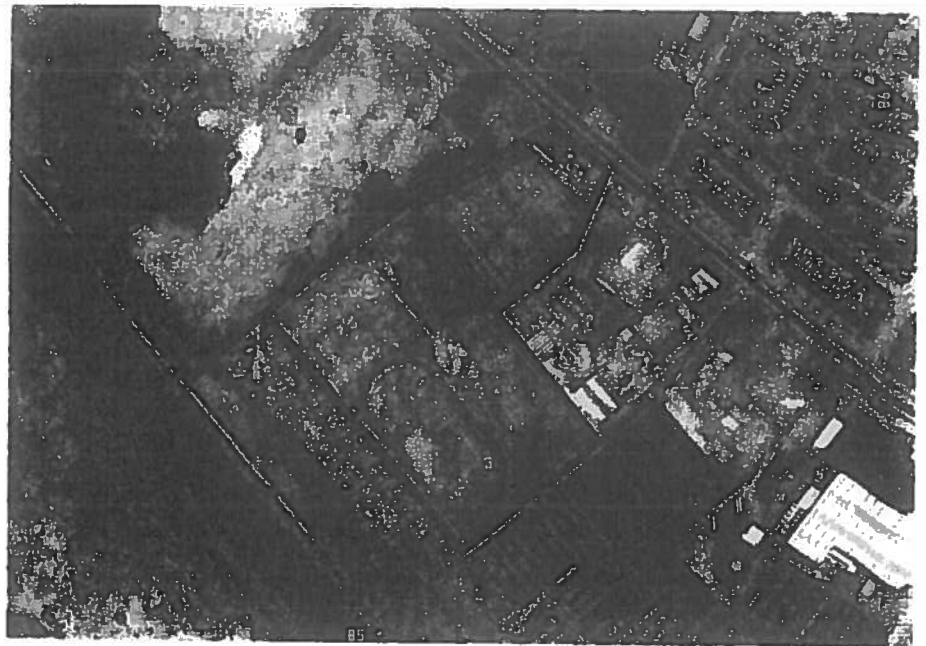


URS

Desk Study

Westthorn, Glasgow



Prepared by URS Corporation Ltd

October 2004

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1. INTRODUCTION

URS Corporation Ltd (URS) have undertaken a short Desk Study considering the development potential of a site named 'Westthorn, Glasgow', located to the north of the River Clyde, in the Dalmarnock area of Glasgow, as shown on the Site Location Plan in Appendix A. At present, no masterplan has been created for the site, but it is understood that the development of the site will be for a football training ground.

This report comprises a short desk study, the main objective of this work is to identify ground related factors that could constrain the development of the site and to provide recommendations that could enable the constraints to be overcome.

URS has prepared this report for the sole use of Montagu Evans in accordance with the agreement under which our services were performed. No other warranty, expressed or implied, is made as to the professional advice included in this report or any other services provided by us. This report may not be relied upon by any other party without the prior and express written agreement of URS.

Unless otherwise stated in this report, the assessments made assume that the site and facilities will continue to be used for their current purpose without significant change. The conclusions and recommendations contained in this report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested. Information obtained from third parties has not been independently verified by URS, unless otherwise stated in the report.

2. SITE DETAILS

2.1. Site Reconnaissance

URS Corporation undertook a site walkover on 21 September 2004. Observations were made regarding topography, ground conditions, vegetation cover, current site use and neighbouring site usage. Unfortunately however no access to the site could not be made due to the gates being locked, therefore all observations were made from the perimeter of the site.

Photographic records of the site walkover are included in Appendix B.

2.2. Documentary Research

The history of the site and an account of the environmental setting were compiled from an examination of historical and current Ordnance Survey sheets and published geological information.

2.3. Data Sources

The following sources of data were used during the course of the investigation:

- Glasgow City Council – Report E108
- Hydrogeological Map of Scotland, 1988
- Groundwater Vulnerability Map of Scotland, 1992
- Aerial photograph

3. SITE DETAILS

3.1. Site Location

The site is located at approximately 15-20m above ordnance datum (AOD) on a small access road, connecting to London Road, in the Dalmarnock area of Glasgow. A site location plan can be found in Appendix A.

Information regarding the exact location of the site is as follows:

Site Name: Westthorn, Glasgow
Council: Glasgow City Council
Grid Reference: NS 626 633
Approximate Area: 8 hectares

Current Address: Westthorn Recreation Ground/Celtic Sports Ground

The site currently comprises an L-shaped area of open ground, with Celtic Sports Ground located in the northern portion and Westthorn Recreation Ground in the southern portion of the area. The immediate area to the south of the site is occupied by allotment gardens, while the area to the east and northeast is occupied by industrial units. London Road is present to the north of the site while undeveloped open ground of the former Belvidere Hospital is present to the west.

The area surrounding the site generally comprises a mix of existing properties including commercial, residential and industrial buildings.

3.2. Site Description

The following description of the site is based upon a site reconnaissance undertaken on 21st September 2004. The weather during the site walkover survey was cold, with light showers. However, unfortunately no access to the site could be made due to the gates being locked, therefore all observations were made from the perimeter of the site. A photographic record of the site is included in Appendix B.

The site is an L-shaped parcel of land and extends to approximately 8 hectares in area. Access to the site can be gained from London Road.

The site is bound by a high metal fence with a set of locked gates, which open onto the small access road on the western boundary of the site. The northern portion of the site (Celtic Sports Ground) was occupied by the Celtic Supporters Club, but the area to the immediate south of this could not be seen from the perimeter of the site due to a tree covered bund which ran along the western boundary of this area. The southern portion of the site (Westthorn Recreational Area) appeared to be utilised in the eastern half as a recreational area, with an astro-turf pitch and a football pitch. The western portion of this area appeared to be unused, however the area had been kept tidy, with the grass cut. The bund also continued along the western boundary of the southern portion of this site, however there was a gap in the bund where the gates opened into a small road onto the site, where the remainder of the site could be viewed. A large pond of surface water had gathered in the south western corner of the site and a bund also bounded the site to the south.

3.3. Site History

The following account of the historical development of the site is based upon an examination of available in-house historical Ordnance Survey maps. Copies of selected historical maps are included in Appendix C.

1861

The map of 1861 shows the site to be generally undeveloped with only a small ruin shown in the centre of the site. London Road is noted to the north, while trees are present to the south of the site with a small spring, present on the bank of the River Clyde.

1895

From 1895 the site is shown to be occupied by Westthorn Pumping Station (Glasgow Corporation Water Works), with two associated reservoirs and a well on the southern portion of the site, while Westthorn Brick Works, with an associated clay pit and well is noted on the northern portion of the site. Belvidere Hospital (Infectious diseases) has been established to the immediate west of the site, while the remaining surroundings of the site remain relatively unchanged.

1912

By 1912, the clay pit in the northern portion of the site has reduced in size, and an additional clay pit has been established to the east of the site boundary.

1934

The map of 1934 shows the reservoirs in the southern portion of the site to be disused and Westthorn Brick Works to have been removed. Allotment gardens have been established to the immediate south of the site, while Belvidere Brick Works is noted to the east of the site. The area to the immediate north of London Road is noted to have been developed with residential dwellings.

1955

By 1955 the site is shown to have been adapted as recreational ground, with New Barrowfield football ground on the northern portion of the site and Westthorn Recreation Ground with associated running track, cycling track and bowling greens. Belvidere Brick Works is shown to have been removed, with the residential area to the north of London Road developing further.

1973

The southern portion of the site is shown to have remained relatively unchanged until 1973, while the northern portion of the site is now noted as Celtic Sports Ground. A number of industrial works have been established to the immediate east of the site, including a Haulage Depot and Bonded Stores.

4. ENVIRONMENTAL SETTING

4.1. General Geology

Information regarding the geological conditions at the site was obtained from the Geological Sheet NS 66 SW 1:10,560.

The natural underlying superficial deposits at the site are recorded as clay and silt, with fill material overlying these deposits in the northern portion of the site. No made ground deposits are shown on the southern portion of the site (Westthorn Recreation Ground), however some made ground deposits are expected in this area associated with the former infilled reservoirs and development of the site. The geological maps indicate that these superficial deposits are likely to be in the order of 30m thick.

The underlying solid geology consists of strata of Middle Coal Measures, where extensive mine working has previously been undertaken in coals of more than 0.7m thick. Two geological faults are noted in the eastern portion of the site, both trending in a north to south direction, downthrowing to the east. The strata beneath the site are recorded to dip to the southwest at low angles.

Both the Glasgow Main Coal and the Glasgow Ell Coal are shown to outcrop beneath the site.

4.2. Mining Activity

The sequence of strata within the surrounding area can be found summarised in the table below:

Seam	Thickness (m)	Separation (m)
Glasgow Ell Coal	1.30	
		9.50
Glasgow Main Coal	1.30	
		16.00
Humph Coal	0.90	
		7.50
Glasgow Splint Coal	1.00	
		1.0
Virgin Coal	0.20-1.10	

Published geological maps indicate shallow mineworkings (within 30m of rockhead) to be present in all of the above coal seams, beneath the majority of the site. Additionally, it is known that the Ell and the Main Coals have been mined to, or near, their outcrop within this area of Glasgow. Therefore, based on the information examined the site is considered to be minerally unstable.

One abandoned mine shaft is shown to lie within the north eastern corner of Westthorn Recreation Ground. Additionally, in areas of previous mining the presence of unrecorded shallow workings or mine entries cannot be discounted.

4.3. Hydrology

The River Clyde flows in a generally southeast to northwest direction approximately 110m to the south of the site, however information on the water quality of the River Clyde, in this area, is currently unknown.

4.4. Hydrogeology

The Groundwater Vulnerability Map of Scotland indicates the bedrock beneath the site to be moderately permeable. These are fractured or potentially fractured rocks, which do not have a high primary permeability, or other formations of variable permeability. Although not producing large quantities of water for abstraction, they are important for local supplies and in base flow to rivers.

Small quantities of ground water may be encountered in the made ground. Groundwater is also likely to be present in the alluvium and any underlying sand and gravels. These are likely to be in hydraulic continuity with the River Clyde, therefore the rest water level in these formations is expected to be similar to that of the river.

5. PREVIOUS INVESTIGATIONS

The area of Westthorn Recreation Ground has been subject to a number of previous investigations, which were provide by Glasgow City Council in Report E108. The contents of this report can be found summarised below.

An investigation undertaken in 1978 on the southern portion of the site encountered workings in both the Main Coal and the E11 Coal seams, with workings extending at or near the outcrop zones of both seams.

A report from the Mineral Valuer dated 3 July 1986 also notes that old workings in the Humph Coal have previously been proved. This report also gives an approximate position for the shaft located in the north eastern corner of Westthorn Recreation Ground.

A letter dated 27th September 1978 states that an *'examination of the plans of the E11 and Main Coal seams disclosed, that as longwall workings in these seams proceeded northwards towards the site, they encountered old stoop and room workings'*.

A review of all of the site investigation information available indicated the following summarised ground conditions:

- **Made Ground** was encountered in some exploratory positions up to a depth of 2.5m. The made ground consisted mainly of clay and ash fill with some brick and slag material.
- **Alluvial Clays and Silts** were encountered below the made ground at every exploratory position. These deposits comprised mainly thinly laminated slightly sandy clay or silt. These deposits ranged from 14.7m thick to 22.4m thick, encountered to depths ranging between 16.5m and 22.7m below ground level.
- **Sands and Gravels** were sometimes encountered beneath the alluvial deposits encountered at depths ranging between 16.5m to 22.0m below ground level, extending to depths ranging between 23.20m and 30.8m below ground level.
- **Glacial Till** was encountered at most exploratory locations, ranging in thickness between 3.8m and 6.25m and encountered to depths ranging between 24.3m and 32.4m below ground level.
- **Bedrock** of sandstone and mudstone was encountered at depths ranging between 25.3m and 32.4m below ground level.
- A number of rotary cored boreholes encountered waste, possible waste or voids at depths ranging between 25.91m and 49.20mbgl below ground level. These are noted to be recorded workings within the E11 or Main Coal seams.

Groundwater was recorded in a number of boreholes, encountered at shallow depths ranging between 2.00m and 2.30m below ground level and at greater depths ranging between 16.5m to 30.0m below ground level.

Limited contamination testing indicated elevated levels of arsenic, copper, nickel, selenium, lead, zinc, toluene extractable matter and loss on ignition within the shallow soils across the Westthorn Recreation Ground area. Levels of other contaminants were generally low.

6. CONCLUSIONS AND RECOMMENDATIONS

This report considers the redevelopment potential of a 8 hectare land parcel located in the Dalmarnock area of Glasgow. The National Grid Reference for the approximate centre of the site is NS 626 633.

Historically the site was occupied by a waterworks with two associated reservoirs, a well and a brick works with an associated clay pit. The clay pit and the reservoirs are likely to have been infilled prior to the site being adopted as a recreational ground from 1955 to present day. Currently the site is generally in recreational use comprising Celtic Sports Ground located in the northern portion and Westthorn Recreation Ground in the southern portion of the area.

Published geological information indicates the superficial deposits to consist of fill material in the northern portion of the site, underlain by alluvial clays and silts. No made ground deposits are shown on the southern portion of the site (Westthorn Recreation Ground), however some made ground deposits are expected in this area associated with the former infilled reservoirs and development of the site. The site is underlain by solid strata of the Middle Coal Measures at depths generally between 25-30m below ground level. Shallow mineworkings (within 30m of rockhead) are recorded beneath the site in the Humph Coal, the Glasgow Main Coal and the Glasgow Ell Coal, with a single abandoned mineshaft located in the north eastern corner of Westthorn Recreation Ground.

Previous investigation undertaken within the Westthorn Recreation Grounds indicates made ground up to 2.5m thick underlain by alluvial clays and silt to a maximum depth of 22.7m below ground level. Sands and gravels were encountered in a number of exploratory positions beneath the clays and silts to a maximum depth of 30.8m. These deposits were in turn underlain by glacial till at most locations ranging to depths of between 24.3m and 32.4m below ground level. Rockhead was generally encountered between 25-30m in a number of rotary borehole which recorded mineworkings at depths ranging between 25.91m and 49.20m below ground level. These workings were noted to be recorded workings in the Glasgow Ell and Glasgow Main Coal seams. It is therefore considered that further investigation would be required at this site to establish the extent of the shallow mineworkings.

Discontinuous shallow groundwater bodies are likely to be present in the superficial deposits including the made ground, fill, alluvium and glacial sand and gravels. Groundwater is unlikely within the Till although local bodies within the sand and gravel lenses may be encountered. The groundwater bodies are likely to be laterally persistent but poorly connected vertically. Groundwater flow in the underlying bedrock strata is predominantly along fissures and other discontinuities and is likely to be present in the sandstones and siltstones in the Coal Measures.

Any contaminants on the site will largely be controlled by the historical usage of the site and surrounding area. In this regard, the historic development and subsequent demolition and infilling of the brick works and associated pit and the waterworks with associated reservoirs, which previously operated on the site are likely to represent the main sources of any contamination.

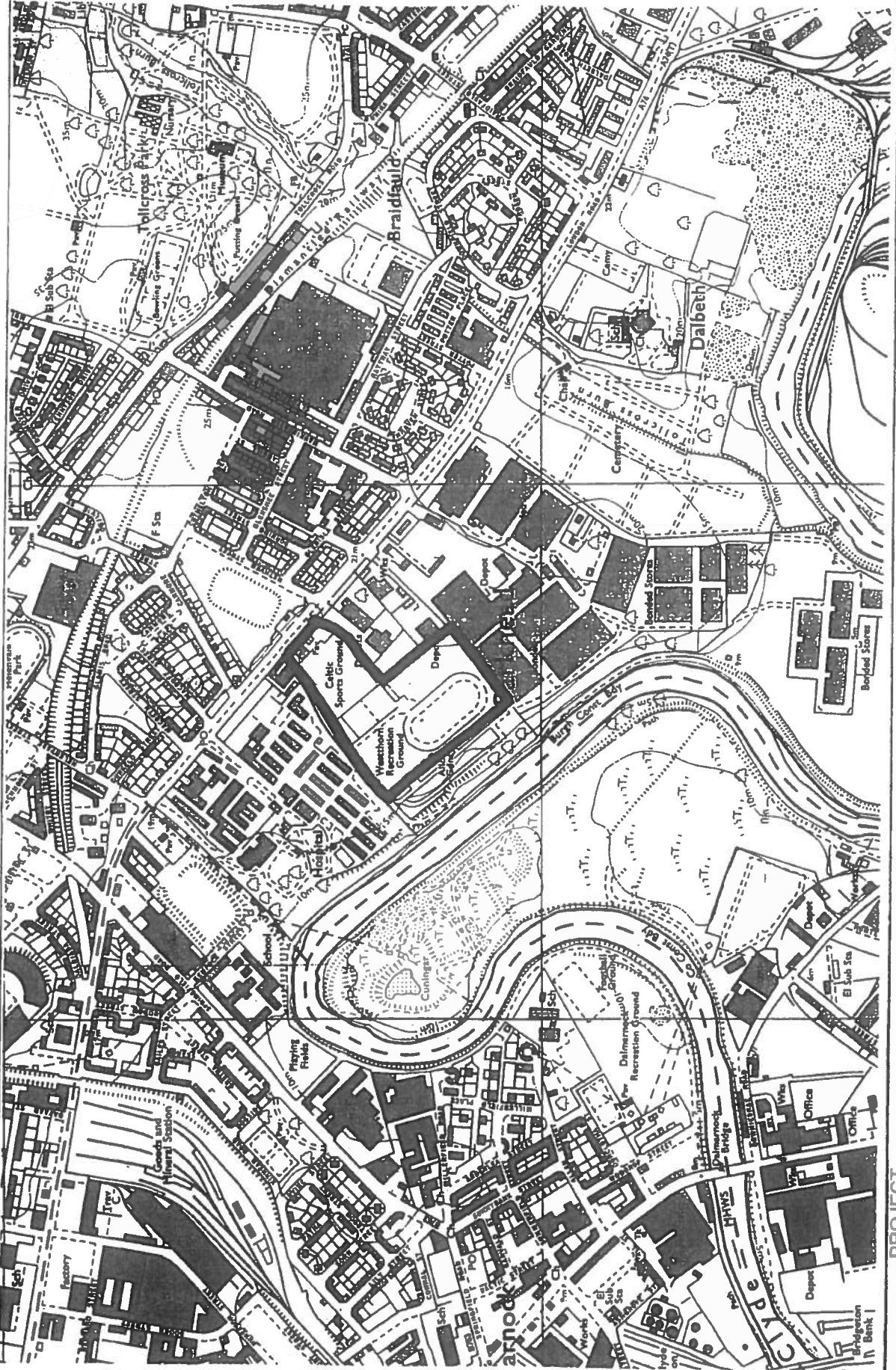
Previous investigation with limited contamination testing results indicated elevated levels of arsenic, copper, nickel, selenium, lead, zinc, toluene extractable matter and loss on ignition within the shallow soils across the Westthorn Recreation Ground area. Levels of other contaminants were generally low.

With regard to 'abnormal works', the site is underlain by shallow workings in the Ell, Main and Humph Coal seams and treatment of these will be required prior to any future development. The abandoned mine shaft is conjectured to lie on the site boundary and would require to be located to allow its potential impact on any future development to be assessed.

Contamination is expected on the site, and as such any future development would require this material to be removed from the site or capped using inert clay material. Gas generation arising from the fill material over the site is possible and gas protection measures below buildings may be necessary together with venting in capped open areas. Additionally, owing to the ground conditions prevailing on the site special foundation works would be required for some structures.

Based on the above and other potential constraints identified from the Desk Study, it is considered that further investigation, in the form of a Stage 2 Intrusive Investigation, prior to undertaking development at the site would be required. Details of the scope of the investigation works may be dependent on the scale and layout of the proposed future development of the site and further discussions would be required in this respect.

Appendix A - Site Location Plan

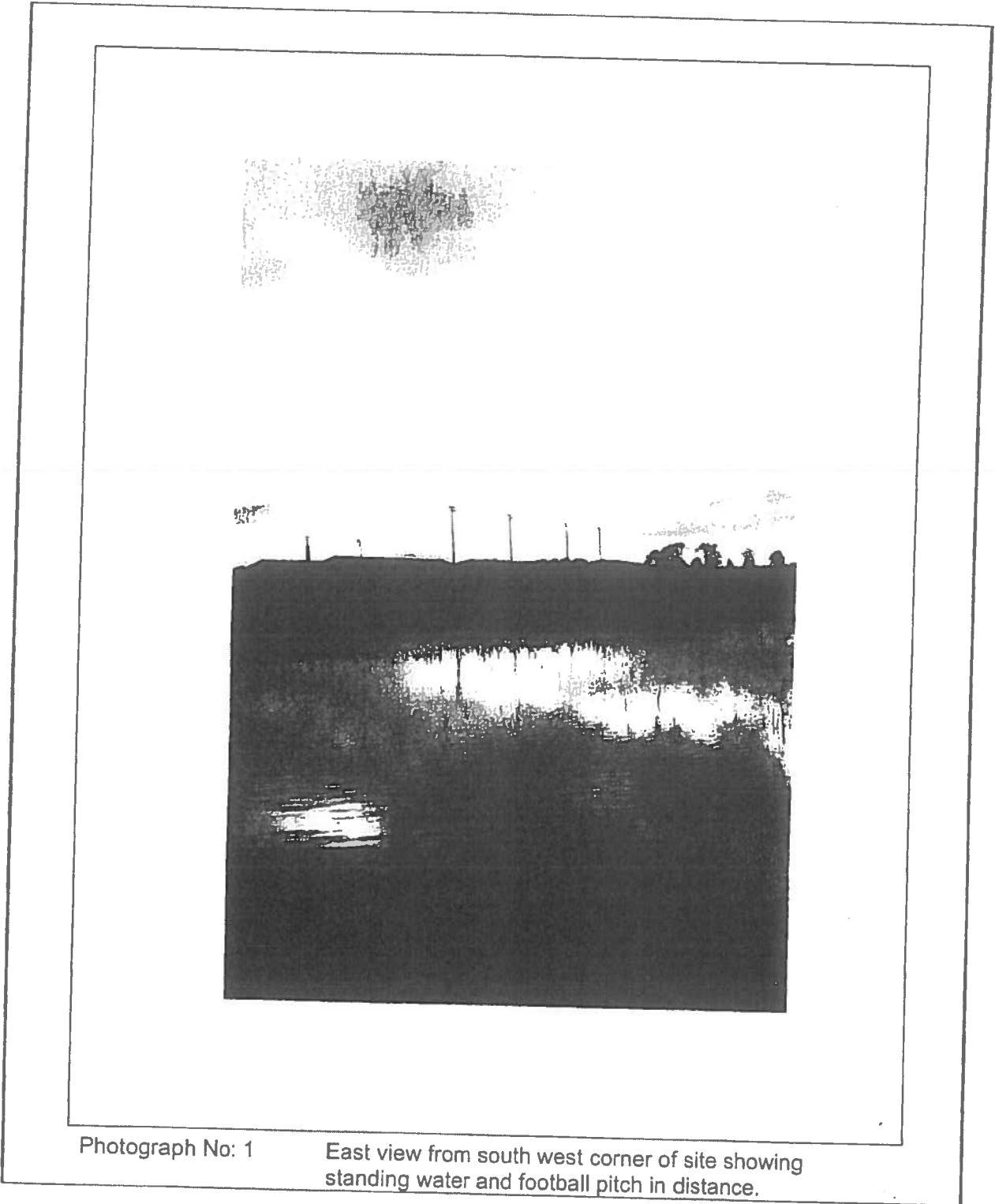


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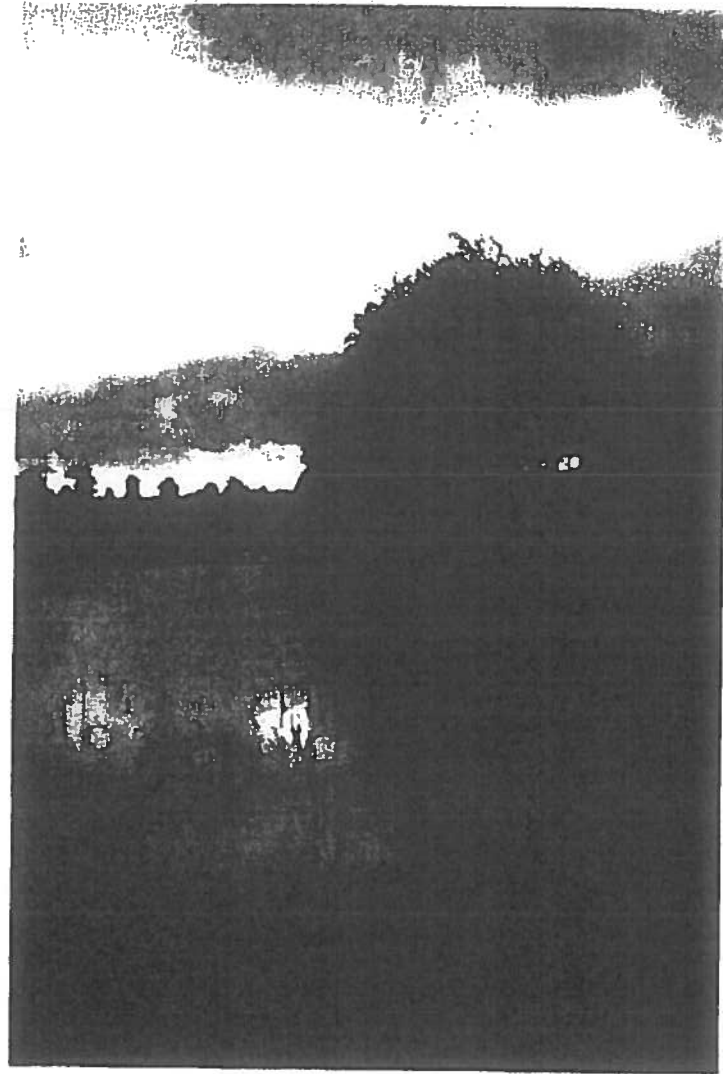
Figure 1
SITE LOCATION PLAN

Appendix B - Site Photographs



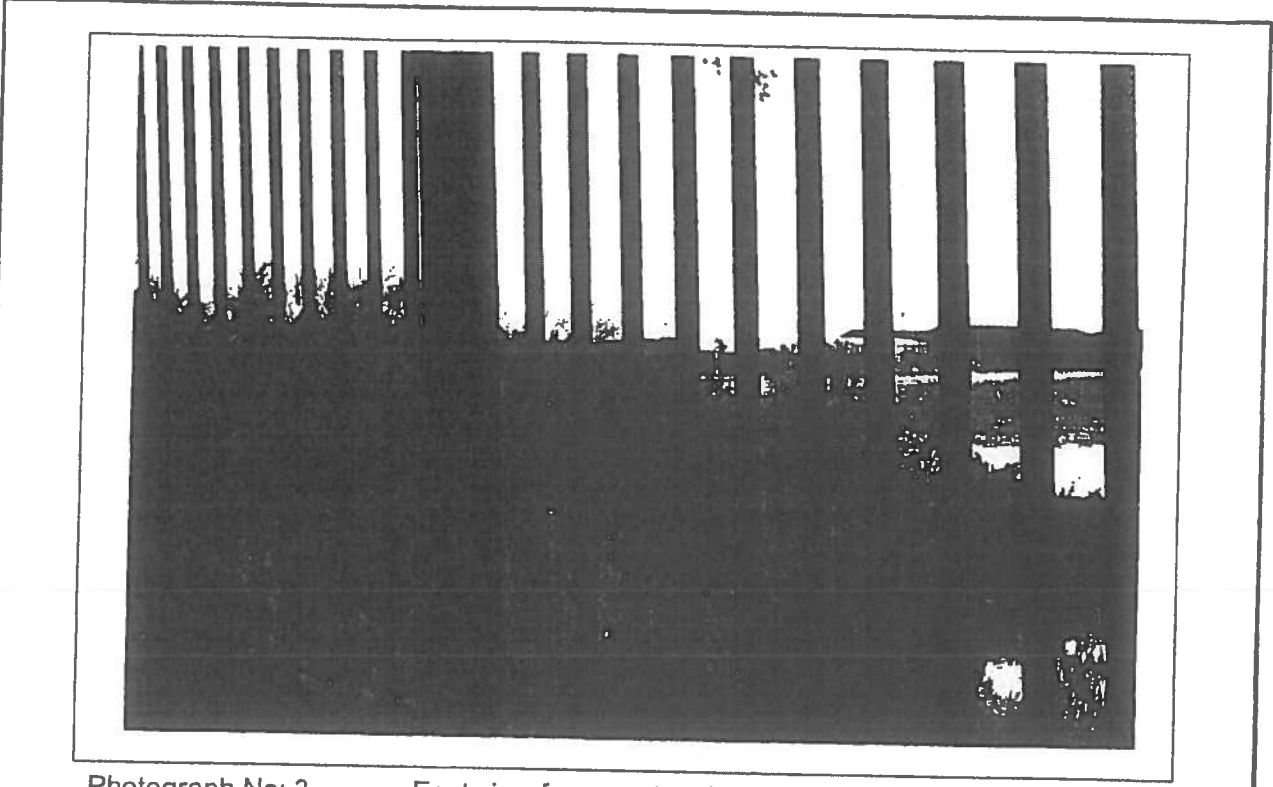
Photograph No: 1 East view from south west corner of site showing standing water and football pitch in distance.

Client: Montagu Evans	Site: Westthorn Recreational Ground	Date: 21/10/04	Job No: 9731
		Prep. By: [REDACTED]	



Photograph No: 2 East view from western boundary of site showing standing water.

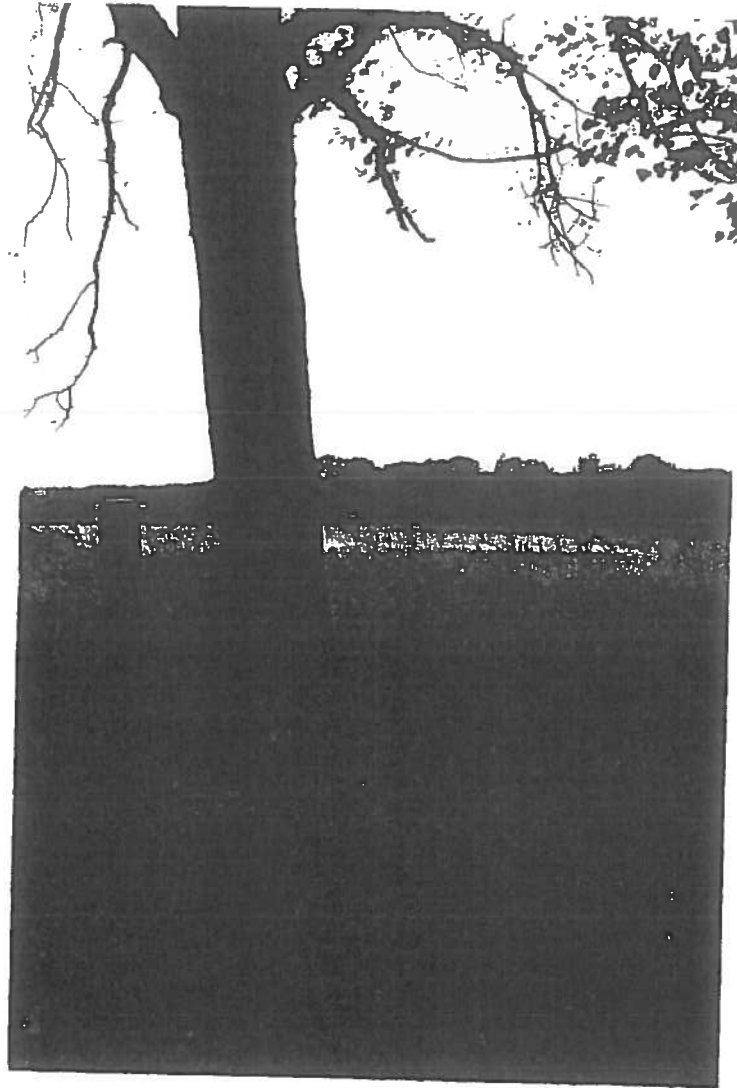
Client: Montagu Evans	Site: Westthorn Recreational Ground	Date: 21/10/04	Job No: 9731
		Prep. By: [REDACTED]	



Photograph No: 3

East view from western boundary of site showing boundary fence and football pitch in distance.

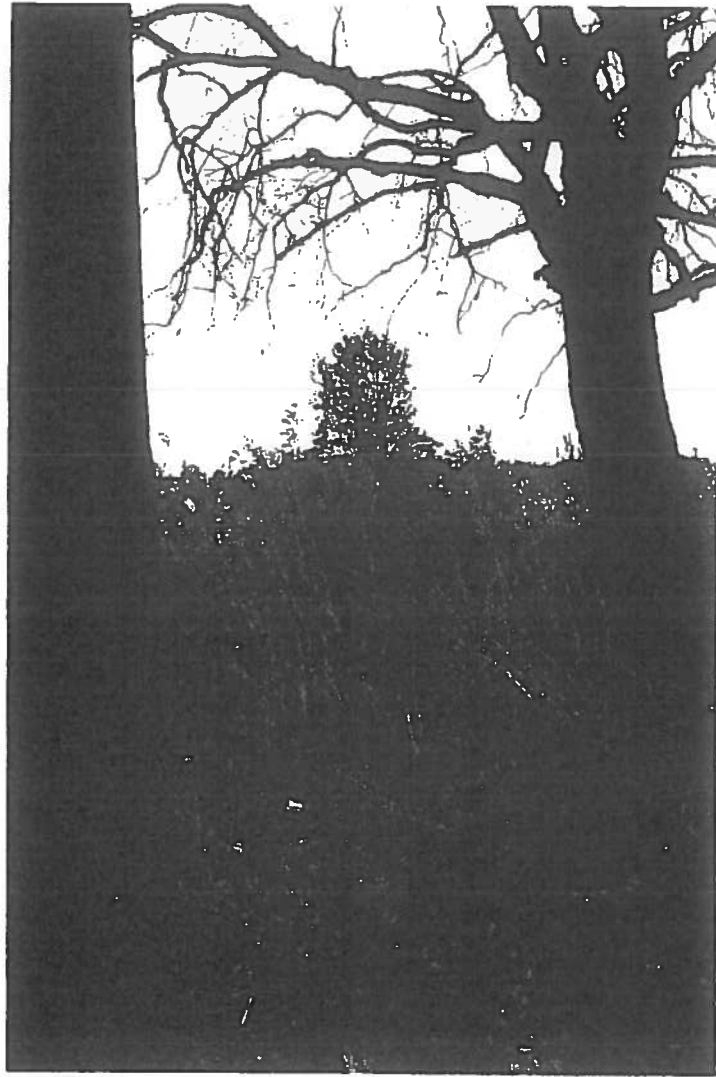
Client: Montagu Evans	Site: Westthorn Recreational Ground	Date: 21/10/04	Job No: 9731
		Prep. By: [REDACTED]	



Photograph No: 4

South east view from western boundary of site showing open recreation ground in the south west portion of the site.

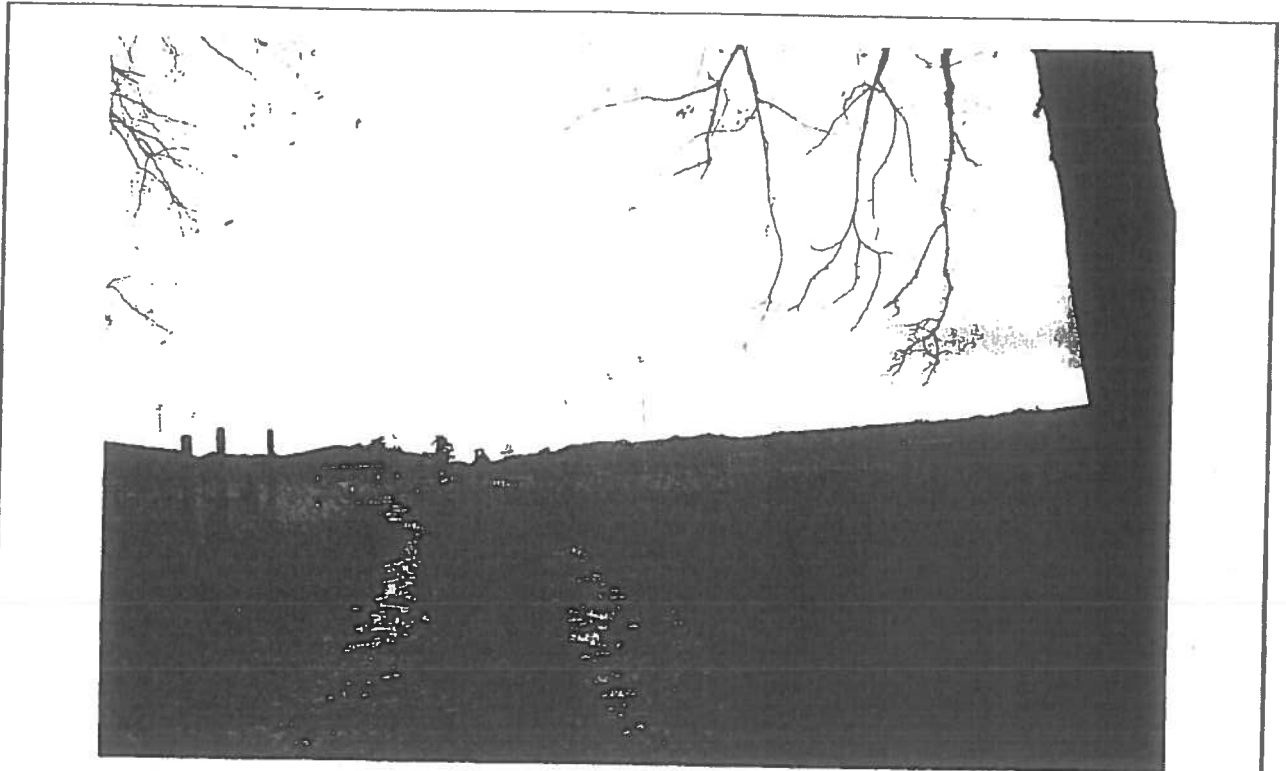
Client: Montagu Evans	Site: Westthorn Recreational Ground	Date: 21/10/04	Job No: 9731
		Prep. By: [REDACTED]	



Photograph No: 5

North east view from western boundary of site towards the boundary of Westthorn Recreational Ground and Celtic Sports Ground.

Client: Montagu Evans	Site: Westthorn Recreational Ground	Date: 21/10/04	Job No: 9731
		Prep. By: [REDACTED]	

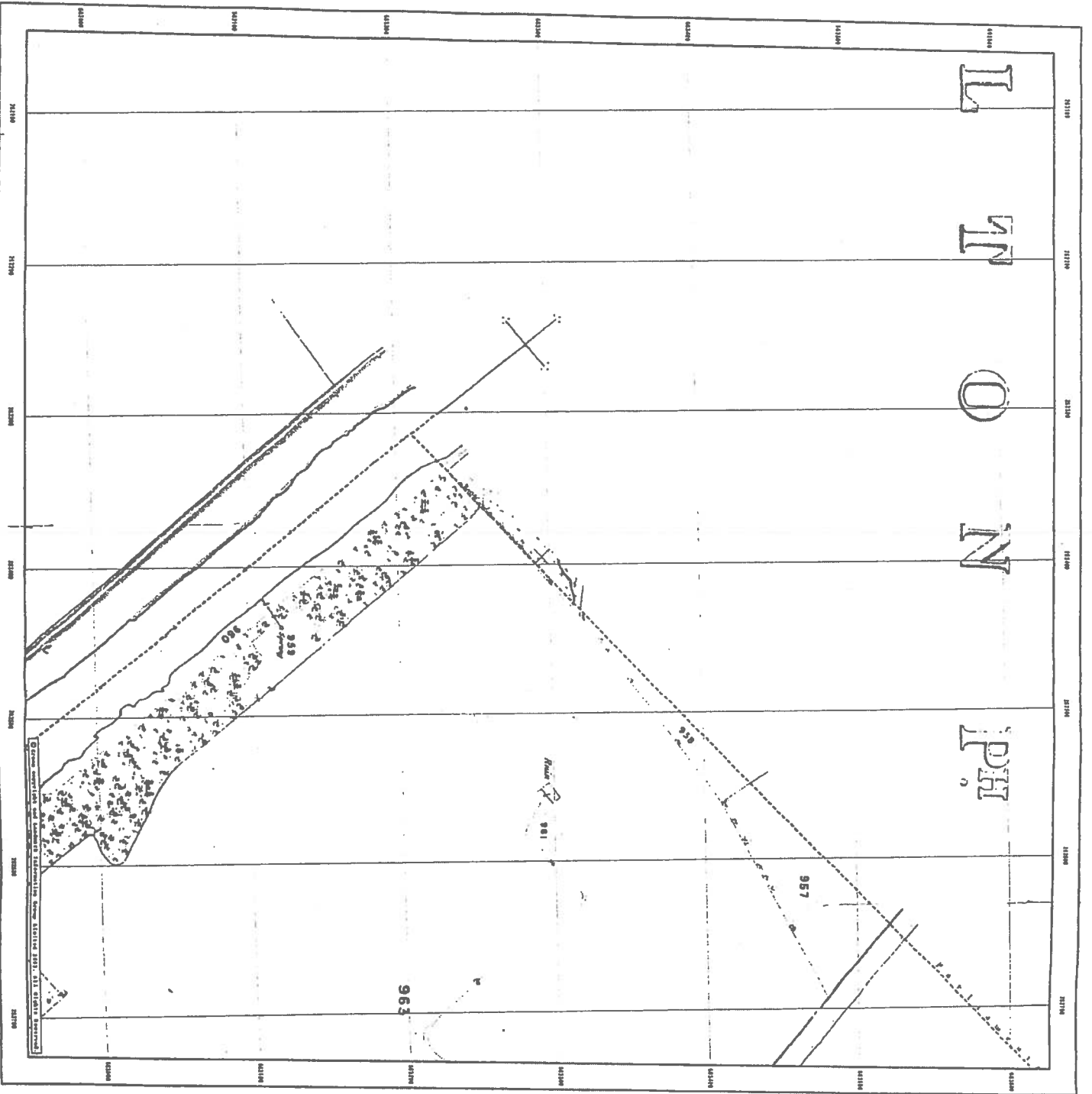


Photograph No: 6

South east view along an access road from a locked gate on the western portion of the site towards football pitches and the Westthorn Recreational Ground.

Client: Montagu Evans	Site: Westthorn Recreational Ground	Date: 21/10/04	Job No: 9731
		Prep. By: [REDACTED]	

Appendix C - Historical Plans



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CLIENT DETAILS
Envirocheck Order No. EC640731_11_1

SITE DETAILS
Grid Reference 262400 963300
Type Survey

Historical Map Legend

Quarry	Sand Pit	Marsh	Roads
Gravel Pit	Clay Pit	Rough Pasture	Furze
Refuse Heap	Shingle	Oisiers	Ford
Railway crossing	River or Canal	Road	Land Crossing
Embankment	Cudding	Road crossing	Railway
Road over	River or Canal	Arrow denotes flow of Water	

LANARKSHIRE

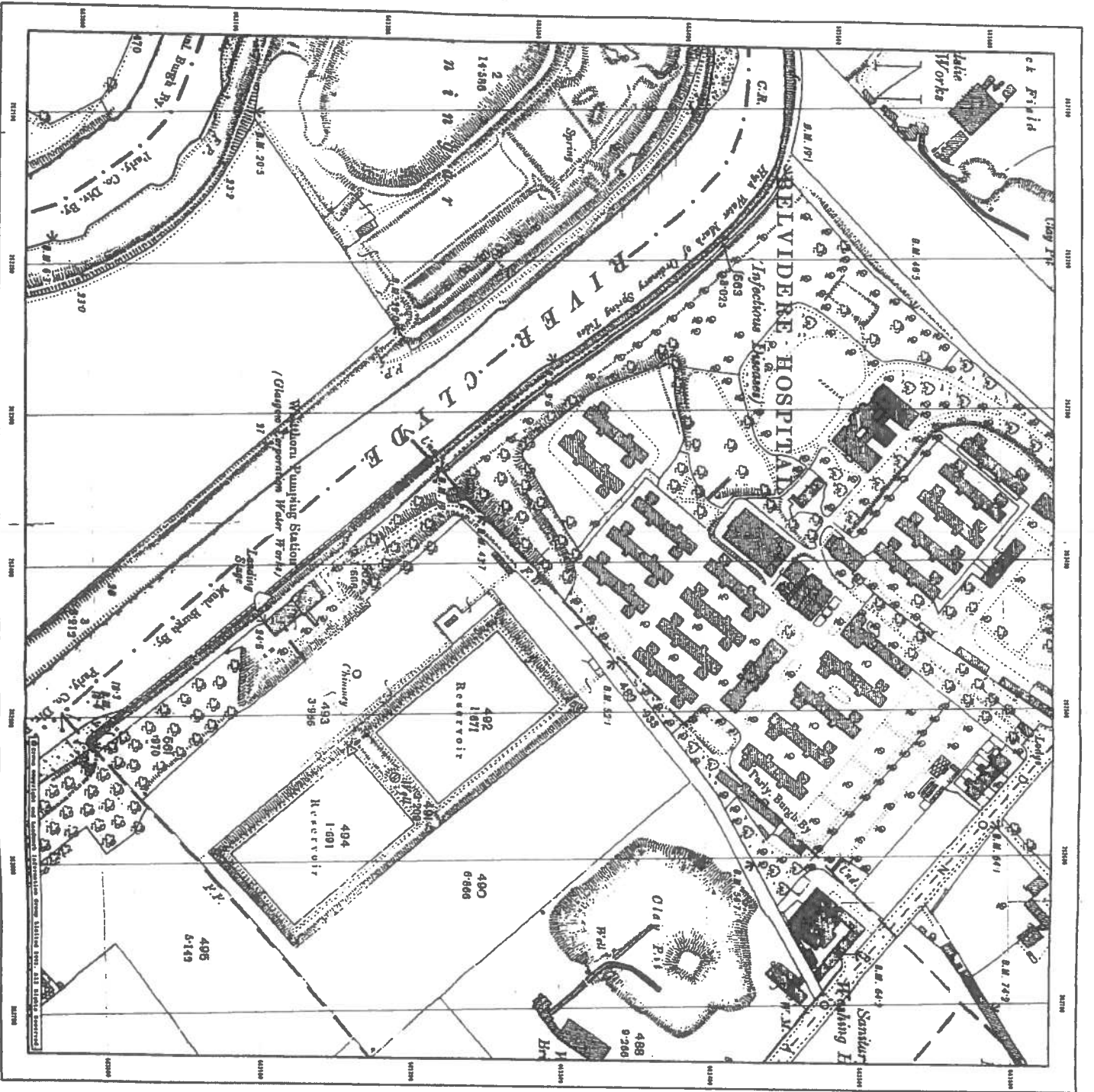
This historical map shows one hundred acre plots produced from a large predominantly rural area of the north. Adapted from the 1856 Ordnance Survey map of Lanarkshire, it was revised and reissued by 1981 to cover the whole of what is now Lanarkshire. The published map shows the whole of Lanarkshire, but this map is only a portion of the whole. The map is published as a historical reference, and is not intended to be used as a legal document. It is not a substitute for a current map, and is not intended to be used as a legal document. It is not a substitute for a current map, and is not intended to be used as a legal document.

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CLIENT DETAILS
Envirocheck Order No. EC940731_11_1

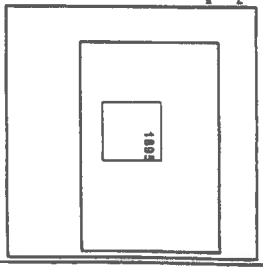
SITE DETAILS
Grid Reference 262400 663300
Civic Gateway

Historical Map Legend

Quarry	Sand Pit	Marsh	Reeds
Gravel Pit	Clay Pit	Rough Pasture	Furze
Rubble Heap	Shingle	Oscars	Ford
Railway crossing River or Canal	Railway crossing Road	Level Crossing	Road crossing Railway
Embankment	Cutting	Road over River or Canal	Arrow denotes flow of Water

LANARKSHIRE

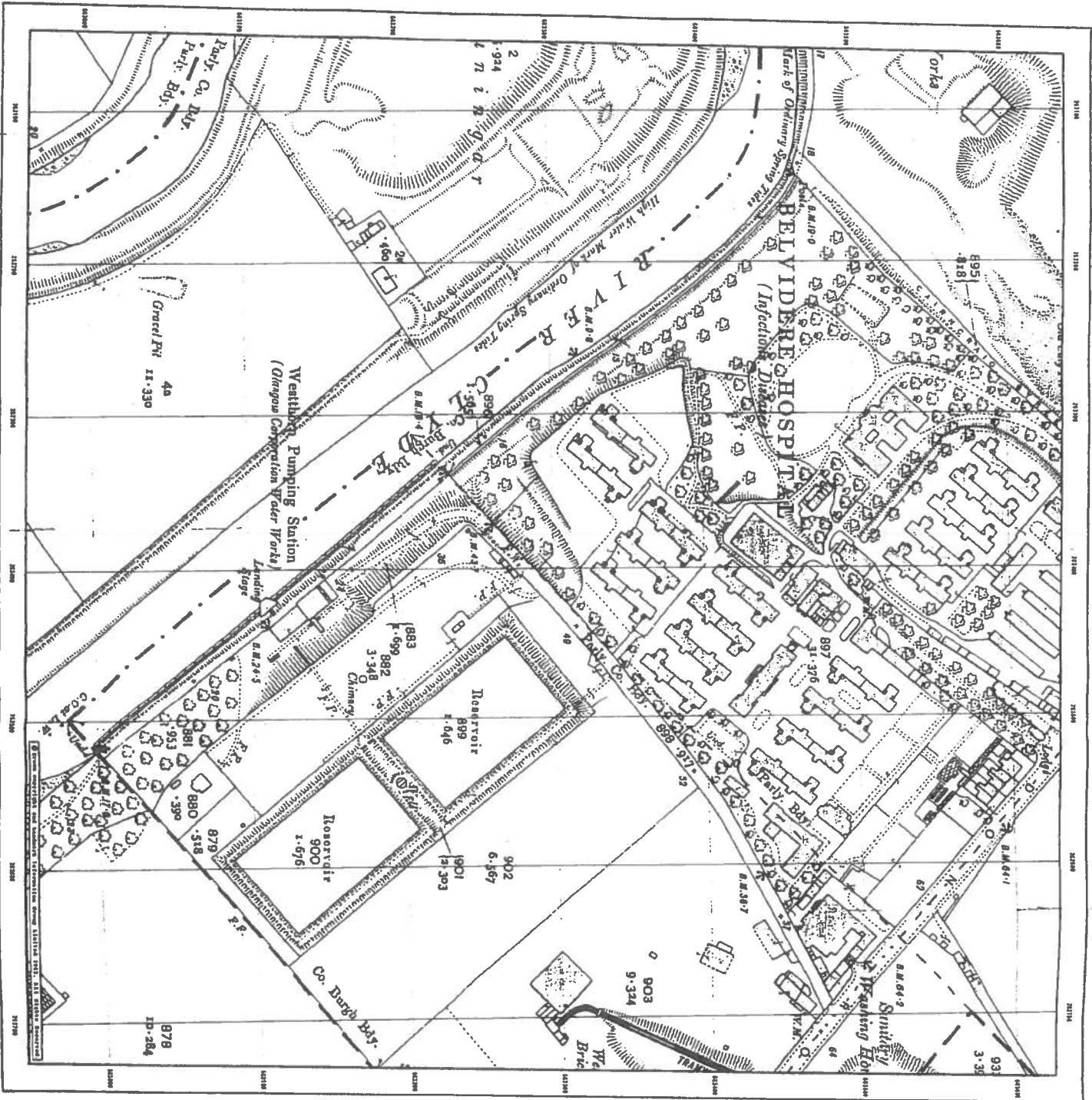
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CLIENT DETAILS
 Envirocheck Order No. ECG40731_11_3
1000 West Street, Suite 100, Hamilton, NZ 3202

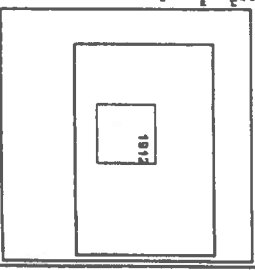
SITE DETAILS
 Grid Reference 282400 683300
 Type: Quarry

Historical Map Legend							
	Quarry		Sand Pit		Marsh		Rocks
	Gravel Pit		Clay Pit		Rough Pasture		Furze
	Redden Heap		Shingle		Oolites		Ford
	Railway crossing		Road		Land Crossing		Road crossing
	River or Canal		Cutting		Road over River or Canal		Arrow denoting flow of water
	Embankment		Road over River or Canal		Road over River or Canal		Road over River or Canal
	Road over River or Canal		Road over River or Canal		Road over River or Canal		Road over River or Canal

LANDMARKSHIRE

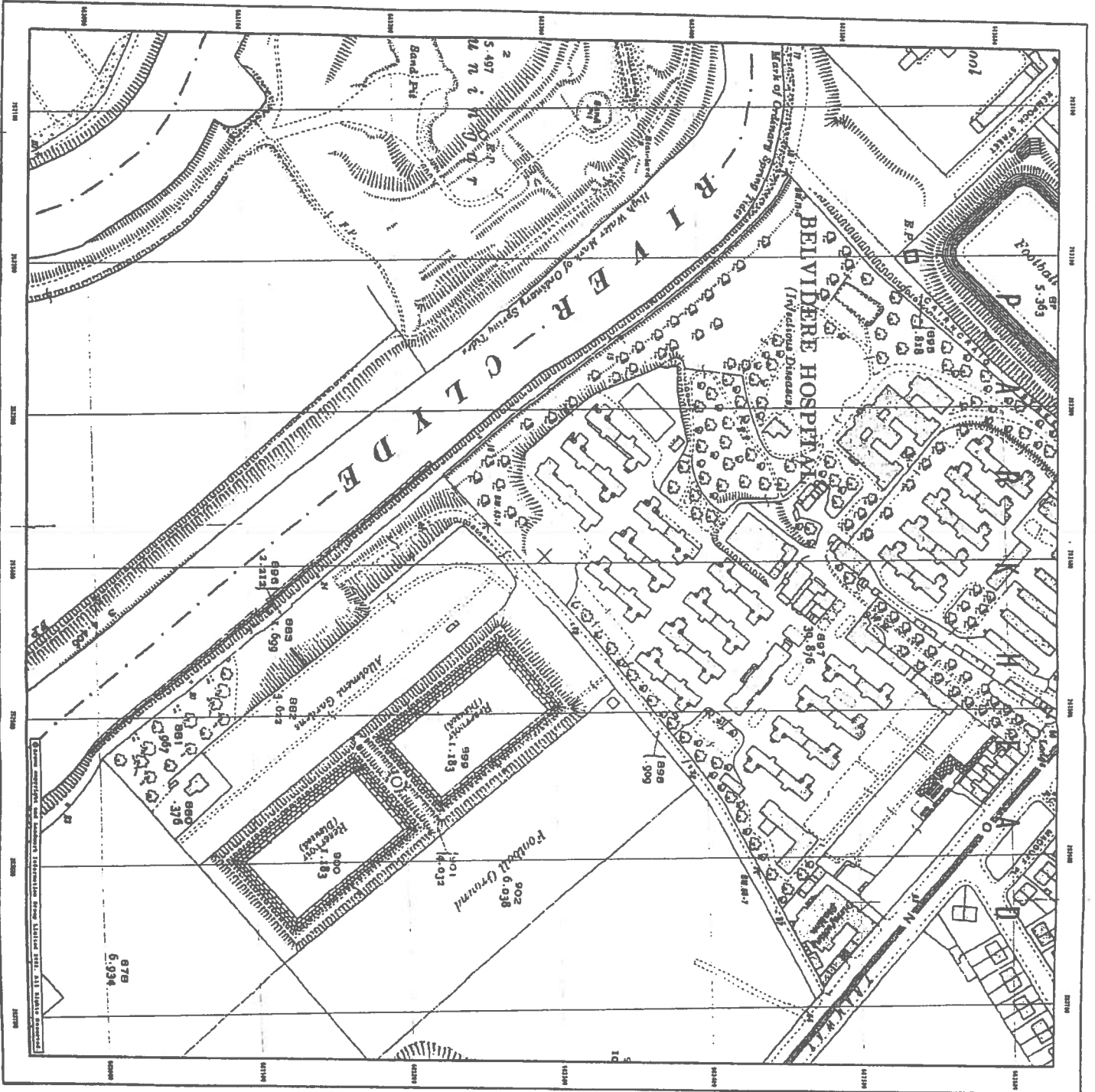
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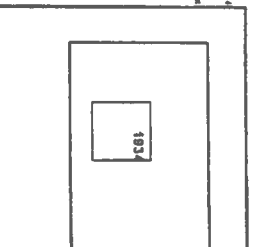
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Envirocheck Order No. ECG60731_11_1

SITE DETAILS 9
Grid Reference 262400 683300

Site Owner

Historical Map Legend		

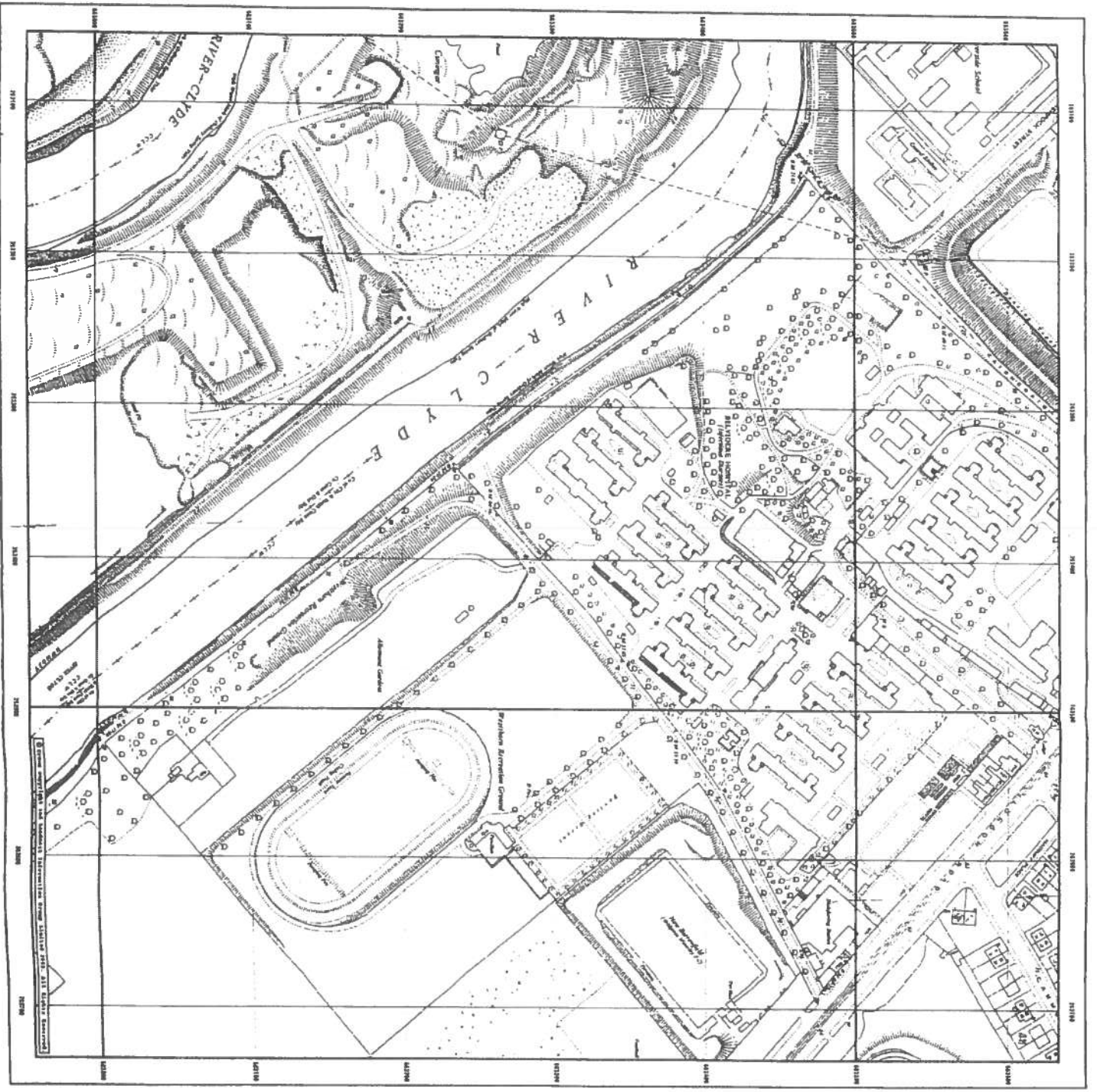
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CLIENT DETAILS Envirocheck Order No. EC144731_11_1

SITE DETAILS Grid Reference 282400 603300
 Type Quarry

Historical Map Legend

- Inactive Quarry: Chalk
- Active Quarry: Chalk
- Pit or Clay Pit
- Slope
- Pylon
- Electrically Transmission Line
- Direction of Water flow
- Marsh
- Saltings
- Orchard Tree
- Rough Grassland
- Scrub
- Heath
- Bracken
- Coniferous Tree (Not Surveyed)
- Non-coniferous Tree (Not Surveyed)
- Coniferous Tree (Surveyed)
- Non-coniferous Tree (Surveyed)

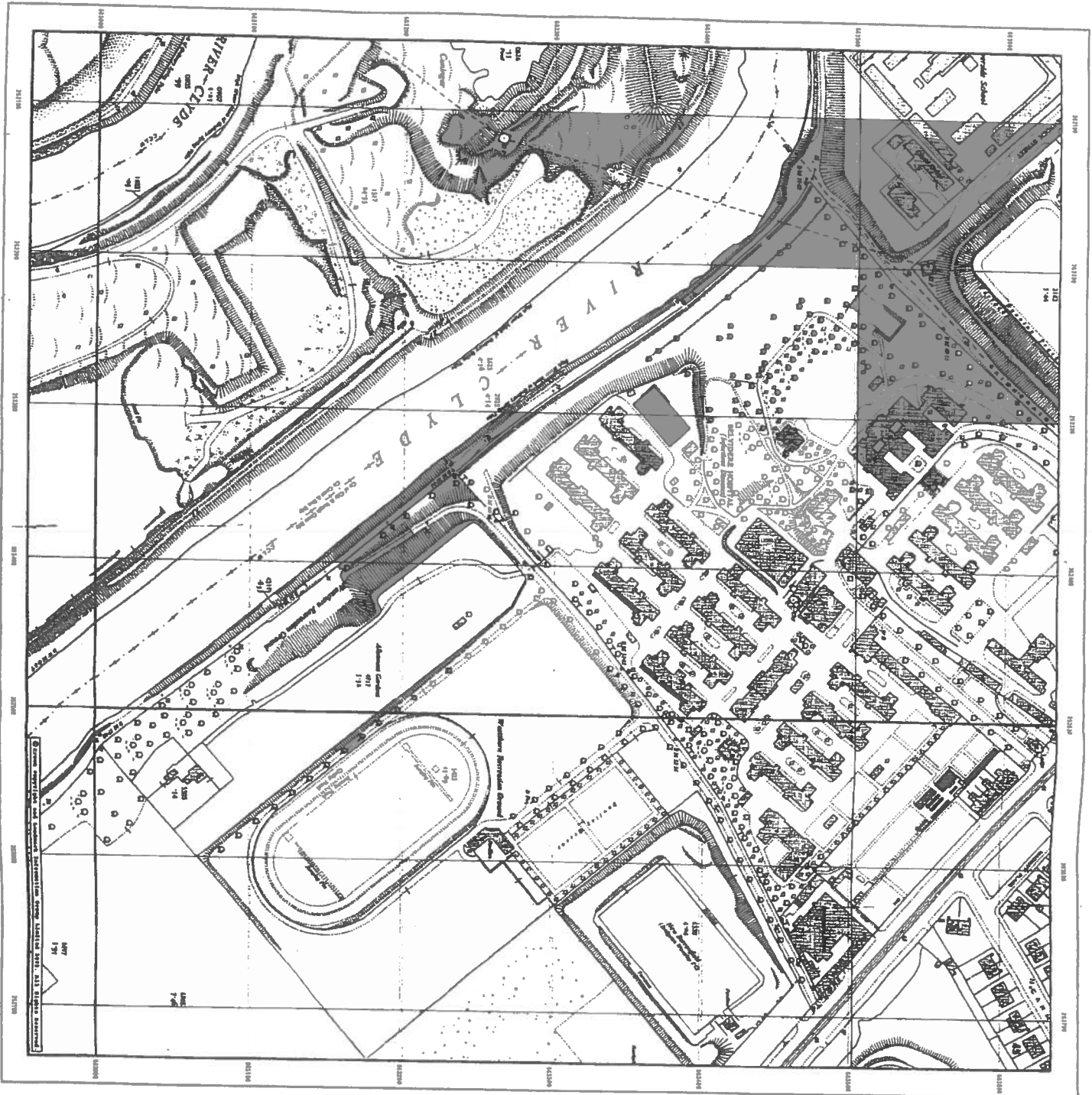
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1954	1954
1954	1954

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CLIENT DETAILS
 Envirocheck Order No. EG640733_11_1

SITE DETAILS
 Grid Reference 202400 663300

Historical Map Legend

- Inertive Quarry: Chalk
- Active Quarry: Chalk
- Pit or Clay Pit
- Culvert
- Slope
- Electricity Transmission Line
- Direction of Water flow
- Cypripa. Oslar
- Pylon
- Marsh
- Saltings
- Orchard Tree
- Roads
- Rough Grassland
- Scrub
- Heath
- Bracken
- Coniferous Tree (Surveyed)
- Coniferous Tree (Not Surveyed)
- Non-coniferous Tree (Surveyed)
- Non-coniferous Tree (Not Surveyed)

ORDNANCE SURVEY PLAN

The boundaries shown on this map are those of the Ordnance Survey, which are based on the 1842, 1884 and 1924 editions of the Ordnance Survey maps and are not necessarily the same as the boundaries shown on the 1985 map. The 1985 map is a derivative of the 1924 map and is not a true reproduction of the 1924 map. The 1985 map is a derivative of the 1924 map and is not a true reproduction of the 1924 map. The 1985 map is a derivative of the 1924 map and is not a true reproduction of the 1924 map.

