4/200. Published 1976 (Scale 1:250)

This shows the site to be much the same as in 1971, except that the large circular holder in the south-eastern corner of the site had been removed. This plan shows that the services to the site consisted of several 8" and 12" gas mains connecting the pressure reduction plant to the mains running along Ford Road. These mains went on to supply both Arundel town and Slindon. (Drawing No. C406A/6)

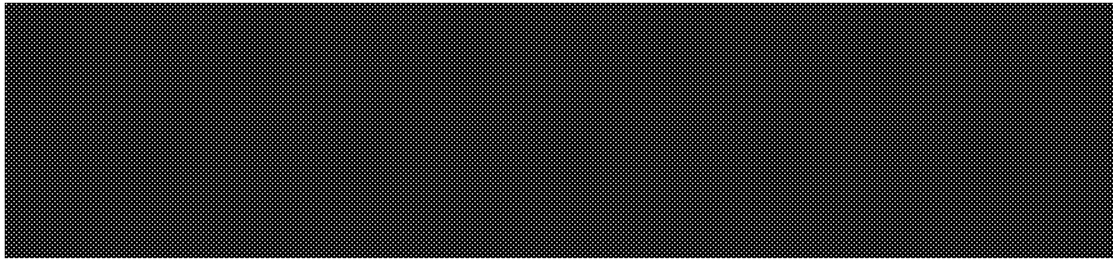
3.7 Harrison and Co. Site Investigation No. C604, 1988.

In 1988 a limited site investigation of the site was carried out, consisting of 22 trial pits. The trial pits were logged and samples taken for contamination testing. The findings of this investigation are given in full in report C604, but are summarised below.

Natural ground was encountered within all the trial pits and generally consisted of clay Alluvium, gravelly clay from the Reading Beds and weathered Upper Chalk.

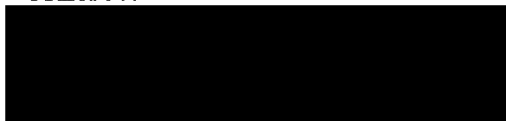
Within the British Gas compound, buried structures, consisting of concrete, pipes and metal, were encountered. Generally the depth of fill across this part of the site was about 1.3 m, but ranged up to depths of 3.0 m below ground level.

Within the south-western part of the site, which was occupied by pasture land, the top soil was generally underlain by natural materials, although in places limited quantities of chalk and brick fill were found. This material may originate from the demolition of the public baths, which were sited close to this end of the site.



3.8 Site Visit, May 1993.

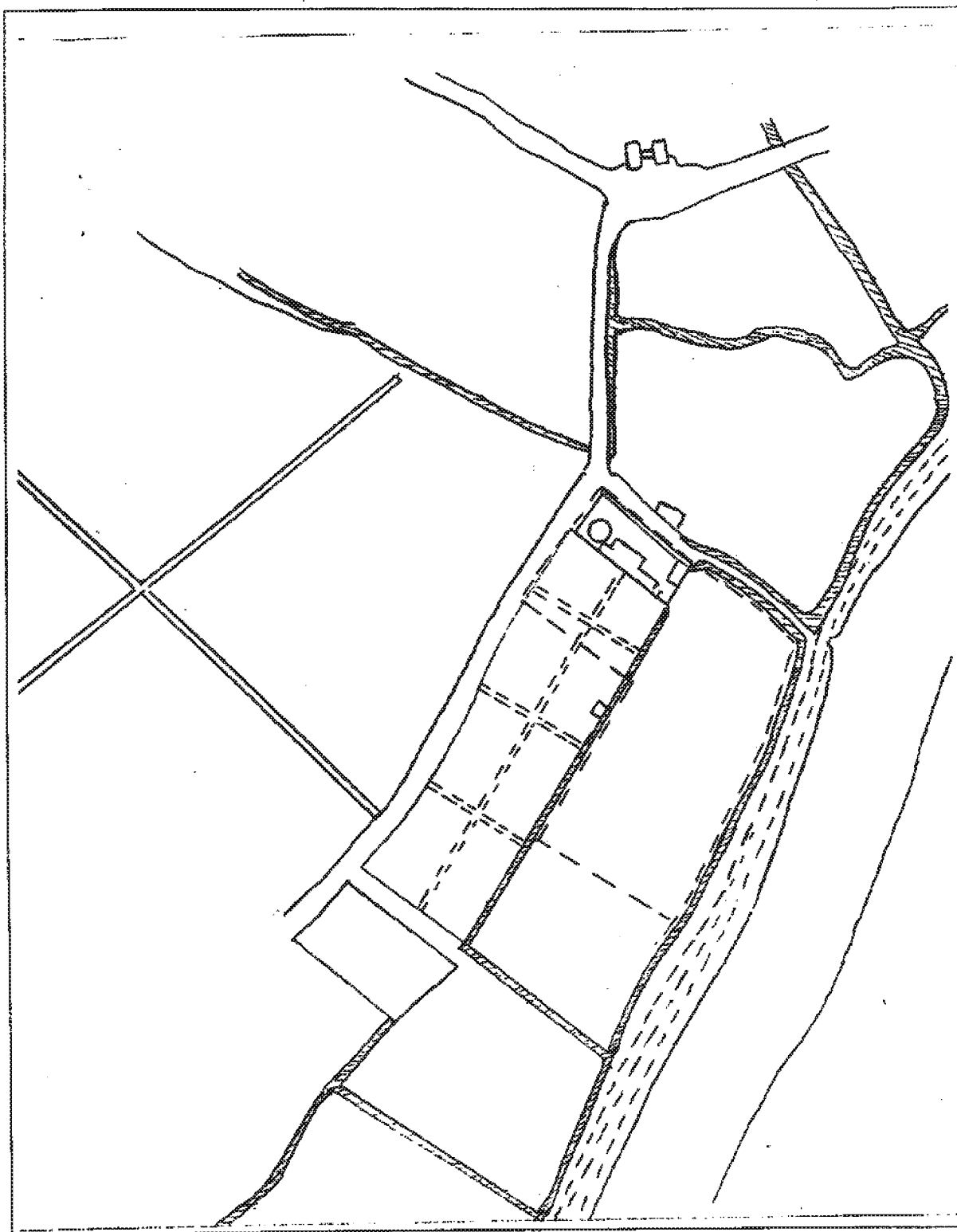
The site was visited by an engineer from Harrisons and Company on the 2nd July 1993 and since access to the gas works compound was not possible, a partial walk-over survey was carried out. The area under consideration included the British Gas compound and the area between the Ford Road houses and the drainage ditch adjacent to the river Arun. The site visit showed that the compound was no longer in use, and that the pressure reduction station appeared to be in some state of disrepair. The compound still was surrounded and divided by security fencing as shown on the 1976 British Gas plan. The north-western half of the compound was covered with gravel and looked as if it had been used as a vehicle park. The south-eastern half of the compound was as shown on the 1976 British Gas Plan, although in a general state of disrepair and abandonment. The rest of the site consisted of large pasture bounded by gardens to the north-west, the gas works security fence to the north-east, a tree lined drainage ditch to the south-east and open land to the south-west. Within the south-eastern drainage ditch water flowed quite rapidly south-westwards from a concrete culvert at the northern end of the ditch. It seems likely that this culvert connects with the concrete sluice gate at the end of the site access lane. Between the ditch and the River Arun was a river levee or embankment, 2 - 3 m high. The face of the embankment was armoured against erosion with concrete blocks.



Matthew Naylor B.Sc. (Hons).
Project Engineer



Malcolm S. Price M.Sc., C. Eng., M.I.C.E., F.G.S.
Director



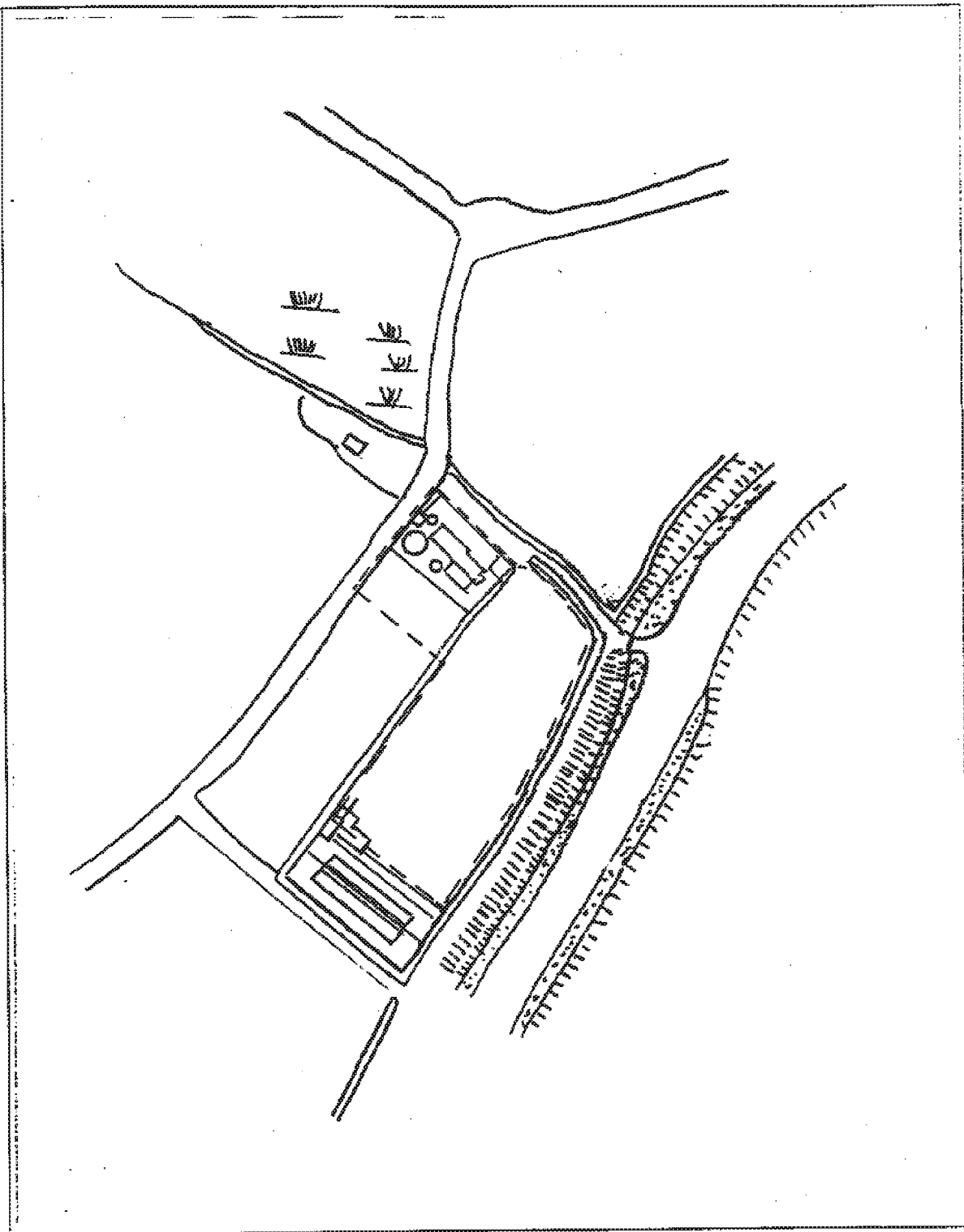
Ford Road, Arundel, West Sussex.

Tortington Tithe Map : Drawing No. C604A/1

Library No. TD/W128-MS84 (Published 1840), 1st. Edition

Scale : 1 : 2500

July 1993

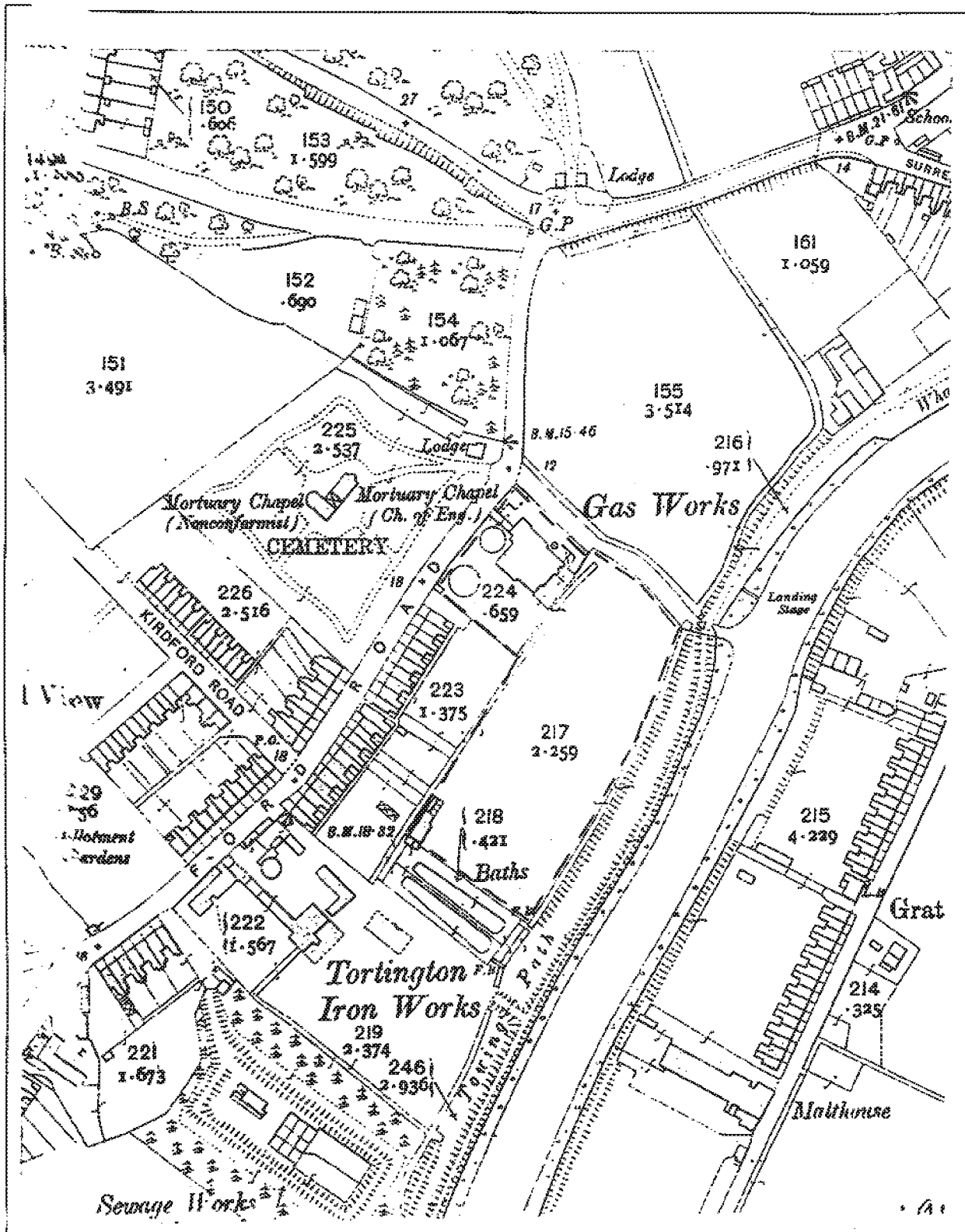


Ford Road, Arundel, West Sussex.

O.S. County Series Map : Drawing No. C604A/2
O.S. West Sussex Sheet LXIII/1 (Published 1877), 1st. Edition

Scale : 1 : 2500

July 1993



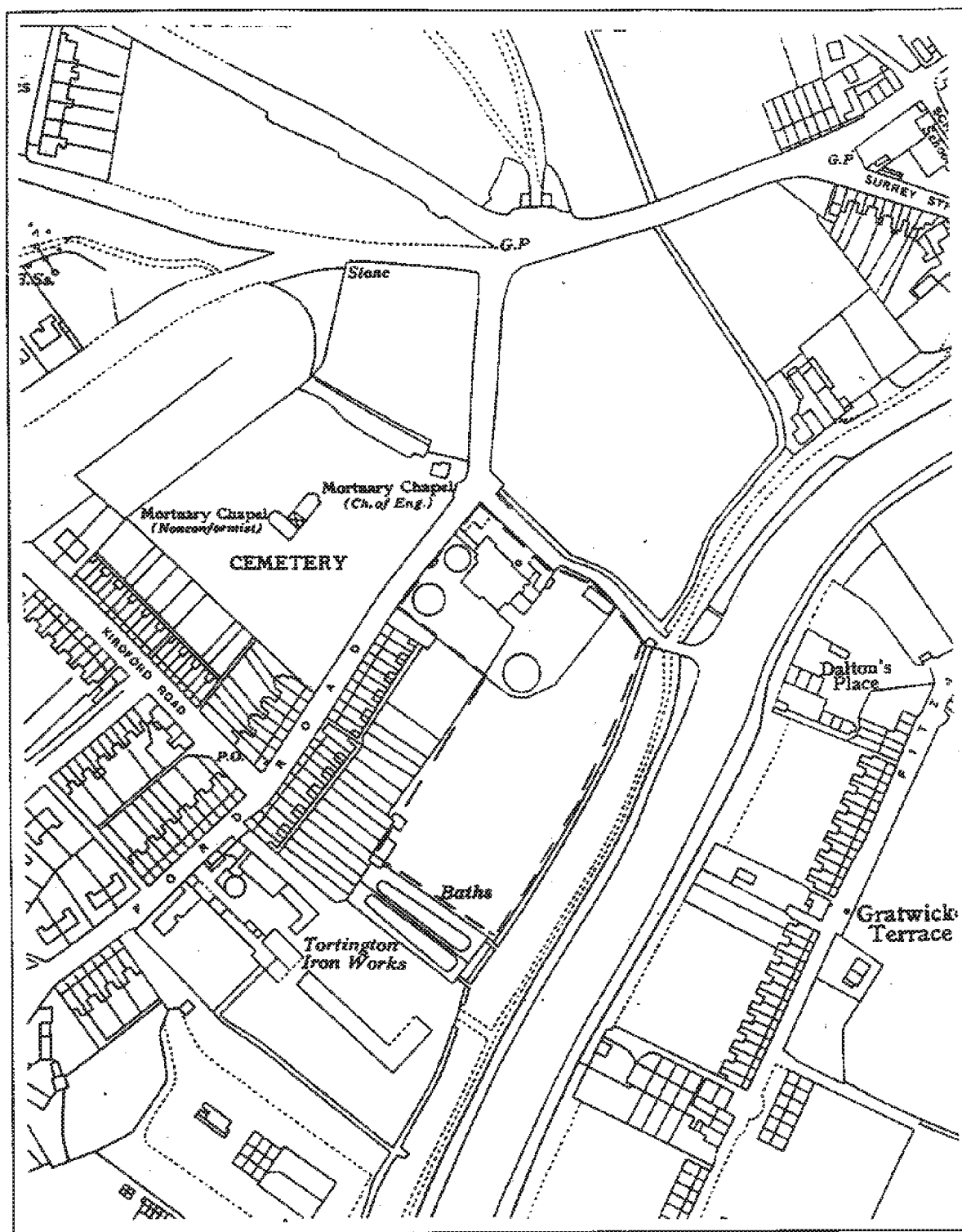
Ford Road, Arundel, West Sussex.

O.S. County Series Map : Drawing No. C604A/3

O.S. West Sussex Sheet LXIII/I (Published 1910)

Scale : 1 : 2500

July 1993



Ford Road, Arundel, West Sussex.

O.S. County Series Map : Drawing No. C604A/4

O.S. West Sussex Sheet LXIII/1 (Published 1937)

Scale : 1 : 2500

July 1993

Appendix B
Trial Pit and Borehole Logs, Site Photographs
and Site Works Log

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Woodcote Grove, Ashley Road
Epsom, Surrey, KT18 5BW



BOREHOLE LOG

Boring Contractor : ESL					Job No : A71430/ 015162		Borehole No : BH1	
Boring method : CFA					Client : Lattice Property		Sheet 1 of 2	
Boring diameter : 100			Casing diameter : 50		Site : Arundel		Ground level : 3.67 (Relative to Ordnance datum)	
Boring equipment :					Project : Arundel Site Investigation		Date commenced : 07/06/2000	Date completed : 07/06/2000
Easting : 501285.29			Northing : 106775.30					
Sample Details			Groundwater Details		Depth (mBGL)	Level (mAOD)	Key	Description of Strata
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well		3.67		
01	S	1.00			0.80	2.87		Soft to firm brown sandy clay with much gravel and cobble of builders rubble fill. MADE GROUND
02	S	2.00						Firm light brown very gravelly CLAY. Gravel of flint. NATURAL GROUND.
03	S	3.00						Red brown silty sandy with only occasional gravel at 1.3m. Brown without sand/ silt, very gravelly at 2.5m.
04	S	5.00						Soft to firm wet light brown, with occasional fine chalk gravel (not flint) at 2.5m.
05	S	7.00			6.50	-2.83		Soft light grey decomposed CHALK with occasional dark grey staining, slight odour. NATURAL GROUND. With occasional hard core stones at 7.4m.
								Continued Next Sheet
Groundwater Depth to water strike					Remarks :			
Struck (m) : 3.30 Flow Remarks :					Logged By : ESL			

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Woodcote Grove, Ashley Road
Epsom, Surrey, KT18 5BW



BOREHOLE LOG

Boring Contractor : ESL					Job No : A71430/ 015162		Borehole No : BH1	
Boring method : CFA					Client : Lattice Property		Sheet 2 of 2	
Boring diameter : 100			Casing diameter : 50		Site : Arundel		Ground level : 3.67 (Relative to Ordnance datum)	
Boring equipment :					Project : Arundel Site Investigation		Date commenced : 07/06/2000	Date completed : 07/06/2000
Easting : 501285.29			Northing : 106775.30					
Sample Details			Groundwater Details		Depth (mBGL)	Level (mAOD)	Key	Description of Strata
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well		3.67		
06	S	9.00				-6.33		Soft light grey decomposed CHALK with occasional dark grey staining, slight odour. NATURAL GROUND.
								End of Borehole at 10.00 m
Groundwater						Remarks :		
Struck (m) : 3.30		Flow Remarks :				Logged By : ESL		

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Woodcote Grove, Ashley Road
Epsom, Surrey, KT18 5BW



BOREHOLE LOG

Boring Contractor: ESL					Job No: A71430/ 015162		Borehole No: BH2	
Boring method: CFA					Client: Lattice Property		Sheet 1 of 2	
Boring diameter: 100			Casing diameter: 50		Site: Arundel		Ground level: 3.40 (Relative to Ordnance datum)	
Boring equipment:					Project: Arundel Site Investigation		Date commenced: 08/06/2000	Date completed: 08/06/2000
Easting: 501272.21			Northing: 106727.31					
Sample Details			Groundwater Details		Depth (mBGL)	Level (mAOD)	Key	Description of Strata
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well		3.40		
01	S	1.00			0.20	3.20		Loose light brown coarse gravel fill. MADE GROUND. Soft to firm red/brown very silty CLAY. NATURAL GROUND. Much flint gravel at 0.7m.
02	S	2.00						Soft sandy with only very occasional gravel at 1.8m.
03	S	3.00						
04	S	5.00						Light brown without sand at 4.0m.
05	S	7.00			6.50	-3.10		Soft wet white to light brown completely decomposed CHALK with very occasional flint gravel. NATURAL GROUND. With occasional hard core stones at 7.2m.
								Continued Next Sheet
Groundwater ☒ Depth to water strike					Remarks:		Logged By: ESL	
Struck (m):		Flow Remarks:						
2.68								

ARUN DISTRICT COUNCIL AB/88/19/PL

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Epsom, Surrey, KT18 5BW



BOREHOLE LOG

Boring Contractor : ESL				Job No : A71430/ 015162		Borehole No : BH3		
Boring method : CFA				Client : Lattice Property		Sheet 1 of 2		
Boring diameter : 100		Casing diameter : 50		Site : Arundel		Ground level : 3.22 (Relative to Ordnance datum)		
Boring equipment :				Project : Arundel Site Investigation		Date commenced : 07/06/2000	Date completed : 07/06/2000	
Easting : 501295.70		Northing : 106741.54						
Sample Details			Groundwater Details		Depth (mBGL)	Level (mAOD)	Key	Description of Strata
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well		3.22		
					0.60	2.62		Soft to firm black /brown sandy CLAY fill, with much gravel and builders rubble. With odour. MADE GROUND
01	S	1.00						Soft to firm light brown CLAY. No odour. NATURAL GROUND Red /brown with flint gravel at 0.8m. Very gravelly at 1.5m.
02	S	2.00						
03	S	3.00						With gravel at 2.8m. Soft light brown light grey with fine chalk gravel (no flint) at 3.0m. Light grey with odour at 3.2m.
04	S	5.00						Light brown with flint gravel (no chalk) and slight odour at 4.3m.
					5.80	-2.38		
05	S	7.00						White very light brown completely decomposed CHALK with occasional hard core stones. NATURAL GROUND
								Continued Next Sheet
Groundwater Depth to water strike				Remarks :				Logged By : ESL
Struck (m) Flow Remarks : 3.20								

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BOREHOLE LOG

Boring Contractor : ESL				Job No : A71430/ 015162		Borehole No : BH3		
Boring method : CFA				Client : Lattice Property		Sheet 2 of 2		
Boring diameter : 100		Casing diameter : 50		Site : Arundel		Ground level : 3.22 (Relative to Ordnance datum)		
Boring equipment :				Project : Arundel Site Investigation		Date commenced : 07/06/2000	Date completed : 07/06/2000	
Easting : 501295.70		Northing : 106741.54						
Sample Details			Groundwater Details		Depth (mBGL)	Level (mASOD)	Key	Description of Strata
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well		3.22		
06	S	9.00			10.00	-6.78		White very light brown completely decomposed CHALK with occasional hard core stones. NATURAL GROUND.
								End of Borehole at 10.00 m
Groundwater						Remarks :		Logged By : ESL
Struck (m) Flow Remarks : 3.20								

BOREHOLE LOG

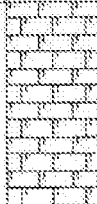
Boring Contractor : ESL				Job No : A71430/ 015162		Borehole No : BH4			
Boring method : CFA				Client : Lattice Property		Sheet 1 of 2			
Boring diameter : 100		Casing diameter : 50		Site : Arundel		Ground level : 2.51 (Relative to Ordnance datum)			
Boring equipment :				Project : Arundel Site Investigation		Date commenced : 06/06/2000	Date completed : 06/06/2000		
Easting : 501304.21		Northing : 106696.39							
Sample Details			Groundwater Details		Depth (mBGL)	Level (mAOD)	Key	Description of Strata	
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well		2.51			
01	S	1.00	▽		0.50	2.01		Firm brown silty gravelly clay fill. MADE GROUND	
02	S	2.00							Soft to firm light brown CLAY. NATURAL GROUND With gravel at 1.0m.
03	S	3.00							Very gravelly at 2.5m.
04	S	5.00							Red / brown stiff silty with very occasional gravel at 3.5m. Firm light brown and gravelly at 4.2m.
05	S	7.00					5.90	-3.39	
								Continued Next Sheet	
Groundwater Depth to water strike				Remarks :				Logged By : ESL	
Struck (m)		Flow Remarks :							
2.28									

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Epsom, Surrey, KT18 5BW



BOREHOLE LOG

Boring Contractor : ESL				Job No : A71430/ 015162		Borehole No : BH4		
Boring method : CFA				Client : Lattice Property		Sheet 2 of 2		
Boring diameter : 100		Casing diameter : 50		Site : Arundel		Ground level : 2.51 (Relative to Ordnance datum)		
Boring equipment :				Project : Arundel Site Investigation		Date commenced : 06/06/2000	Date completed : 06/06/2000	
Easting : 501304.21		Northing : 106696.39						
Sample Details			Groundwater Details		Depth (mBGL)	Level (mAOD)	Key	Description of Strata
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well		2.51		
06	S	9.00			10.00	-7.49		Soft wet white decomposed CHALK with occasional hard core stones and occasional flinty gravel. No odour. NATURAL GROUND.
								End of Borehole at 10.00 m
Groundwater						Remarks :		
Struck (m): 2.28						Flow Remarks :		
						Logged By : ESL		

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BOREHOLE LOG

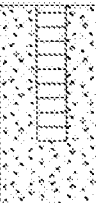
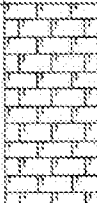
Boring Contractor : ESL				Job No : A71430/ 015162		Borehole No : BH5		
Boring method : CFA				Client : Lattice Property		Sheet 1 of 2		
Boring diameter : 100		Casing diameter : 50		Site : Arundel		Ground level : 2.55 (Relative to Ordnance datum)		
Boring equipment :				Project : Arundel Site Investigation		Date commenced : 06/06/2000	Date completed : 06/06/2000	
Easting : 501341.00		Northing : 106735.55						
Sample Details			Groundwater Details		Depth (mBGL)	Level (mAOD)	Key	Description of Strata
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well		2.55		
01	S	1.00			0.10	2.45		Asphalt, MADE GROUND
					0.30	2.25		Loose red, grey, brown builders rubble, MADE GROUND.
02	S	2.00						Soft to firm light brown CLAY, NATURAL GROUND.
03	S	3.00						Band of gravel at 1.1m.
04	S	5.00						With much gravel at 2.5m.
								Band of gravel at 3.7m.
								Band of gravel at 4.5m.
								Damp at 5.0m.
05	S	7.00			6.00	-3.45		Soft white light grey decomposed CHALK with occasional hard core stones and occasional flint gravel. Wet with hydrocarbon odour. NATURAL GROUND.
								Continued Next Sheet
Groundwater						Remarks :		
Struck (m) Flow Remarks :						Logged By : ESL		

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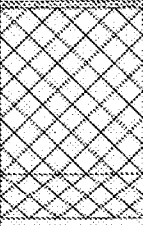


BOREHOLE LOG

Boring Contractor : ESL				Job No : A71430/ 015162		Borehole No : BH5		
Boring method : CFA				Client : Lattice Property		Sheet 2 of 2		
Boring diameter : 100		Casing diameter : 50		Site : Arundel		Ground level : 2.55 (Relative to Ordnance datum)		
Boring equipment :				Project : Arundel Site Investigation		Date commenced : 06/06/2000	Date completed : 06/06/2000	
Easting : 501341.00		Northing : 106735.55						
Sample Details			Groundwater Details		Depth (mBGL)	Level (mAGD) 2.55	Key	Description of Strata
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well				
06	S	9.00						Soft white light grey decomposed CHALK with occasional hard core stones and occasional flint gravel. Wet with hydrocarbon odour. NATURAL GROUND.
					10.00	-7.45		End of Borehole at 10.00 m
Groundwater						Remarks :		
Struck (m) Flow Remarks :						Logged By : ESL		

TRIAL PIT LOG

Client : Lattice Property		Job No : A71430/ 015162		Trial Pit No : TP1	
Project : Arundel Site Investigation		Easting : 501281.30		Sheet 1 of 1	
Site : Arundel		Northing : 106763.75		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 3.60		07/06/2000	07/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.05	3.55		Loose light brown gravel. MADE GROUND
02		1.20	2.40		Loose white to yellow chalk fill with chalk boulders. MADE GROUND
03		1.50	2.10		Becoming dirty, light brown to yellow, patches of some broken brick and metal, patches of orange to brown clay (reworked natural ground). MADE GROUND
End of Trial Pit at 1.60 m					

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	0.80	CHALK, MADE GROUND
02	W	1.40	Slight organic odour, water looking clean
03	S	1.60	Clay on western side of the trial pit.

Remarks :
Logged By : GMA

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Epsom, Surrey, KT18 5BW



TRIAL PIT LOG

Client : Lattice Property		Job No : A71430/ 015162		Trial Pit No : TP2	
Project : Arundel Site Investigation		Easting : 501274.54		Sheet 1 of 1	
Site : Arundel		Northing : 106751.85		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 3.71		07/06/2000	07/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.10	3.61		Loose light brown gravel. MADE GROUND.
02		1.50	2.21		Loose dark brown silty sand with patches of soft orange brown clay (re-worked) and brick, roots, scrap metal, concrete blocks (up to 30cm x 100cm x 60cm), coal, cast iron railway line/track at 1m, 250mm circular wall (broken holder base). MADE GROUND
03					Soft white to grey foul lime or chalk with patches of black staining, pockets of tar or phenol odour with timber and scrap metal. MADE GROUND
04		2.20	1.51		Tar stained gravel at 1.8m
					End of Trial Pit at 2.30 m

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	1.00	MADE GROUND
02	W	1.20	Dark brown water with a brown foam, tar odour.
03	S	1.80	MADE GROUND. Gas works waste.
04	S	2.20	Clay

Remarks :

Logged By : GMA

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Epsom, Surrey, KT18 5BW



TRIAL PIT LOG

Client : Lattice Property				Job No : A71430/ 015162		Trial Pit No : TP2A	
Project : Arundel Site Investigation				Easting : 501274.54		Sheet 1 of 1	
Site : Arundel				Northing : 106751.85		Date commenced :	Date completed :
Excavated By : JCB				Ground Level (mAOD) : 3.71		07/06/2000	07/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.10	3.61		Loose light brown gravel. MADE GROUND
		0.40	3.31		Loose dark brown silty sand. MADE GROUND
02					Soft orange brown CLAY with gravels with red to orange clay patches. No visual or olfactory signs of contamination. NATURAL GROUND. No sign of contamination below base or adjacent.
		2.40	1.31		Turning to a soft yellow to orange clay at 1.5m.
					End of Trial Pit at 2.40 m

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	1.00	Gravelly CLAY
02	S	2.40	CLAY

Remarks :
Logged By : GMA

WS Atkins Consultants Ltd.

Woodcote Grove, Ashley Road
Epsom, Surrey, KT18 5BW



TRIAL PIT LOG

Client: Lattice Property		Job No: A71430/015162		Trial Pit No: TP3	
Project: Arundel Site Investigation		Easting: 501267.52		Sheet 1 of 1	
Site: Arundel		Northing: 106743.94		Date commenced:	Date completed:
Excavated By: JCB		Ground Level (mAOD): 3.76		07/06/2000	07/06/2000

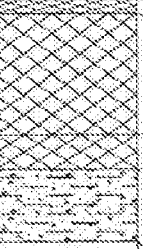
Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.10	3.66		Gravel fill, MADE GROUND
		1.20	2.56		Loose dark brown to black sandy silt, MADE GROUND Concrete base at 1.2m, no visual or satisfactory signs of contamination. End of Trial Pit at 1.20 m

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	1.00	MADE GROUND

Remarks:
Logged By: GMA

TRIAL PIT LOG

Client : Lattice Property		Job No : A71430/ 015162		Trial Pit No : TP3A	
Project : Arundel Site Investigation		Easting : 501267.52		Sheet 1 of 1	
Site : Arundel		Northing : 106743.94		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 3.76		07/06/2000	07/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.10	3.66		Gravel fill. MADE GROUND
		0.95	2.81		Loose dark brown to black sandy silt. MADE GROUND
		1.20	2.56		
02		1.70	2.06		Soft orange to brown clay with gravels. Reworked natural ground.
					Soft orange to brown sandy CLAY with gravel, no visual or olfactory contamination. NATURAL GROUND. Concrete base at 1.2m, 200mm thick. TP moved 0.5m away from the site side, outside the slab. End of Trial Pit at 1.70 m

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01		1.20	Sludge contaminated soil. MADE GROUND
02		1.70	CLAY

Remarks :

 Logged By : GMA

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Woodcote Grove, Ashley Road
Epsom, Surrey, KT18 5BW

**TRIAL PIT LOG**

Client : Lattice Property		Job No : A71430/ 015162		Trial Pit No : TP4	
Project : Arundel Site Investigation		Easting : 501254.14		Sheet 1 of 1	
Site : Arundel		Northing : 106737.88		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 4.01		07/06/2000	07/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.10	3.91		Loose light brown gravel, MADE GROUND.
		1.50	2.51		Loose light brown orange sandy SILT with brick, scrap metal, blue 1960-70's glass bottle, old barrel, steel pipes, coal and cast iron scrap, no odour or visual sign of contamination, MADE GROUND. Quantity of hard core increases at 0.8m. Mass concrete at 1.5m. End of Trial Pit at 1.50 m

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	1.00	MADE GROUND

Remarks :

Logged By : GMA

TRIAL PIT LOG

Client : Lattice Property		Job No : A71436/ 015162		Trial Pit No : TP5	
Project : Arundel Site Investigation		Easting : 501297.40		Sheet 1 of 1	
Site : Arundel		Northing : 106763.41		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 3.35		06/06/2000	06/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01 02 05 03		0.10	3.25		Loose light brown gravel. MADE GROUND
		1.00	2.35		Loose dark brown to black sandy silt with ash, coal, broken bricks, some clay, soft light brown-orange with grey clay patches with gravel and small pockets of reworked natural ground. MADE GROUND
		1.40	1.95		At 0.7m on service road side a third 300mm cast iron pipe and a pocket of tar with contaminated soil (sampled).
		1.70	1.65		At 0.9m two 300mm cast iron pipes full of water, two were broken but the water was not under pressure i.e. it was contained in the pipe.
04		2.50	0.85		Soft black silty clay with heavy tar contamination and brick. MADE GROUND
					Loose black medium gravel with heavy tar contamination and soft light-brown-orange with grey patched clay with gravel. MADE GROUND
					Soft orange brown CLAY with gravel. NATURAL GROUND
					Tar contamination absent by 2.0m
					End of Trial Pit at 2.50 m

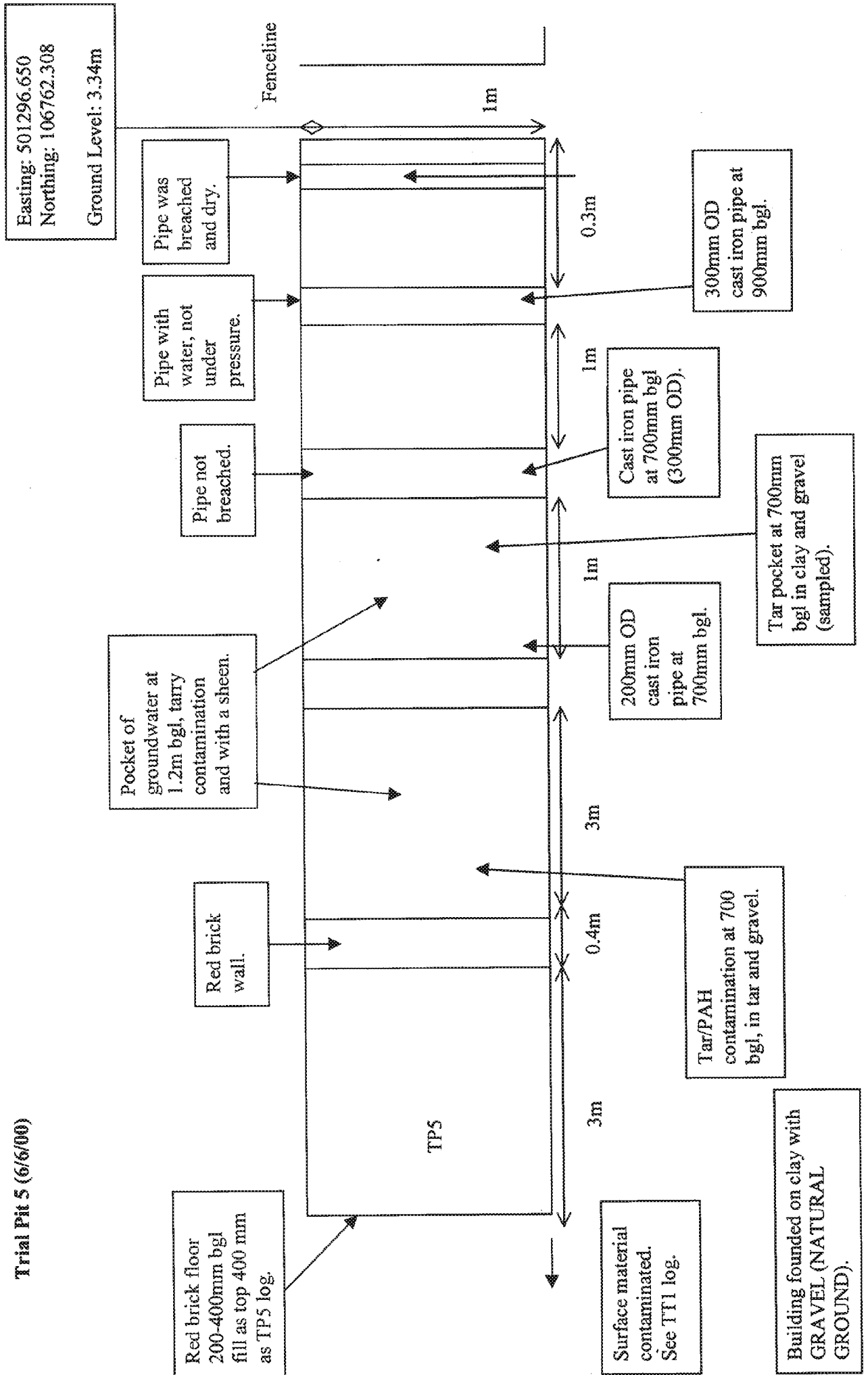
Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	0.70	Tar contaminated soil. MADE GROUND
02	S	0.90	Tar contaminated soil. MADE GROUND
05	W	1.20	Tar contaminated water
03	S	1.30	Tar contaminated soil. MADE GROUND
04	S	2.40	Gravelly CLAY

Remarks :

Logged By : **GMA**

BG Arundel

Trial Pit 5 (6/6/00)



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TRIAL PIT LOG

Client : Lattice Property		Job No : A71430/ 015162		Trial Pit No : TP6	
Project : Arundel Site Investigation		Easting : 501279.84		Sheet 1 of 1	
Site : Arundel		Northing : 106717.93		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 3.13		08/06/2000	08/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.80	2.33		Loose soft dark brown gravelly clayey SILT, rich in organic matter with roots (topsoil). NATURAL GROUND.
02		1.50	1.63		Soft orange brown CLAY. Becoming gravelly clay from 1.0m. No visual or olfactory contamination. NATURAL GROUND.
End of Trial Pit at 1.50 m					

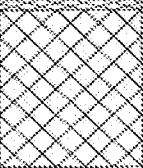
Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	0.50	Gravelly clayey SILT
02	S	1.40	Gravelly CLAY

Remarks :

Logged By : GMA

TRIAL PIT LOG

Client : Lattice Property		Job No : A71430/ 015162		Trial Pit No : TP7	
Project : Arundel Site Investigation		Easting : 501308.47		Sheet 1 of 1	
Site : Arundel		Northing : 106747.02		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 3.00		06/06/2000	06/06/2000

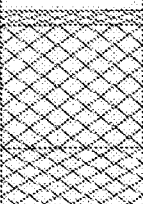
Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.10	2.90		Loose light brown gravel. MADE GROUND.
02		1.20	1.80		Loose dark brown to black sandy silt fill with white ash, brick and coal. MADE GROUND. Pockets of soft light brown to orange with grey chalk, reworked natural ground. TP ended at 1.2m due to two 300mm cast iron pipes. End of Trial Pit at 1.20 m

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	0.50	MADE GROUND
02	S	1.05	NATURAL GROUND on service road side of trial pit.

Remarks :
Logged By : GMA

TRIAL PIT LOG

Client: Lattice Property		Job No: A71430/015162		Trial Pit No: TP8	
Project: Arundel Site Investigation		Easting: 501306.50		Sheet 1 of 1	
Site: Arundel		Northing: 106740.26		Date commenced: 06/06/2000	Date completed: 06/06/2000
Excavated By: JCB		Ground Level (mAOD): 2.94			

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.10	2.84		Loose coarse gravel fill. MADE GROUND.
02		0.95	1.99		Loose dark brown black silty sandy clay fill with ash, coal, brick (red, orange, and yellow in colour). Some clinker and patches of soft orange - brown silty clay (no odour), chalk boulders and patches of spent oxide. MADE GROUND.
03		1.40	1.54		MADE GROUND Cast iron pipe at 1.2m, broken accidentally during excavation. Trial pit ended at 1.4m as broken pipe filled trial pit with water. End of Trial Pit at 1.40 m

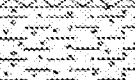
Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	0.50	MADE GROUND
02	W	1.20	Cast iron pipe, dark brown to green water, phenol/oil odour, sheen on the water.
03	S	1.20	MADE GROUND

Remarks:

Logged By: **GMA**

TRIAL PIT LOG

Client : Lattice Property		Job No : A71430/015162		Trial Pit No : TP9	
Project : Arundel Site Investigation		Easting : 581381.54		Sheet 1 of 1	
Site : Arundel		Northing : 106725.33		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 2.95		08/06/2000	08/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.10	2.85		Tarmac road, MADE GROUND
		0.60	2.35		Loose black, dark brown silty clay fill with coal, gravel, sand, chalk, brick work on the northern, eastern and southern sides however on the western side at 0.9m natural ground was encountered, MADE GROUND
02		1.50	1.45		Soft orange to brown CLAY with gravel, NATURAL GROUND
					Becoming more gravelly at 1.4m
					End of Trial Pit at 1.50 m

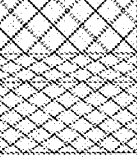
Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	0.50	MADE GROUND
02	S	1.50	NATURAL GROUND

Remarks :

 Logged By : GMA

TRIAL PIT LOG

Client : Lattice Property		Job No : A71430/ 015162		Trial Pit No : TP10	
Project : Arundel Site Investigation		Easting : 501292.61		Sheet 1 of 1	
Site : Arundel		Northing : 106716.39		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mADD) : 3.01		08/06/2000	08/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mADD)	Key	Description of Strata
02		0.40	2.61		Loose light brown clayey silt with roots. MADE GROUND
		0.60	2.41		Mass concrete holder base. MADE GROUND - brick wall at edge
		1.10	1.91		Loose light brown clayey silt and bricks as above. MADE GROUND. Looks clean and no odour. End of Trial Pit at 1.10 m

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
02	S	0.40	Holder side. MADE GROUND

Remarks :			
Logged By : GMA			

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TRIAL PIT LOG

Client : Lattice Property		Job No : A7143W 015162		Trial Pit No : TP 10A	
Project : Arundel Site Investigation		Easting : 501292.61		Sheet 1 of 1	
Site : Arundel		Northing : 106716.39		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 3.81		08/06/2000	08/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.05 0.10	2.96 2.91		Loose light brown gravel.
02		1.90	1.11		Black top/ terrace. MADE GROUND Soft dark brown, black silty clay fill with ash, gravel, coal, brick and timber. No odour. At 1.2m, 200mm diameter clay drainage pipe breached (pipe clay). At 1.6m clay pocket on roadside of pit reworked NATURAL GROUND. (Soft orange-brown CLAY). Slow groundwater seepage at 1.7m Wet at 1.8m End of Trial Pit at 2.30 m

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	1.00	Non holder side. MADE GROUND
02	S	2.00	Non holder side clay. MADE GROUND

Remarks : Not enough water in the pit to sample.

Logged By : GMA

TRIAL PIT LOG

Client : Lattice Property		Job No : A71430/ 015162		Trial Pit No : TP11	
Project : Arundel Site Investigation		Easting : 501309.20		Sheet 1 of 1	
Site : Arundel		Northing : 106707.93		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 2.59		08/06/2000	08/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.05	2.54		Loose light brown gravel. MADE GROUND
		0.40	2.19		Loose dark brown sands with organic matter and some gravel. MADE GROUND
02 03		1.50	1.09		Soft orange to brown clay with gravel at 1.5m. No sign of visual or olfactory contamination. NATURAL GROUND.
					End of Trial Pit at 1.50 m

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	0.20	MADE GROUND
02	S	1.20	NATURAL GROUND
03	S	1.40	NATURAL GROUND

Remarks :

Logged By : GMA

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TRIAL PIT LOG

Client : Lattice Property		Job No : A71430/ 015162		Trial Pit No : TP 11A	
Project : Arundel Site Investigation		Easting : 501309.20		Sheet 1 of 1	
Site : Arundel		Northing : 106707.93		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 2.59		08/06/2000	08/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.20	2.39		Loose light brown clayey fill. Top soil
		0.40	2.19		Pink, light red broken concrete slab 200mm thick. MADE GROUND
		0.60	1.99		Sand and termac. MADE GROUND
		0.90	1.69		Mass concrete base intact 300mm thick.
02	▽	1.40	1.19		Soft orange to brown CLAY with gravel. NATURAL GROUND
				End of Trial Pit at 1.40 m	

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	0.20	Non holder side
02	S	1.20	Non holder side
03	S	1.40	Below footing slab. Holder side.

Remarks :	
Logged By : GMA ▽ Depth to water strike	

TRIAL PIT LOG

Client: Lattice Property		Job No: A71430/ 015162		Trial Pit No: TP12	
Project: Arundel Site Investigation		Easting: 501319.24		Sheet 1 of 1	
Site: Arundel		Northing: 106709.73		Date commenced:	Date completed:
Excavated By: JCB		Ground Level (mAOD): 2.43		08/06/2000	08/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.05	2.38		Loose light brown gravel. MADE GROUND
02		0.70	1.73		Soft dark brown silty clay (organic rich). MADE GROUND
03		1.60	0.83		Soft orange light brown CLAY. NATURAL GROUND At 0.7m five 10mm dead electric cables. With some gravel at 1.2m.
					End of Trial Pit at 1.60 m

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	0.50	MADE GROUND
02	W	1.30	looks clean, no odour, orange to brown coloration
03	S	1.50	CLAY

Remarks:

Logged By: GMA Depth to water strike

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TRIAL PIT LOG

Client : Lattice Property		Job No : A71430/ 015162		Trial Pit No : TP13	
Project : Arundel Site Investigation		Easting : 501327.97		Sheet 1 of 1	
Site : Arundel		Northing : 106719.91		Date Commenced :	Date completed :
Excavated By :		Ground Level (mAOD) : 2.48		08/06/2000	08/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.10	2.38		Wood chippings and moss. MADE GROUND.
02					Loose dark brown clayey SILT with sand and mott, no odours or sign of contamination. NATURAL GROUND.
		1.40	1.08		20 mm dead steel water pipe and 5 dead electric cables at 0.8m.
					End of Trial Pit at 1.40 m.

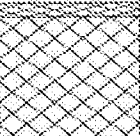
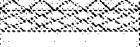
Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	0.60	Clayey SILT
02	S	1.20	Clayey SILT

Remarks :

Logged By : **GMA**

TRIAL PIT LOG

Client : Lattice Property		Job No : A71430/ 015162		Trial Pit No : TP14	
Project : Arundel Site Investigation		Easting : 501336.52		Sheet 1 of 1	
Site : Arundel		Northing : 106740.64		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 2.63		08/06/2000	08/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata	
01		0.10	2.53		Tarmac / black top.	
02		1.00	1.63			Loose, black to brown with white specks, sandy silt with ash, chalk, glass, scrap metal, brick, clay pipe, clinker and slight gasworks odour. MADE GROUND
		1.15	1.48			Soft orange to light brown CLAY with gravel, reworked natural ground. MADE GROUND Concrete slab at base (1.15m) End of Trial Pit at 1.15 m

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	0.80	MADE GROUND
02	S	1.10	MADE GROUND. Clay

Remarks :
Logged By : GMA

TRIAL PIT LOG

Client : Lattice Property		Job No : A71430/015162		Trial Pit No : TTI	
Project : Arundel Site Investigation		Easting : 501277.60		Sheet 1 of 1	
Site : Arundel		Northing : 106732.08		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 3.52		06/06/2000	06/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
03		0.10	3.42		Loose light brown gravel. MADE GROUND
01		0.70	2.82		Loose dark brown sandy SILT with clay and roots. NATURAL GROUND
03					Soft orange to brown CLAY with gravel. NATURAL GROUND
04		1.40	2.12		
05					End of Trial Pit at 1.60 m

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
03	S	0.20	Clayey sandy SILT at TTB
01	S	0.80	Gravelly CLAY at TTA
03	S	1.00	Gravelly CLAY at TTB
04	S	1.30	Gravelly CLAY at TTA
05	S	1.60	CLAY at TTA

Remarks :
Logged By : GMA

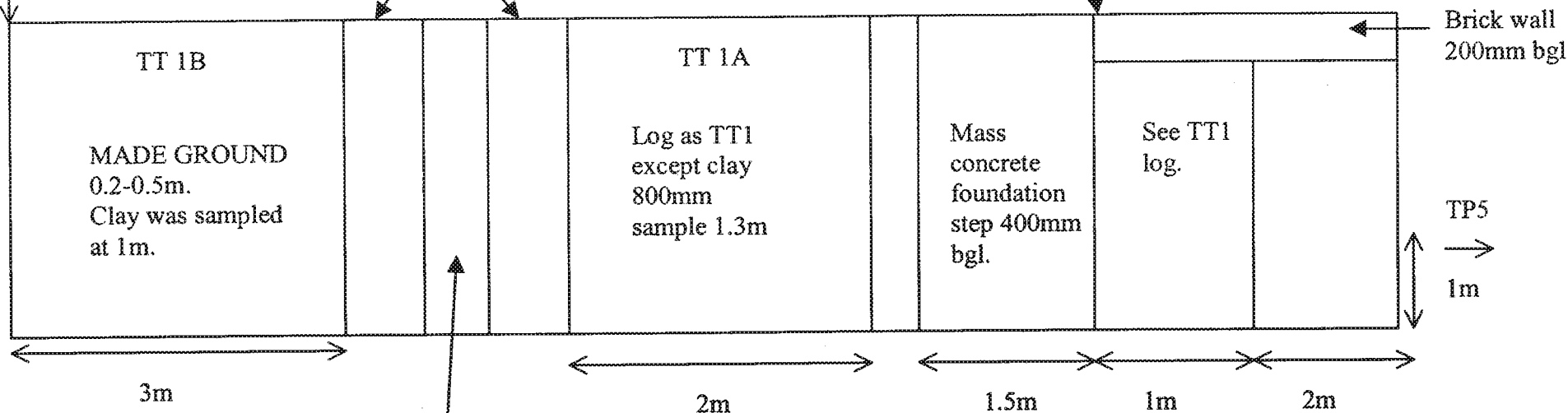
BG Arundel**Trial Trench 1 (6/6/00)**

Easting: 501277.601
 Northing: 106732.086
 Ground Level: 3.52m

100mm clay pipe

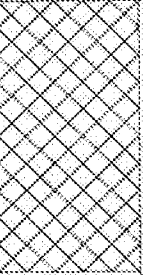
Two 300mm
 cast iron pipes
 300mm bgl.

300mm thick
 red brick wall.



TRIAL PIT LOG

Client : Lattice Property		Job No : A71430/ 015162		Trial Pit No : TT2A	
Project : Arundel Site Investigation		Easting : 501306.15		Sheet 1 of 1	
Site : Arundel		Northing : 100783.68		Date commenced :	Date completed :
Excavated By : JCB		Ground Level (mAOD) : 2.93		09/06/2000	09/06/2000

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01					Loose light brown sandy silt with ash, bricks and concrete. MADE GROUND Brick foundation from 0.7 to 1.9m. Soft orange to brown on the western side at 1.0m to base of pit. At 1.0m material became more clayey i.e. sandy silt with clay and re-worked natural ground soft orange to brown. Anaerobic odour and black staining at 1.8m. Concrete at base 1.9m. End of Trial Pit at 1.90 m
02		1.90	1.03		

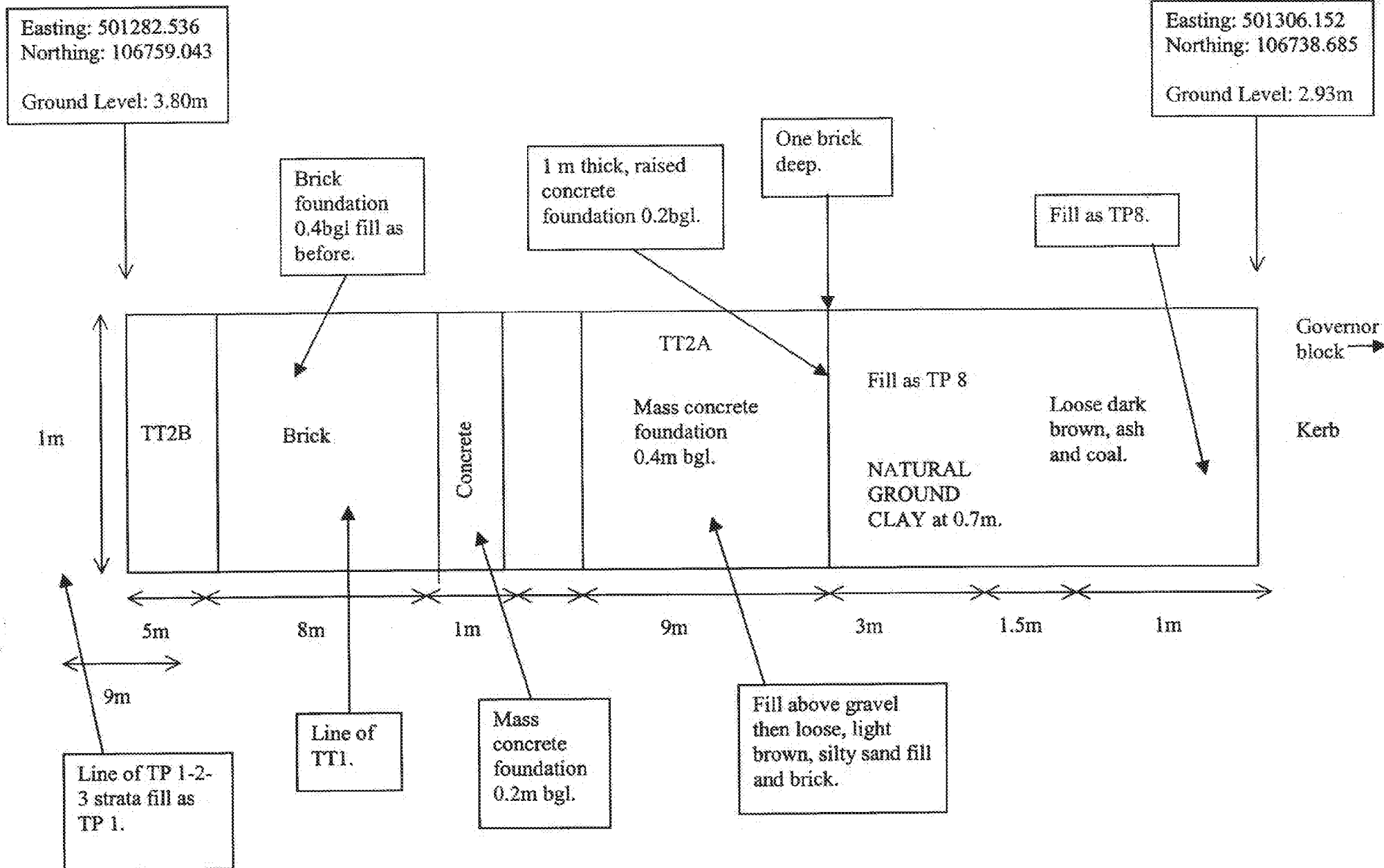
Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	0.60	MADE GROUND. Black stained material.
02	S	1.80	MADE GROUND

Remarks :

Logged By : **GMA**

BG Arundel

Trial Trench 2 (9/6/00)



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TRIAL PIT LOG

Client: Lattice Property		Job No: A71430/ 015162		Trial Pit No: TT2B	
Project: Arundel Site Investigation		Easting: 501282.53		Sheet 1 of 1	
Site: Arundel		Northing: 196759.04		Date commenced: 09/06/2000	Date completed: 09/06/2000
Excavated By: JCB		Ground Level (mAOD): 3.80			

Sample Location	Groundwater Strike	Depth (mBGL)	Level (mAOD)	Key	Description of Strata
01		0.50	2.30		Loose light brown silty sand with gravel and broken brick. MADE GROUND
02		2.00	1.80		At 1.0m anaerobic odour and black staining 10cm hard as in TT2A. Soft orange to light brown CLAY with gravel. NATURAL GROUND
End of Trial Pit at 2.00 m					

Sample Details			
Sample Reference	Type (Soil or Water)	Depth (mBGL)	Description
01	S	0.50	MADE GROUND
02	S	2.00	CLAY

Remarks:
Logged By: GMA

Arundel Site Log (5 to 9 June 2000)

Date	Plant and Labour	Progress	Notes
5 June	Myself and SubScan Engineer	Identification of underground services	Services marked on the ground and recorded on site sketch
6 June	Myself, One RST rig with two crew, One JCB and Driver.	Construction of TP5, TP7, TP8, TT1, BH4 and BH5. First set of samples sent to Lab	Skip arrived on site.
7 June	Myself, One RST rig with two crew, One JCB and Driver.	Construction of TP1, TP2, TP3, TP4, BH1 and BH3. Borehole 4 and 5 developed. Second set of samples sent to Lab	-
8 June	Myself, One RST rig with two crew, One JCB and Driver.	Construction of TP6, TP9, TP10, TP11, TP12, TP13, TP14, and BH2. Borehole 1, 2 and 3 developed. Third set of samples sent to Lab	-
9 June	Myself, one addition WSA Scientist, One JCB and Driver, Two surveyors on site carry out full survey, Tim Greaves from Reading University on site.	Construction of TT1, groundwater of BH1 to 5. Forth set of samples sent to Lab	Skip collected from site empty. pH, Temp, conductivity, meter failure on site after purging third BH. However, all borehole are purged dry and allowed to recover. Very wet day. Site levelled and tided up.

Appendix C

Results of Chemical Analysis

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TES ID Number	13714	13715	13513	13514	13511	13512	14446	14447	14452	13716	13515	14453	13515	13717	13517	13718	14454
BH/TP	T/P	T/P	T/P	T/P	T/P	T/P	T/P	T/P	T/P	T/P	QC Blank	QC Blank	QC Blank	QC Blank	QC Blank	QC Blank	QC Blank
Sample Number	0003A	4	5	5	7	8	9	14									
Depth	1.2	1	0.9	1.3	0.5	0.5	0.5	0.8									
pH units	7.4	7.5	8	8.4	6.6	6.9	7.4	8	8	8.1	7.6	6.96	7	6.9	7.9	7.9	7.9
Total Organic Carbon	16	31	20	43	1.1	4.2	3.1	1.9	0.1	0.2	0.3	<0.1	<0.1	<0.1	100	98	96
Conductivity uS/cm @ 25C	346	317	406	395	345	349	419	212	<100	<100	<100	<100	<100	<100	2750	2760	2820
Cresols	<0.1	<0.1	<0.1	11.8 <0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	97	93	93
Xylenols	<0.1	<0.1	<0.1	11.3 <0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	101	95	100
Phenol	<0.1	<0.1	<0.1	6.2 <0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	92	88	85
Trimethylphenols	<0.1	<0.1	0.4	4.2 <0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	100	100	103
Total Phenols	<0.4	<0.4	<0.7	33.5 <0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	390	377	381
Naphthalene	0.02 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	88	88	93
Acenaphthene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	87	87	89
Acenaphthylene	<0.01	<0.01	0.01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	86	86	89
Fluorene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	90	90	91
Phenanthrene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	92	92	92
Anthracene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	77	77	67
Fluoranthene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	90	90	92
Pyrene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	90	90	91
Benzo(a)Anthracene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	83	83	83
Chrysene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	85	85	87
Benzo(b)Fluoranthene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	82	82	84
Benzo(k)Fluoranthene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	82	82	83
Benzo(a)Pyrene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	81	81	80
Dibenzo(a,h)Anthracene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	79	79	80
Indeno(1,2,3-cd)Pyrene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	76	76	78
Benzo(ghi)Perylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	78	78	80
Total PAH	<0.17	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	1346	1346	1359
Arsenic as As (Dissolved)	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	95	99	95
Cadmium as Cd (Dissolved)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	98	98	97
Chromium as Cr (Dissolved)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	99	101	98
Lead as Pb (Dissolved)	<0.03	<0.03	<0.03	0.03 <0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	98	98	99
Copper as Cu (Dissolved)	<0.01	<0.01	<0.01	0.01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	99	99	97
Nickel as Ni (Dissolved)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	98	99	100
Zinc as Zn (Dissolved)	0.04	0.02	0.02	0.01	0.02	0.02	0.04	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	99	99	98
Mercury as Hg (Dissolved)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0014	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	88	92	92
Selenium as Se (Dissolved)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	96	95	98
Chloride as Cl	2	2	2	4	<2	<2	<2	2	<2	<2	<2	<2	<2	<2	99	100	97
Total Sulphur as SO4 (Dissolved)	79.1	110	78	103	145	140	159	49.3	<0.06	0.13	<0.06	<0.06	<0.06	<0.06	99	98	98
Iron as Fe (Dissolved)	0.17	0.58	0.05	0.49	0.01	0.21	0.16	0.29	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	99	100	98
Ammoniacal Nitrogen as N	2.2	0.2	35	46	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	96	96	96
Nitrate as N	<1.0	<1.0	<1.0	102	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	102	103	105
Cyanide (Free) as CN	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	104	104	105
Cyanide (Total) as CN	0.3	1.1	<0.1	0.2	0.2	0.5	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	80	85	84
Complex Cyanide as CN	0.3	1.1	<0.1	0.2	0.2	0.5	<0.1	0.2	<0.1	<0.1	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Sulphide (Free) as S	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	107	107	91
TPH GC	0.28	<0.1	1	1.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	75	75	72
Benzene (µg/l)	36	<5	<5	4550	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	100	100	99
Toluene (µg/l)	40	<5	8	7400	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	102	102	102
Ethyl Benzene (µg/l)	270	<5	<5	330	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	100	100	101
Xylenes (µg/l)	280	<5	540	5530	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	103	103	104

Results expressed as mg/l unless stated

TES ID Number	13373	13374	13375	13376	13377	13378	13379	13380	13381	13382	13383	13384	13385
Description	TP 01 @ 1 TP 08 @ 1 TP 02 @ 1 TP 12 @ 1 BH 01 @ 3 BH 02 @ 2 BH 03 @ 3 BH 04 @ 2 BH 05 @ 2 Stream	TP 01 @ 1 TP 08 @ 1 TP 02 @ 1 TP 12 @ 1 BH 01 @ 3 BH 02 @ 2 BH 03 @ 3 BH 04 @ 2 BH 05 @ 2 Stream	TP 01 @ 1 TP 08 @ 1 TP 02 @ 1 TP 12 @ 1 BH 01 @ 3 BH 02 @ 2 BH 03 @ 3 BH 04 @ 2 BH 05 @ 2 Stream	TP 01 @ 1 TP 08 @ 1 TP 02 @ 1 TP 12 @ 1 BH 01 @ 3 BH 02 @ 2 BH 03 @ 3 BH 04 @ 2 BH 05 @ 2 Stream	TP 01 @ 1 TP 08 @ 1 TP 02 @ 1 TP 12 @ 1 BH 01 @ 3 BH 02 @ 2 BH 03 @ 3 BH 04 @ 2 BH 05 @ 2 Stream	TP 01 @ 1 TP 08 @ 1 TP 02 @ 1 TP 12 @ 1 BH 01 @ 3 BH 02 @ 2 BH 03 @ 3 BH 04 @ 2 BH 05 @ 2 Stream	TP 01 @ 1 TP 08 @ 1 TP 02 @ 1 TP 12 @ 1 BH 01 @ 3 BH 02 @ 2 BH 03 @ 3 BH 04 @ 2 BH 05 @ 2 Stream	TP 01 @ 1 TP 08 @ 1 TP 02 @ 1 TP 12 @ 1 BH 01 @ 3 BH 02 @ 2 BH 03 @ 3 BH 04 @ 2 BH 05 @ 2 Stream	TP 01 @ 1 TP 08 @ 1 TP 02 @ 1 TP 12 @ 1 BH 01 @ 3 BH 02 @ 2 BH 03 @ 3 BH 04 @ 2 BH 05 @ 2 Stream	TP 01 @ 1 TP 08 @ 1 TP 02 @ 1 TP 12 @ 1 BH 01 @ 3 BH 02 @ 2 BH 03 @ 3 BH 04 @ 2 BH 05 @ 2 Stream	TP 01 @ 1 TP 08 @ 1 TP 02 @ 1 TP 12 @ 1 BH 01 @ 3 BH 02 @ 2 BH 03 @ 3 BH 04 @ 2 BH 05 @ 2 Stream	TP 01 @ 1 TP 08 @ 1 TP 02 @ 1 TP 12 @ 1 BH 01 @ 3 BH 02 @ 2 BH 03 @ 3 BH 04 @ 2 BH 05 @ 2 Stream	TP 01 @ 1 TP 08 @ 1 TP 02 @ 1 TP 12 @ 1 BH 01 @ 3 BH 02 @ 2 BH 03 @ 3 BH 04 @ 2 BH 05 @ 2 Stream
Sample Date	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
pH units	6.9	7.6	7	5.6	7.2	7.2	7.1	7.2	7	7.2	7.6	7	7.9
Total Organic Carbon	28	22	60	22	15	3	4.2	3.6	9.8	22	88	<0.1	96
Conductivity uS/cm @ 25C	1400	815	429	1080	1730	752	776	769	2190	354	1470	<100	2710
Cresols	0.4 <0.1	0.7 <0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	18.8 <0.1		97
Xylenols	1.2 <0.1	0.4 <0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	15.5 <0.1		101
Phenol	0.2 <0.1	0.5 <0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	11.6 <0.1		92
Trimethylphenols	0.6 <0.1	0.3 <0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4.4 <0.1		100
Total Phenols	2.4 <0.4	1.9 <0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	50.3 <0.4		390
Naphthalene	0.26 <0.01	2.8 <0.01	0.06 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	11 <0.01		82
Acenaphthene	0.01 <0.01	0.05 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		96
Acenaphthylene	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.14 <0.01		70
Fluorene	<0.01	<0.01	0.11 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.1 <0.01		91
Phenanthrene	0.05 <0.01	0.28 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.62 <0.01		97
Anthracene	<0.01	0.04 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.24 <0.01		82
Fluoranthene	0.01	0.02	0.06 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.07 <0.01		98
Pyrene	0.01 <0.01	0.06 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05 <0.01		97
Benzo(a)Anthracene	<0.01	0.01	0.02 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02 <0.01		95
Chrysene	<0.01	0.01	0.03 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		96
Benzo(b)Fluoranthene	<0.01	<0.01	0.01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02 <0.01		95
Benzo(k)Fluoranthene	<0.01	<0.01	0.01 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02 <0.01		94
Benzo(a)Pyrene	0.01	0.02	0.02 <0.01	<0.01	0.01	<0.01	0.02 <0.01	<0.01	0.01	<0.01	0.02 <0.01		91
Dibenz(a,h)Anthracene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		89
Indene(123-cd)Pyrene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		89
Benzo(ghi)Perylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		95
Total PAH	<0.46	<0.19	<0.65	<0.16	<0.21	<0.16	<0.17	<0.16	<0.16	<0.16	<12.34	<0.16	1457
Cyanide (Free) as CN	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	103
Cyanide (Total) as CN	1.5	0.2 <0.1	3.3	3.3	1	<0.1	0.1 <0.1	0.1 <0.1	0.9 <0.1	<0.1	<0.1	<0.1	99
Complex Cyanide as CN	1.5	0.2 <0.1	3.3	3.3	1	<0.1	0.1 <0.1	0.1 <0.1	0.9 <0.1	<0.1	<0.1	N.D.	
Arsenic as As (Dissolved)	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	98
Cadmium as Cd (Dissolved)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	98
Chromium as Cr (Dissolved)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	100
Lead as Pb (Dissolved)	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	96
Copper as Cu (Dissolved)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	99
Nickel as Ni (Dissolved)	0.02 <0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	97
Zinc as Zn (Dissolved)	0.01 <0.01	0.01	0.01	0.03	0.01	0.02	0.01	0.01	0.01	0.02	0.03 <0.01	<0.01	99
Mercury as Hg (Dissolved)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	80
Selenium as Se (Dissolved)	0.003 <0.001	0.001	0.002	0.002	0.002	0.002	0.001	0.002	0.003 <0.001	<0.0001	0.002 <0.001	<0.0001	100
Ammoniacal Nitrogen as N	23.4	0.5	7.8 <0.1	10.8	68.2 <0.1	4.1	12.3 <0.1	75.5	0.5	86	0.11		100
Nitrate as N	<0.5	<0.5	<0.5	<0.5	5	5	0.7	5.1 <0.5	<0.5	0.7 <0.5	0.7 <0.5		100
Suspended Solids	29800	545	730	6220	1930	1640	6400	2280	2210	184	6440 <5		97
Chloride as Cl	52	27	22	36	111	58	42	52	43	30	55 <2		99
Total Sulphur as SO4 (Dissolved)	300	24.1	49.5	406	498	44	68.1	45.7	952	27.3	253 <0.06		98
Iron as Fe (Dissolved)	3.02	1.54	8.56	1.23	0.13	0.07	0.01	0.01	0.38	0.13	2.58 <0.01		99
Sulphide (Free) as S	<0.2	<0.2	4.4 <0.2	1.23	1.1	<0.2	0.4 <0.2	<0.2	<0.2	<0.2	<0.2		104
TPH GC	5.3	12	37	0.43	1.9	0.46	0.74	0.36	0.77	0.55	83 <0.1		94
Benzene (µg/l)	1480 <5	8080 <5	8080 <5	<5	<5	<5	<5	<5	<5	<5	11600 <5		100
Toluene (µg/l)	74 <5	4380 <5	4380 <5	<5	<5	<5	<5	<5	<5	<5	8140 <5		103
Ethyl Benzene (µg/l)	<5	539 <5	539 <5	<5	15 <5	<5	<5	<5	<5	<5	176 <5		102
Xylenes (µg/l)	159 <5	2090 <5	2090 <5	<5	81 <5	<5	<5	<5	<5	<5	4650 <5		105

Results expressed as mg/l unless stated

Appendix D

Groundwater Levels

Groundwater Levels

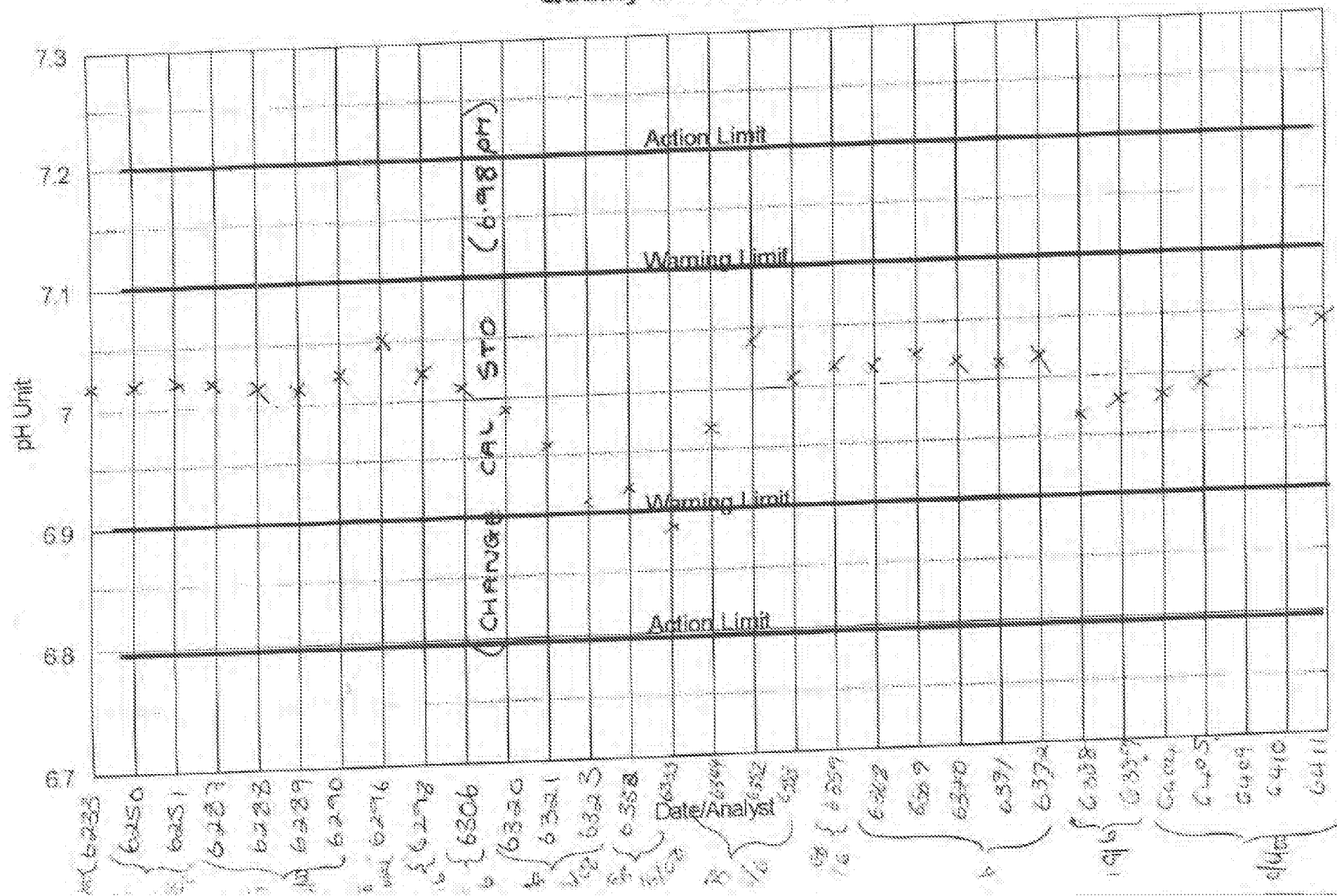
	Date:	Friday 9th June 2000		Wednesday 19th July 2000		
Borehole ID	Elevation mAOD to top of cover	Depth to water	Water Level mAOD	Depth to water	Water Level mAOD	Aquifer
BH1	3.97	3.30	0.67	3.900	0.070	Chalk
BH2	3.71	2.68	1.03	3.465	0.245	Chalk
BH3	3.59	3.20	0.39	3.115	0.475	Chalk
BH4	2.87	2.28	0.59	2.435	0.435	Chalk
BH5	2.90	2.02	0.88	2.855	0.045	Chalk

Appendix E

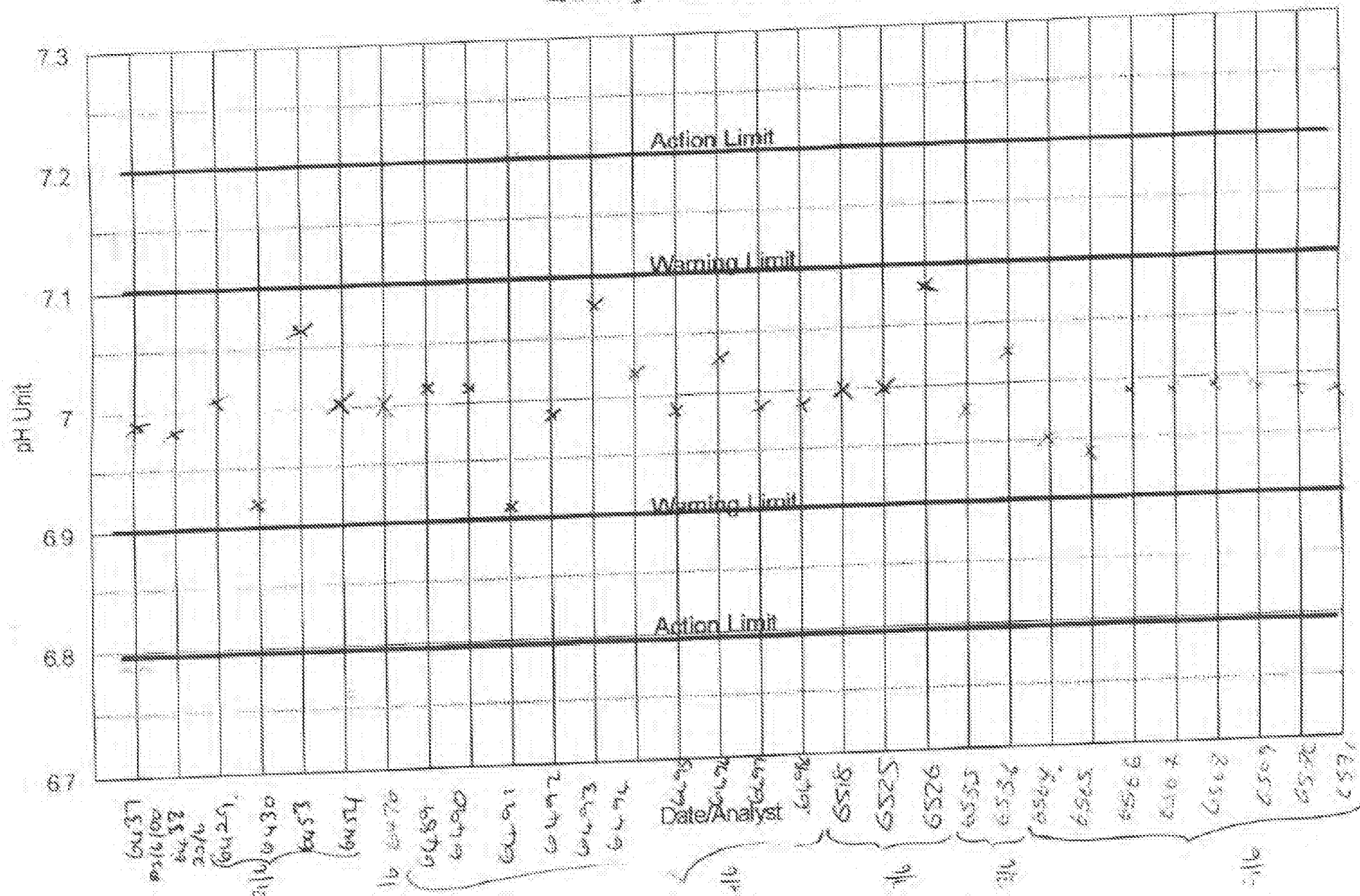
Analytical Quality Control Standard Charts

Note : Those charts able to be provided by TES Brethby (TESB) are included. For remaining charts not able to be provided please contact :

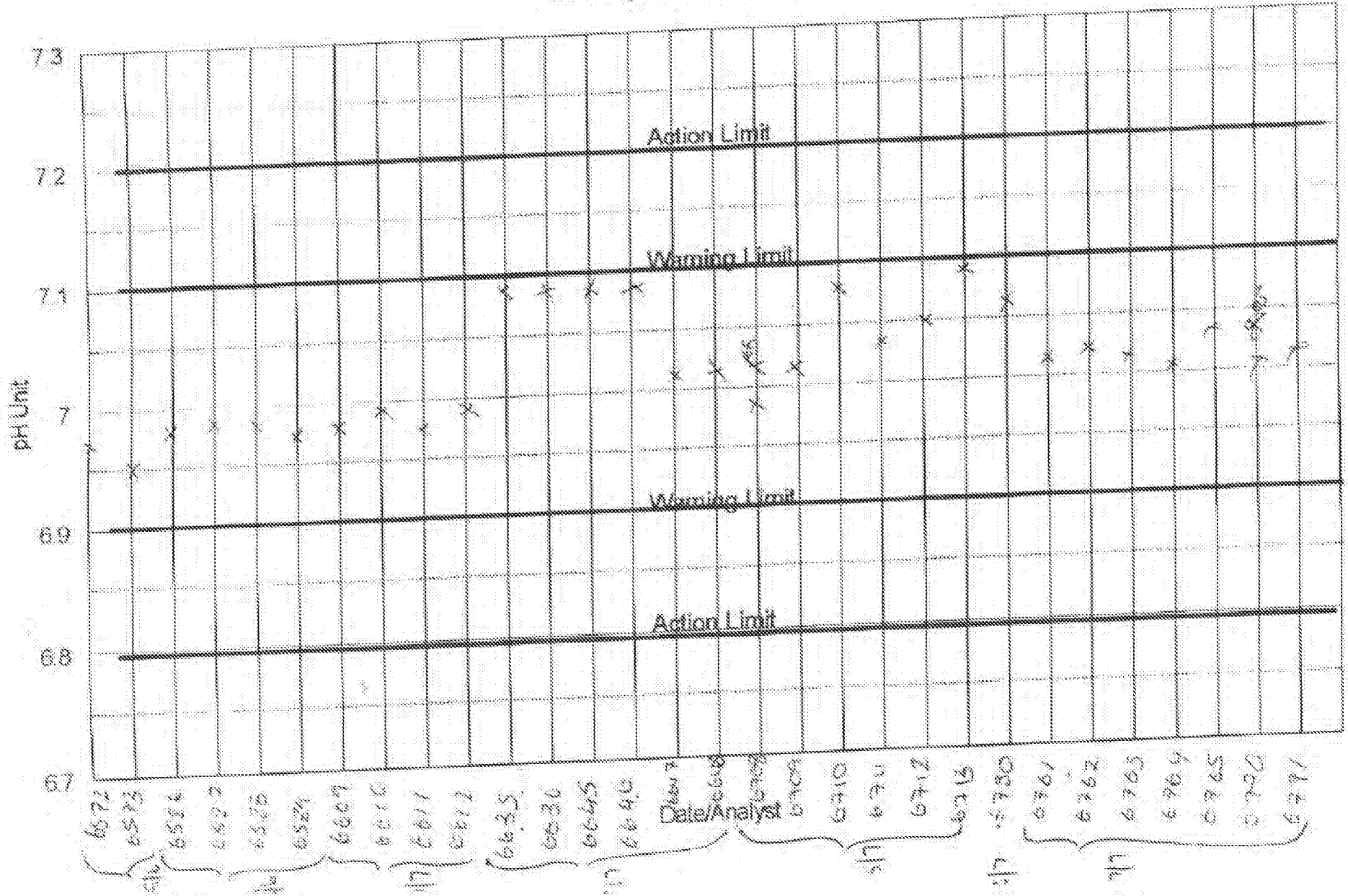
Ms. Jackie Hannah
TES Brethby
PO Box 100
Brethby Business Park
Ashby Road
Burton-on-Trent
DE15 0XD



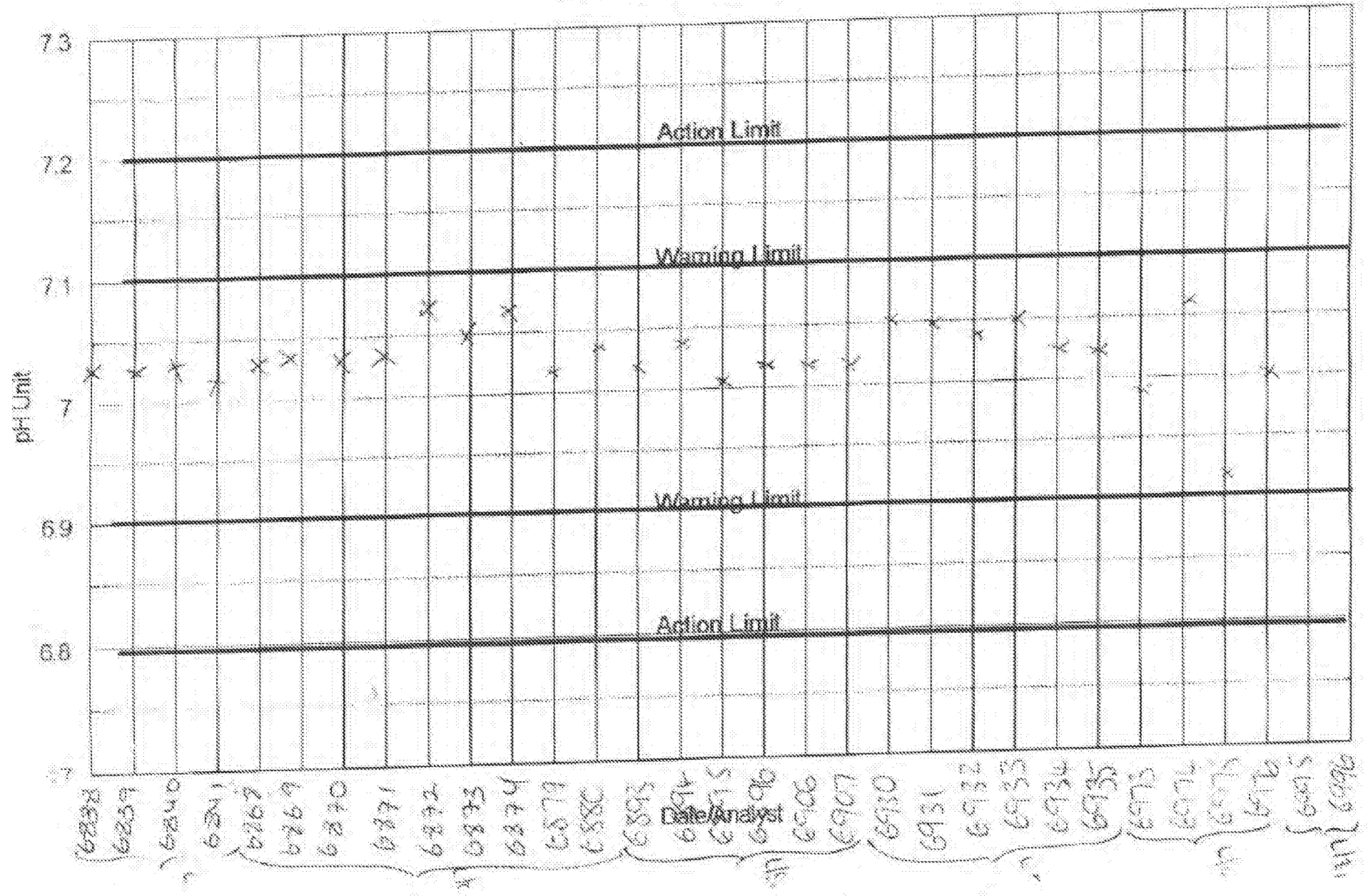
pH of Soil Samples Quality Control Chart



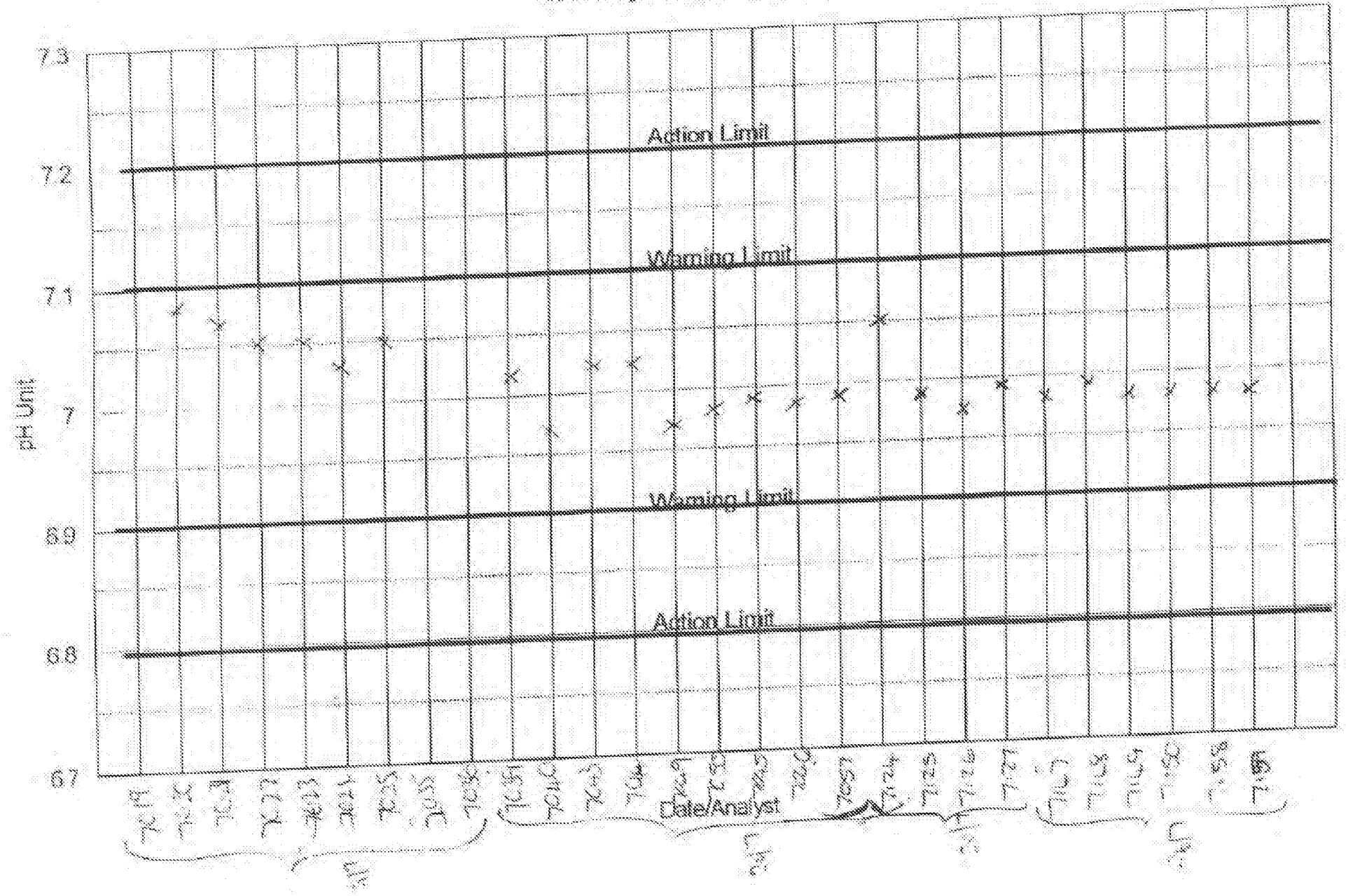
pH of Soil Samples Quality Control Chart



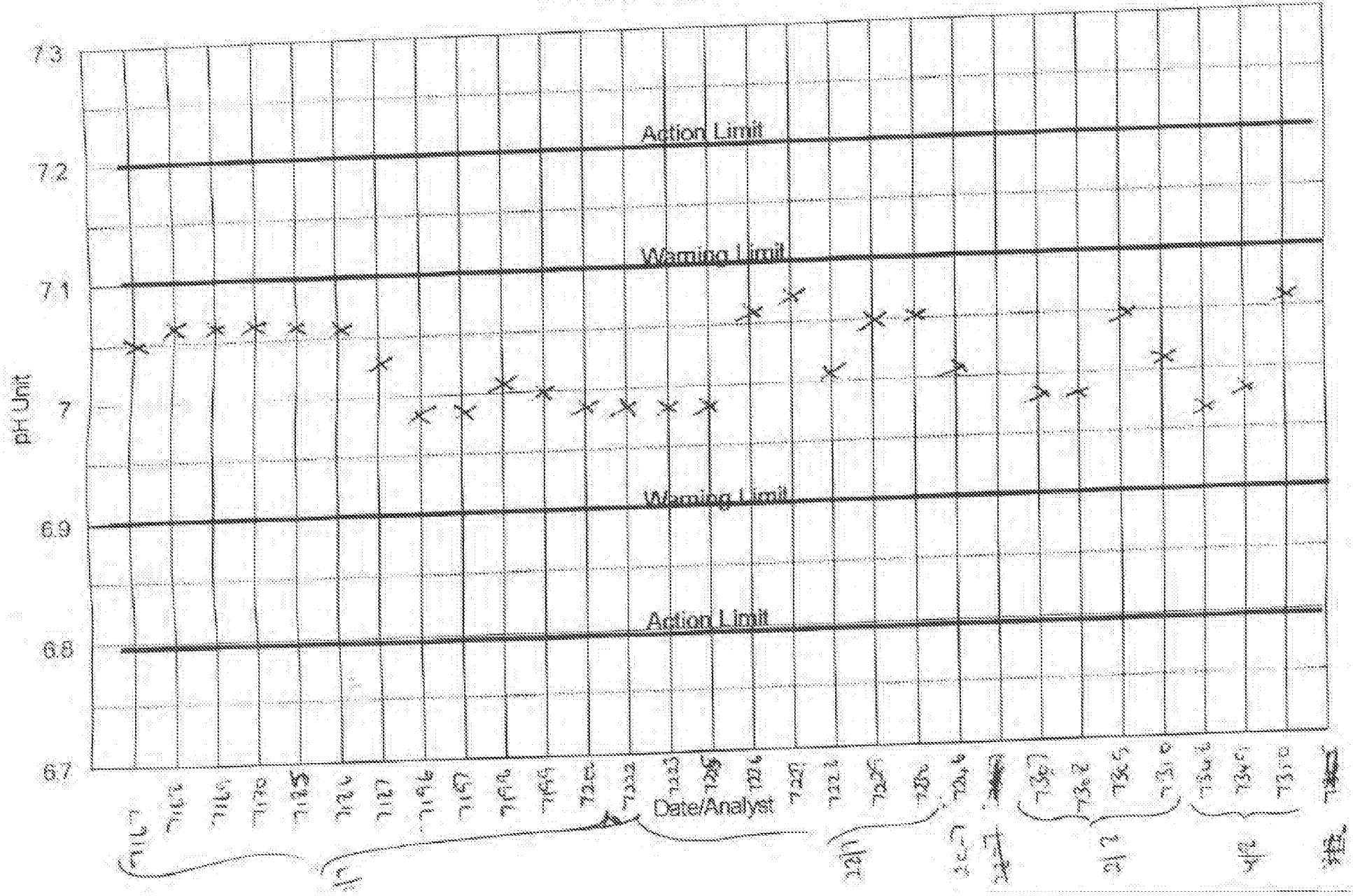
pH of Soil Samples Quality Control Chart

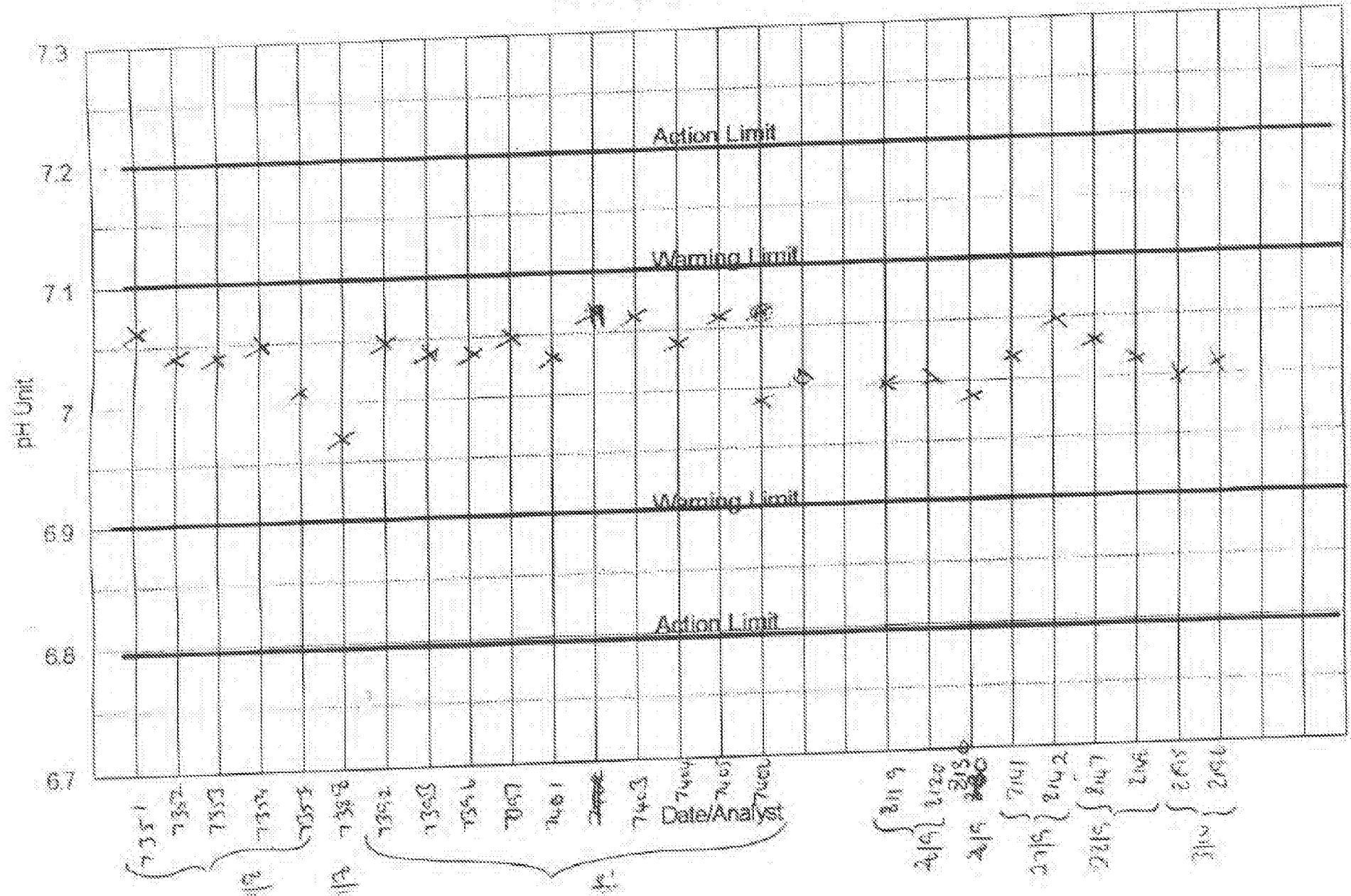


pH of Soil Samples Quality Control Chart

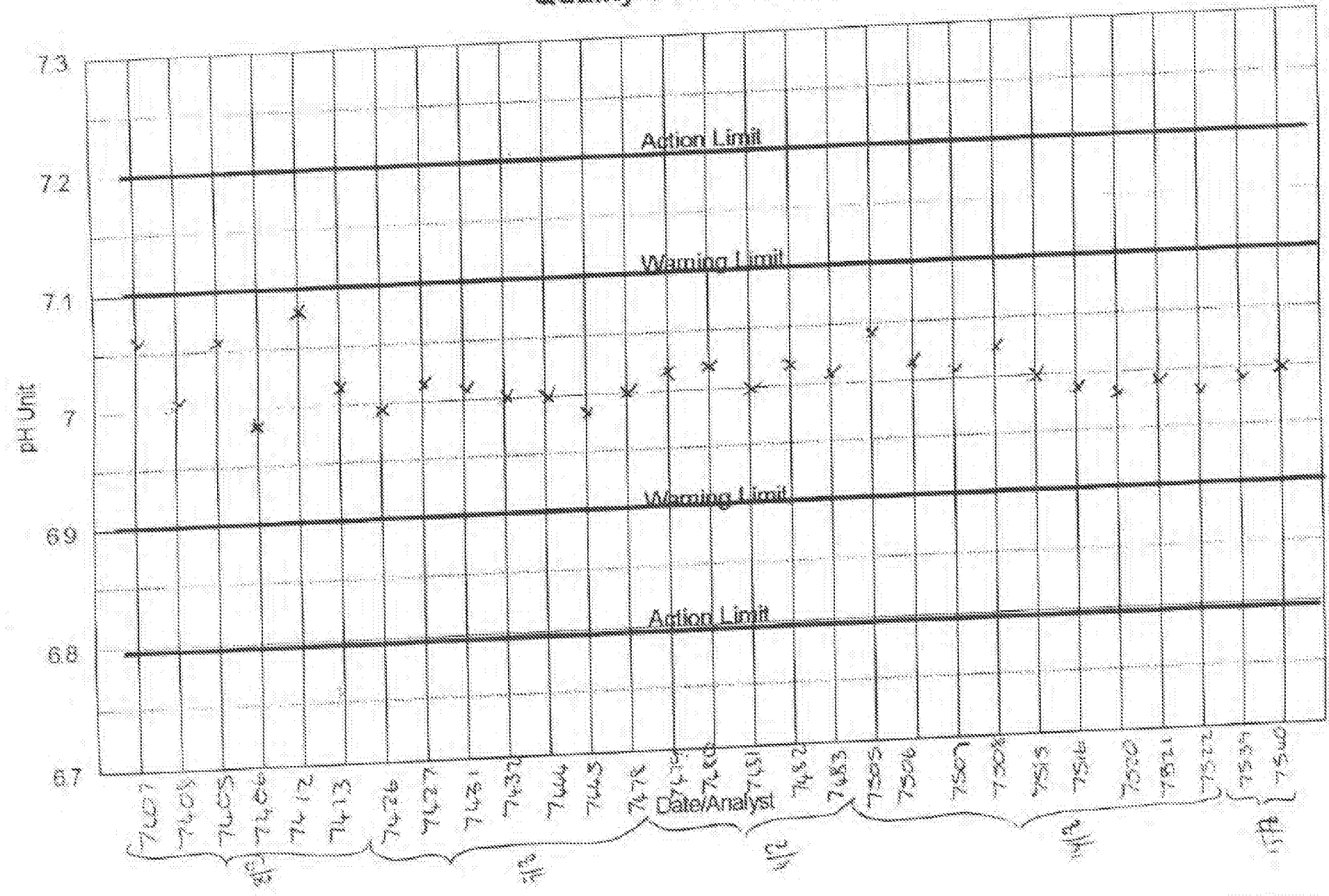


pH of Soil Samples Quality Control Chart

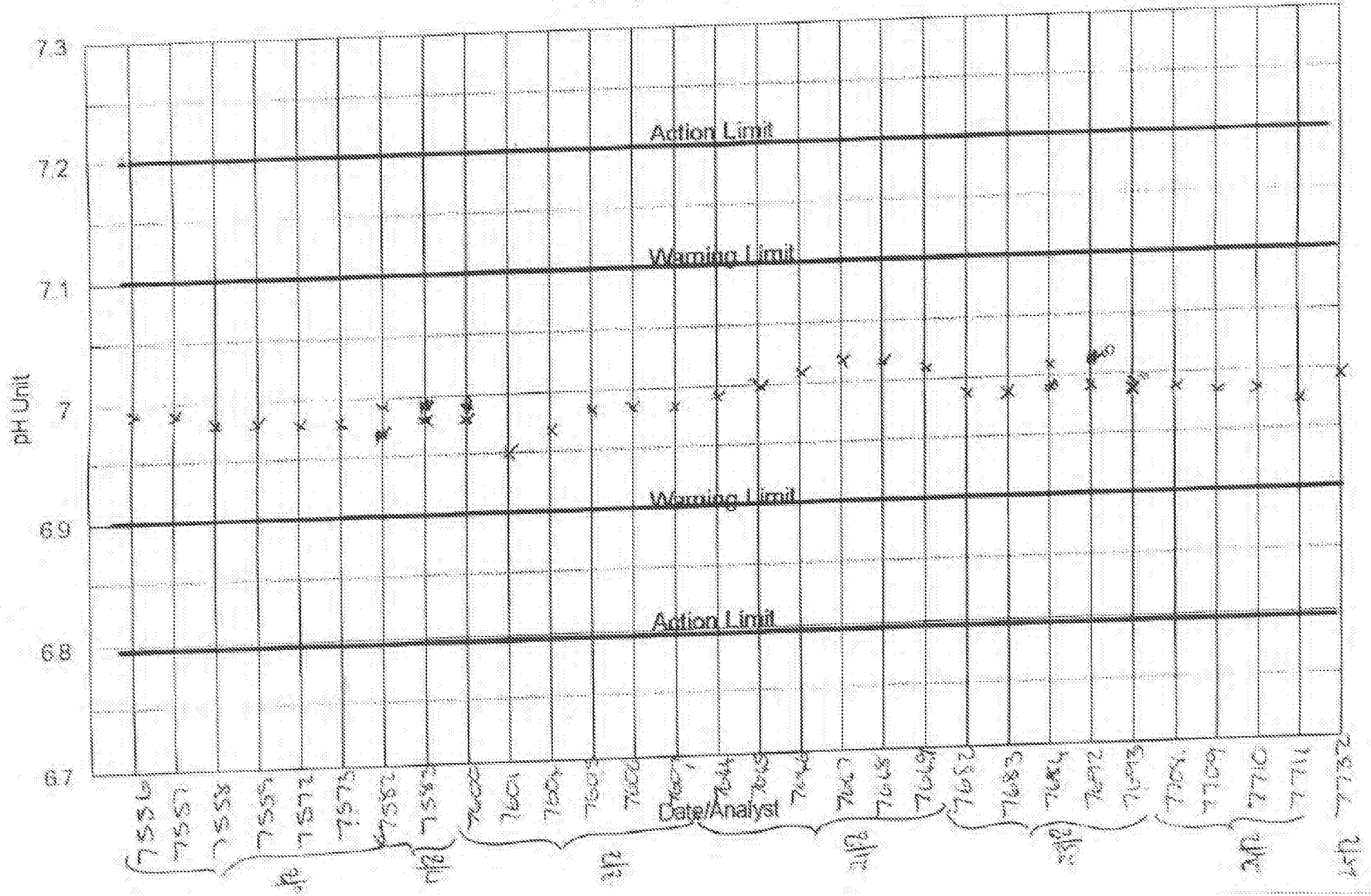


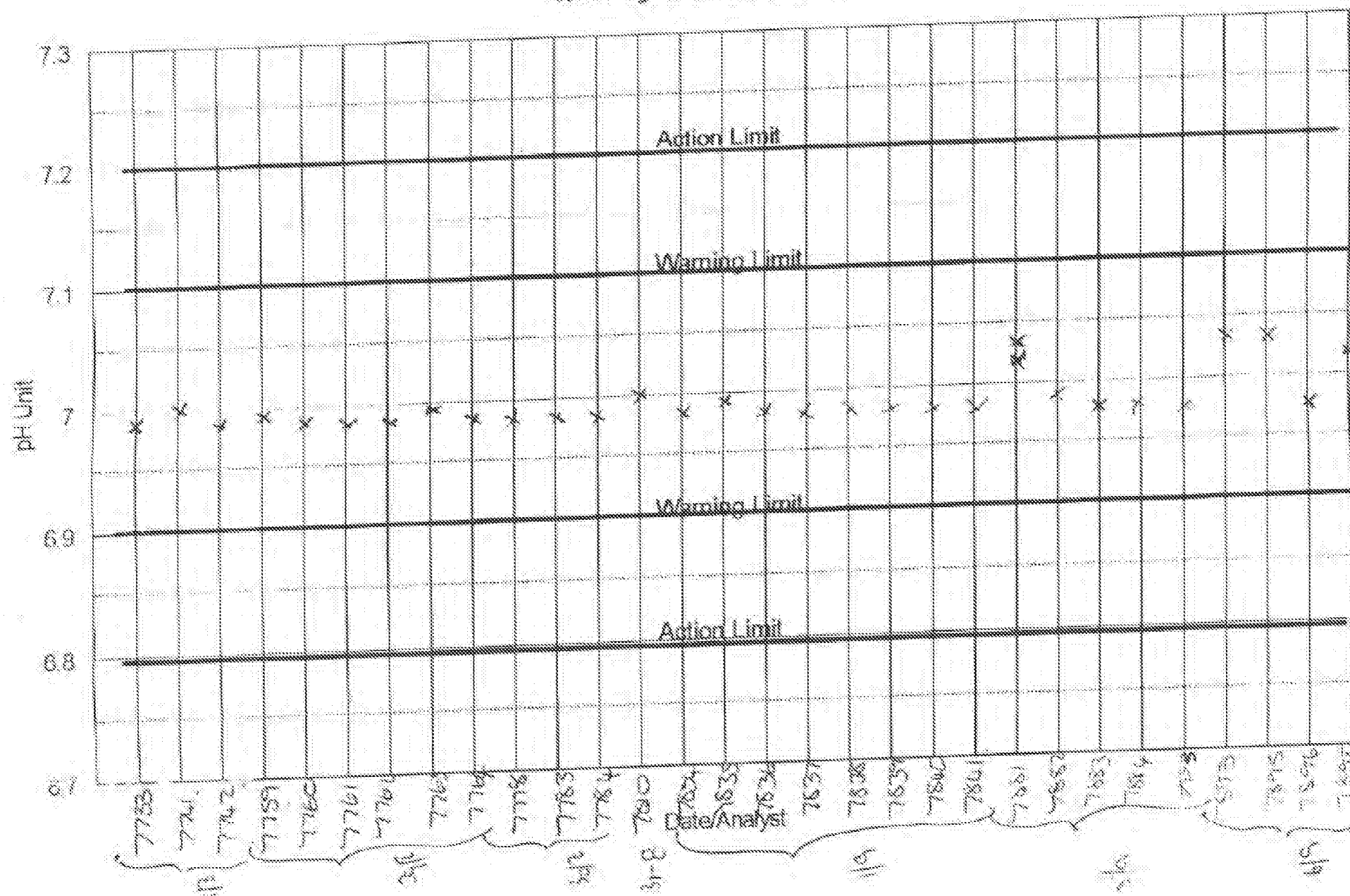


pH of Soil Samples Quality Control Chart

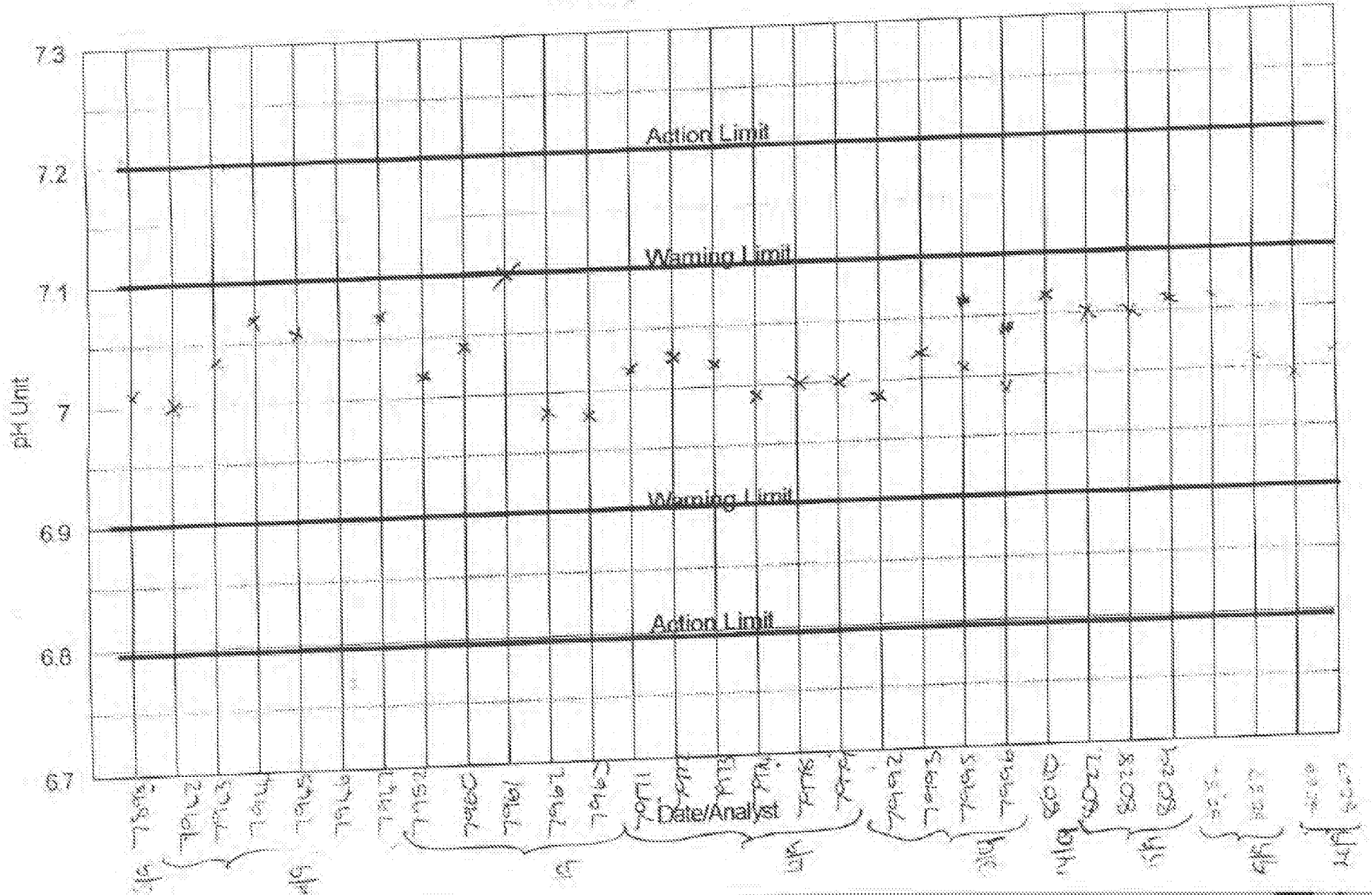


pH of Soil Samples Quality Control Chart





pH of Soil Samples Quality Control Chart



pH of Soil Samples Quality Control Chart

