



e3p

Phase I Geoenvironmental Site Assessment
Sulby Street, Manchester

Reference: 15-395-R1-1
Date: February 2022



PHASE I GEOENVIRONMENTAL SITE ASSESSMENT

Land off Sulby Street
Manchester
M40 5HY

Prepared for:
Challenger Homes (Moston) Limited

Report Ref: 15-395-R1-1
Date Issued: February 2022

Sulby Street

Phase I Geoenvironmental Site Assessment
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EXECUTIVE SUMMARY

Site Address	Land off Sulby Street, Manchester, M40 5HY	
Grid Reference	E 387410 N 401566	
Site Area	0.3 Ha.	
Proposed Development	Challenger Homes intends to construct 8 townhouses and 12 apartments with associated adopted estate roads and utility infrastructure.	
Current Site Use	The subject site is a rectangular shaped parcel of land located to the south of Moston and is currently unoccupied. In the north of the site is the unoccupied St Luke's Social Club (a one story brick building, with a mixture of a tiled and flat roof). The site is uniform in topography across the site. Several mature trees were noted in the south east of the site. The south of the site contained a mixture of soft cover (grass) and scrub. A formal drainage survey has not been completed; however, during the site walkover several manholes were noted around the perimeter of Luke's Social Club. An overhead cable is present transecting the site from the north east to the southwest.	
Site History	The site comprised agricultural fields until 1908, with a pond located on the western boundary from 1893. From 1908, several structures are recorded in the southeast of the site and an embankment in the centre of the site. The pond is no longer marked from 1922. From 1931, the site was recorded as Tennis Grounds in the south and a Hall structure in the north. The Tennis Grounds were no longer recorded from 1950. From 1987, the Hall was recorded as St Luke's Men's Club. There appears to have been no further changes to the subject site, to the present day.	
Environmental Setting	Drift Geology	Glacial Till.
	Bedrock Geology	Pennine Middle Coal Measures – MUDSTONE, SILTSTONE AND SANDSTONE.
	Faults	A normal fault trending north to south and dipping east is present in the south east corner of the site.
	Hydrogeology	Secondary A bedrock aquifer with a secondary undifferentiated superficial aquifer recorded. One groundwater abstraction licence is recorded 1930 m south-west for general use.
	Hydrology	There are no surface watercourses within an influencing distance of the site. Due to the local topography, any shallow groundwater if present will likely flow in a southerly direction towards the Rochdale Canal.
	Flood Risk	Unaffected by flooding from rivers.
Utility Locations	A formal drainage survey has not been completed; however, during the site walkover several manholes were noted around the perimeter of Luke's Social Club. An overhead cable is present transecting the site from the north east to the southwest.	



Landfill Sites and Ground Gases	No current landfill sites are located within 250 m of the site. However, the site has undergone some historic development and ground working and an infilled pond is present on the western boundary. A historic landfill site is located 169 m north east of the site. The Made Ground associated with the historic development and any organic deposits may produce hazardous ground gases such as methane and carbon dioxide.
Radon	Less than 1% of houses above the 'Action Level' – no special precautions required.
Coal Mining/Land Stability	The site is located in a coal mining reporting area but not within a development high-risk area. The site is located in an area at low risk from coal mining and is not located within an area at risk from ground instability arising from historic coal mining activities.
Hazardous Installations	No hazardous installations that could potentially prejudice the proposed construction of highly sensitive residential dwellings have been identified within influencing distance of the subject site.
Initial Conceptual Site Model	Contaminant Sources ✿ Made Ground (historical buildings/infilled ponds) – Polyaromatic hydrocarbons (PAH), heavy metals, hydrocarbon compounds (TPHs), asbestos containing materials (ACMs), ground gases. ✿ Historical car park use (spillages of fuel etc.) – PAHs, TPHs, Metals ✿ Current building in the centre of the site –ACMs. Pathways ✿ Direct contact and ingestion. ✿ Volatilisation/indoor explosion. ✿ Vapour inhalation. ✿ Dust inhalation. Receptors ✿ Future site users (proposed residential end-users and construction workers). ✿ Buildings (proposed residential units). ✿ Underlying aquifer (Secondary A bedrock aquifer).
Recommendations	Intrusive geoenvironmental ground investigation to confirm the conceptual site model throughout the site.



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DRAWING LIST

15-395-001 - Site Location Plan
15-395-002 - Proposed Development Plan
15-395-003 - Historical Features Plan
15-395-004 - Site Features Plan



1. INTRODUCTION

1.1. BACKGROUND

E3P Ltd has been commissioned by Challenger Homes (the client) to undertake a Phase I Geoenvironmental Site Assessment at land to the east of Sulby Street, M40 5HY.

This report is required to determine potential contaminated land liabilities and geotechnical constraints as part of a proposed site redevelopment

1.2. PROPOSED DEVELOPMENT

Challenger Homes intends to construct 8 townhouses and 12 apartments with associated adopted estate roads and utility infrastructure. E3P notes the sensitivity and confidentiality of the proposals. Drawing 15-395-002 (Appendix III) identifies the proposed development layout.

A snapshot of the proposed development layout is indicated in Figure 1.1.

FIGURE 1.1 SNAPSHOT OF PROPOSED DEVELOPMENT



1.3. OBJECTIVES

- ✳ The objectives of the geoenvironmental investigation are as follows:
- ✳ Review historical plans, geology, hydrogeology, site sensitivity, floodplain issues, mining records and any local authority information available in order to complete a desk study in line with Environment Agency (EA) document Land Contamination: Risk Management (LC:RM) (2019)
- ✳ Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors.
- ✳ Assess the desk-study information and, where possible, provide preliminary recommendations in relation to foundations, pavement construction and floor slabs.
- ✳ Provide recommendations regarding future works required and undertake a preliminary pre-construction cost appraisal.

1.4. SOURCES OF INFORMATION

Background information was sought from the following sources:

- ✳ Groundsure Search;
- ✳ Historical mapping dated 1848 to 2021. A selection of historical maps are reproduced in Appendix V;
- ✳ On-line planning records held by Manchester City Council;
- ✳ Consultations with representatives of Manchester City Council;
- ✳ Magic Map Groundwater Vulnerability Map;
- ✳ Radon: Guidance on protective measures for new buildings (BRE Document BR 211, 2007);
- ✳ British Geological Survey Map;
- ✳ Groundsure IO database;
- ✳ <https://zeticauxo.com/downloads-and-resources/risk-maps/>; and,
- ✳ <https://flood-map-for-planning.service.gov.uk>.

1.5. LIMITATIONS

The limitations of this report are presented in Appendix I.

1.6. CONFIDENTIALITY

E3P has prepared this report solely for the use of the client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from E3P; a charge may be levied against such approval.



1.7. RISK CLASSIFICATION

E3P has utilised the available data to classify the site on the basis of its likely contaminated land liability and potential for geotechnical constraints in relation to the site development. The risk classification definitions are summarised in Table 1.1.

TABLE 1.1 RISK CLASSIFICATION

RISK	DEFINITION
Low	There are unlikely to be significant contaminated land liabilities/geotechnical constraints associated with the property.
Low Moderate	There are unlikely to be significant contaminated land liabilities/geotechnical constraints associated with the property with regard to the proposed use. However, minor issues may require further consideration in the event of future redevelopment of the site.
Moderate	Some potential contaminated land liabilities/geotechnical constraints are likely to affect the property as a result of historical and/or current activities. The risks identified are unlikely to pose an immediate significant issue, but the purchaser/developer may wish to make further enquiries of the vendor or undertake further environmental improvements. Redevelopment of the site will likely require further site investigation.
Moderate High	Some potentially significant contaminated land liabilities/geotechnical constraints have been identified at the property that requires further assessment, including intrusive ground investigations.
High	Significant potential contaminated land liabilities/geotechnical constraints have been identified at the property. Further assessment including intrusive ground investigation will be required to determine to the level of risk and associated liability.



2. SITE SETTING

2.1. SITE DETAILS

Site Address	Land off Sulby Street, Manchester, M40 5HY.
National Grid Reference	E 387410 N 401566.
Site Area	0.3 Ha.

All acronyms used within this report are defined in the Glossary presented in Appendix II.

A site location map is presented in Appendix III as Drawing 15-395-001.

2.2. CURRENT SITE USE

E3P has undertaken a site walkover of the entire site and a description of the key findings is summarised in Table 2.1.

TABLE 2.1 SITE DESCRIPTION

Occupancy/Use	The subject site is a rectangular shaped parcel of land located to the south of Moston and is currently unoccupied. In the north of the site is the unoccupied St Luke's Social Club (a one story brick building, with a mixture of a tiled and flat roof).	
Surface Cover (%)	Buildings	20%
	Hardstand	40%
	Soft Cover	40%
Structures	The only structure present on site is the previously named St Luke's Social Club, in the north of the site. The structure appears to be a one storey brick building, with a mixture of a tiled and flat roof.	
Access	The site is open access to the public from either Sulby Street to the east and Bacup Street to the west. Vehicular access can be gained from Sulby Street, through a padlocked gate. There is no access to the building on site.	
Slope	The site is uniform in topography across the site.	
Retaining Structures	No retaining structures are present on site.	
Vegetation/Ecology	Several mature trees were noted in the south east of the site. The south of the site contained a mixture of soft cover (grass) and scrub.	
Hazardous Material Storage	No above-ground storage tanks (ASTs) or underground storage tanks (USTs) were observed at the site during the preliminary site walkover.	



Asbestos-Containing Material (ACM)	No evidence of ACM was noted across the majority of the site during the site walkover. Access was not granted to St Luke's Social Club in the north of the site; however, due to the age of the building, it is possible that ACM will be contained within the building fabric. Due to the lack of any further structures on the site, it is unlikely there will be any further asbestos present on the site. A pre-demolition asbestos survey will be required within all existing buildings within the site boundary.
Polychlorinated Biphenyls (PCBs)	There is no equipment identified that may contain PCBs within the site boundary.
Waste Storage	Potentially hazardous waste streams are unlikely to be generated at the site and none were observed during the preliminary site inspection.
Utility Locations	A formal drainage survey has not been completed; however, during the site walkover several manholes were noted around the perimeter of Luke's Social Club. An overhead cable is present transecting the site from the north east to the southwest.

2.3. SURROUNDING AREA

The surrounding area land uses are summarised in Table 2.2.

TABLE 2.2 SURROUNDING LAND USES

DIRECTION	LAND USE
North	St Dunstan's R C Primary School.
East	Residential units.
South	St Luke's Church.
West	Residential units.

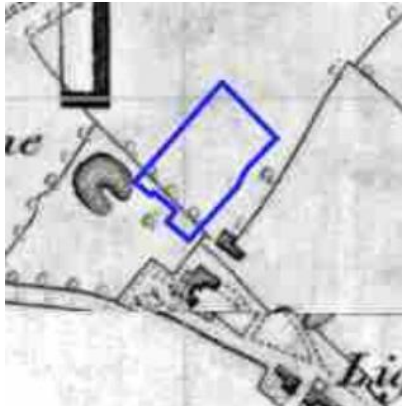
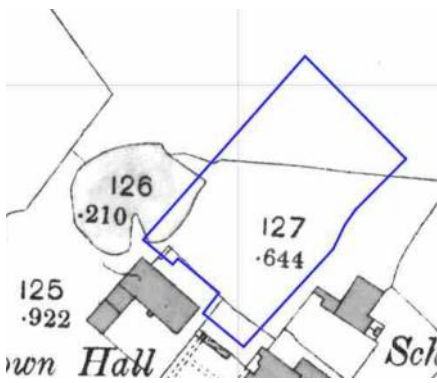


3. SITE HISTORY

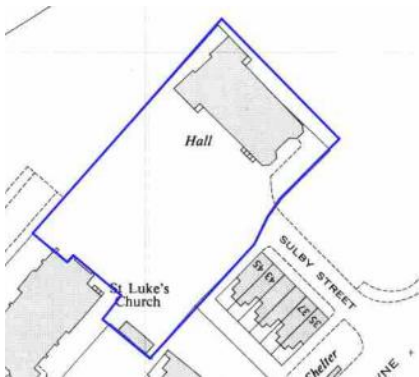
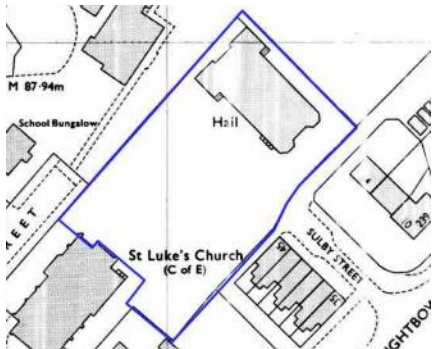
3.1. ON-SITE HISTORICAL DEVELOPMENT

A review of historical mapping and historical aerial imagery pertinent to the site is summarised in Table 3.1. In addition, historical site features are presented on Drawing No 15-395-003 in Appendix III.

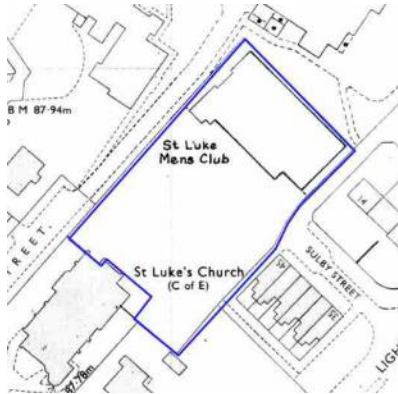
TABLE 3.1 HISTORICAL DEVELOPMENT

MAP EDITION	HISTORICAL LAND USE	HISTORICAL MAP EXCERPT
1848 1:2,500	The site is comprised of agricultural fields with a field boundary and trees present in the south of the site.	
1893 1:2,500	The field boundary or drain that crosses the site is now marked in the north of the site. A pond encroaches on the western boundary of the site.	
1908-1909 1:2,500	In the south east of the site, several structures are marked. In the centre of the site, a boundary marking is present transecting the site in a westerly to easterly direction.	



MAP EDITION	HISTORICAL LAND USE	HISTORICAL MAP EXCERPT
1922 1:2,500	A small singular building is marked in the east of the site. The pond along the western boundary is no longer marked. St Luke's Church encroaches along the southern boundary of the site.	
1931-1933 1:2,500	The site is now utilised as tennis grounds in the south of the site, with a building marked as a hall in the north of the site. The small building in the east of the site has been demolished.	
1950 1:1,250	The tennis grounds are no longer marked in the south of the site. No other changes have occurred on site.	
1972 1:1,250	A small building in the southeast of the site is no longer marked. No other changes have occurred on site.	



MAP EDITION	HISTORICAL LAND USE	HISTORICAL MAP EXCERPT
1987-1992 1:1,250	The hall is now marked as St Luke's Men's Club. No other changes have occurred on site.	
Recent Aerial photography 2015	Recent aerial photography shows an area of hardstanding in the centre of the site, to the south of the Men's Club. The south of the site is vegetated with trees and soft cover, likely grass.	
2021 1:10,000	No changes have occurred on site.	



3.2. OFF-SITE HISTORICAL DEVELOPMENT

A review of potentially contaminative uses identified on historical Ordnance Survey maps within a 250 m radius of the site is summarised in Table 3.2.

TABLE 3.2 SURROUNDING HISTORICAL DEVELOPMENT

SURROUNDING FEATURE	DISTANCE	DATES	DIRECTION
Public Wash House Then: named Public Laundry Then: named Laundry Then: no longer marked	40 m	Pre 1931 – Pre 1972 Pre 1972 – Pre 1992 Pre 1992 – Pre 2003 Pre 2003 – Present	West
Pond Then: Infilled	80 m	Pre 1908 – Pre 1950 Pre 1950 – Present	North East
Electrical Substation	100 m	Pre 1971 – Present	South
Mineral Water Works Then: named works	110 m	Pre 1931 – Pre 1987 Pre 1987 – Present	North West
Surgery	120 m	Pre 1993 – Present	South
Garage Then: marked as Works Then: no longer marked	180 m	Pre 1971 – Pre 1982 Pre 1982 – Pre 2014 Pre 2014 – Present	South West
Blue Stone Farm Then: no longer marked	200 m	Pre 1848 – Pre 1972 Pre 1972 – Present	West
Scrap Metal Yard Then: no longer marked	230 m	Pre 1972 – Pre 2003 Pre 2003 – Present	West
Coal Yard Then: no longer marked	230 m	Pre 1972 – Pre 1987 Pre 1987 – Present	West

3.3. PLANNING HISTORY

E3P has undertaken a review of online planning records held by Manchester City Council and results are discussed below in Table 3.3.

TABLE 3.3 SUMMARY OF PLANNING HISTORY

REFERENCE	PROPOSAL	DECISION	DISTANCE	DIRECTION
131094/FO/2021 Oakland Nursing Home 130 Kenyon Lane Manchester M40 9DF	Change of use of existing care home (Class C2) to 20 x 2 bedroom and 4 x 1 bedroom residential apartments (Class C3), together with associated elevational alterations and associated works	Unknown	106m	South
131434/FO/2021 133-135 Kenyon Lane Manchester M40 9DL	Erection of a single-storey dwelling/house with associated car parking and boundary treatment	Refused 13/10/2021	223m	South West



3.4. ANECDOTAL INFORMATION

A web-based search of the subject site has recovered the following photographs and descriptions of the property, from WT Gunson commercial property consultants:

'The property comprises a single-storey detached former social club with adjoining car park/land. The property is located on a fairly level, regular shaped site of approx. 0.74 acres.

The social club is of brick construction beneath a mixture of pitched tiled roofing and flat roofing.

Internally, the accommodation provides two function rooms with a shared bar, a games room with bar, male and female WCs, a kitchen, beer cellar and an office.'

Plate 1
Function Room



Plate 2
Function Room



Plate 3
Bar area



3.5. PREVIOUS REPORTS

No previous reports have been made available to E3P for the subject site.



4. ENVIRONMENTAL SETTING

4.1. GEOLOGY AND HYDROGEOLOGY

The British Geological Survey (BGS) map (Sheet 85) for the site, (1:50,000, Solid and Drift editions) and online records indicate the site is underlain by the geological sequence presented in Table 4.1.

TABLE 4.1 SUMMARY OF UNDERLYING GEOLOGY

GEOLOGICAL UNIT	CLASSIFICATION	DESCRIPTION	AQUIFER CLASSIFICATION
Drift	Glacial Till	SAND, CLAY and GRAVEL	Secondary Undifferentiated
Solid	Pennine Middle Coal Measures	MUDSTONE, SILTSTONE, SANDSTONE	Secondary A Aquifer

TABLE 4.2 SUMMARY OF BGS BOREHOLE RECORDS

LOCATION	DEPTH	MADE GROUND	DRIFT	SOLID
SD80SE92/A – KENYON LANE SEWER 1 109 m SE	10 m	2.00 m	SAND and CLAY > 10 m	Not encountered
SD80SE92/B – KENYON LANE SEWER 2 214 m SE	10 m	1.83 m	SAND and CLAY > 10 m	Not encountered

TABLE 4.3 FAULTING

LOCATION	DESCRIPTION
On site	A normal fault trending north to south and dipping east is present in the south east corner of the site.
137m NE	A normal fault trending northwest to southeast, dipping northeast.

The Groundsure report indicates that the site is not located within a groundwater source protection zone. However, there is a groundwater/potable abstraction located 1.90 km south west of the site, for a general use. Based on the local topography, it is considered likely that shallow groundwater, if present, will flow in a southerly direction, following the topographical gradient towards the Rochdale Canal to the south.

4.2. NATURAL LANDFORM AND GEOMORPHOLOGY

Based on the initial geological assessment, a review of available topographic data and pertinent mapping, E3P has undertaken a preliminary geomorphological assessment of the landform and its possible mechanism for formation.

It would appear that the current site level plateau will have been formed by the placement and upfilling of material prior to the construction of the historical development in the north of the site.

It is possible that the historical level raising has resulted in greater thicknesses of Made Ground overlying the natural glacial till and alluvial soils associated with the infilled pond along the western boundary of the site.



FIGURE 4.1 SURFACE LIDAR DATA (GROUNDSURE IO)



4.3. GEOTECHNICAL DATA

Geotechnical data presented within a commercially available environmental database is summarised in Table 4.4.

TABLE 4.4 SUMMARY OF GEOTECHNICAL DATA

HAZARD	DESIGNATION
Shrink-Swell Clay	Very low risk
Landslides	Very low risk
Ground Dissolution	Negligible risk
Compressible Ground	Negligible risk
Collapsible Deposits	Very low risk
Running Sand	Very low risk

4.4. RADON RISK POTENTIAL

The Groundsure report indicates the site is situated in an area where less than 1% of homes are above the “Action Level” and that the BGS reports that full radon protective measures are not necessary in the construction of new dwellings or extensions.



4.5. PRELIMINARY GEOTECHNICAL ASSESSMENT

Based on the desk-study information, the following geotechnical assessment has been made:

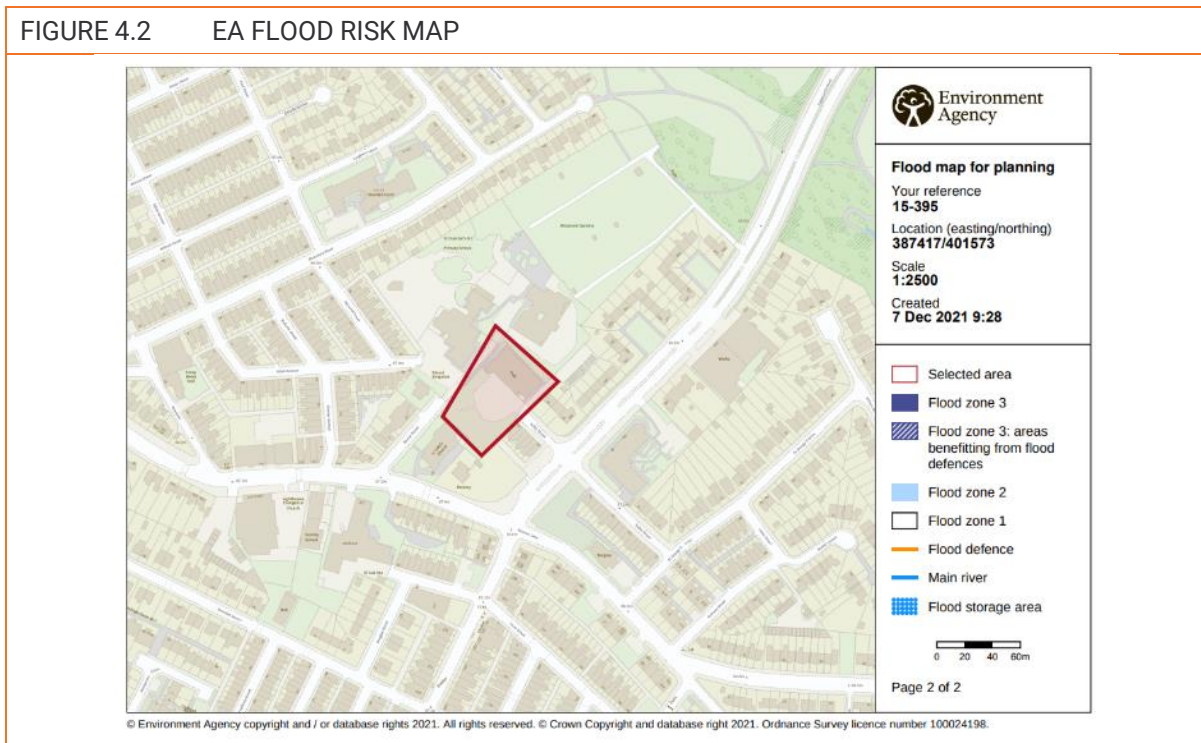
- ✚ Given the predominantly developed nature of the site, it is likely there will be Made Ground fill deposits and obstructions. Existing buildings will require demolition, with all relict foundations grubbing out, prior to the construction of the proposed development.
- ✚ A historically infilled pond is present within the site boundary, which are potential sources of alluvial deposits, silts and possible organic peat deposits in addition to potential depths of Made Ground. Investigation will be required in order to assess these and undertake in-situ geotechnical testing to determine the likely foundation solution for plots in these areas.

4.6. HYDROLOGY

There are no surface water features within 250 m of the subject site.

The site is predominantly located within a currently defined "Flood Risk Zone 1"; defined as land assessed as having less than 1 in 1,000 annual probability of river or sea flooding (< 0.1%), and as such is considered to be unaffected by river flooding. In addition, the Groundsure report states there is a low risk for groundwater flooding to occur at the site. The Environment Agency (EA) Flood Risk Map for the site is presented as Figure 4.2.

FIGURE 4.2 EA FLOOD RISK MAP



Source - <https://flood-map-for-planning.service.gov.uk/>



4.7. INDUSTRIAL LAND USES

Recent industrial land uses are discussed in Table 4.5.

TABLE 4.5 RECENT INDUSTRIAL LAND USES

NAME	CLASSIFICATION	DISTANCE (m)	DIRECTION
Electrical Substation	Infrastructure and Facilities	116	South West
Works	Industrial Features	125	East
Moston Janitorial	Repair and Servicing	131	East
Electrical Substation	Infrastructure and Facilities	241	North West

4.8. SENSITIVE LAND USES

The closest residential properties are located adjacent to the eastern boundary of the site. The site is located within a nitrate vulnerable zone and a SSSI impact risk zone.

4.9. SITE SENSITIVITY ASSESSMENT

The site is assessed to be located within a “Low/Moderate” sensitivity setting as discussed within Table 4.6.

TABLE 4.6 SITE SENSITIVITY ASSESSMENT

SENSITIVITY PROFILE	DISCUSSION	RATING
Groundwater Source Protection Zone or Drinking Water Safeguard Zone	The site is not located within a Groundwater Source Protection Zone or Drinking Water Safeguard Zone.	Low
Distance to the Closest Groundwater Abstraction Point	The closest groundwater abstraction point is located 1.90 km southwest of the site.	Moderate
Aquifer Classification in Superficial Drift Deposits	Secondary Undifferentiated.	Moderate
Aquifer Classification in Bedrock	Secondary A Aquifer.	Moderate
Is the Site Underlain by Low-Permeability Drift to Depths in Excess of 10 m?	The underlying superficial deposits are likely to comprise gravelly sands interbedded with low-permeability clay soils to depths in excess of 5.00 m which may reduce the potential for mobile phase contaminants to migrate towards the bedrock aquifer.	Low
Is the Site Located Within 50 m of a Surface Watercourse?	The site is not located within 50 m of a surface watercourse.	Low
Sensitive Land Uses	The site is located within a nitrate vulnerable zone and a SSSI impact risk zone	Low
OVERALL SITE ENVIRONMENTAL SENSITIVITY		Low/Moderate



5. CONSULTATIONS

5.1. LANDFILL SITES AND WASTE TREATMENT SITES

Historical landfill record records have identified several landfill sites within 500 m of the site boundary. These are summarised in Table 5.1 below.

TABLE 5.1 SUMMARY OF HISTORICAL LANDFILL SITES

RECORD	ENTRIES WITHIN 250 m	DETAILS	DISTANCE
Bluestone Road	169 m	Disposing of environmental permitting regulations.	North East
Church Lane North	259 m	Disposing of commercial, household, environmental permitting regulations waste - last recorded in 1977.	South West
Moston College	392 m	Disposing of commercial, household environmental permitting regulations waste.	West
Lightbowne Phase II, St Marys Road	400 m	Disposing of inert industrial environmental permitting regulations waste between 1980 and 1981 - the license was surrendered in 1996.	South East

There are no current landfill sites within an influencing distance of the site.

However, several waste exceptions have been identified, 144 m south west of the site have a using waste exception. 193 m west of the site six waste exceptions for storing and treating waste.

5.2. REGULATORY DATABASE

The information summarised in Table 5.2 (overleaf) has been obtained from a commercially available environmental database. The summary table only includes records from within 250 m of the subject site and is not otherwise detailed in the report.



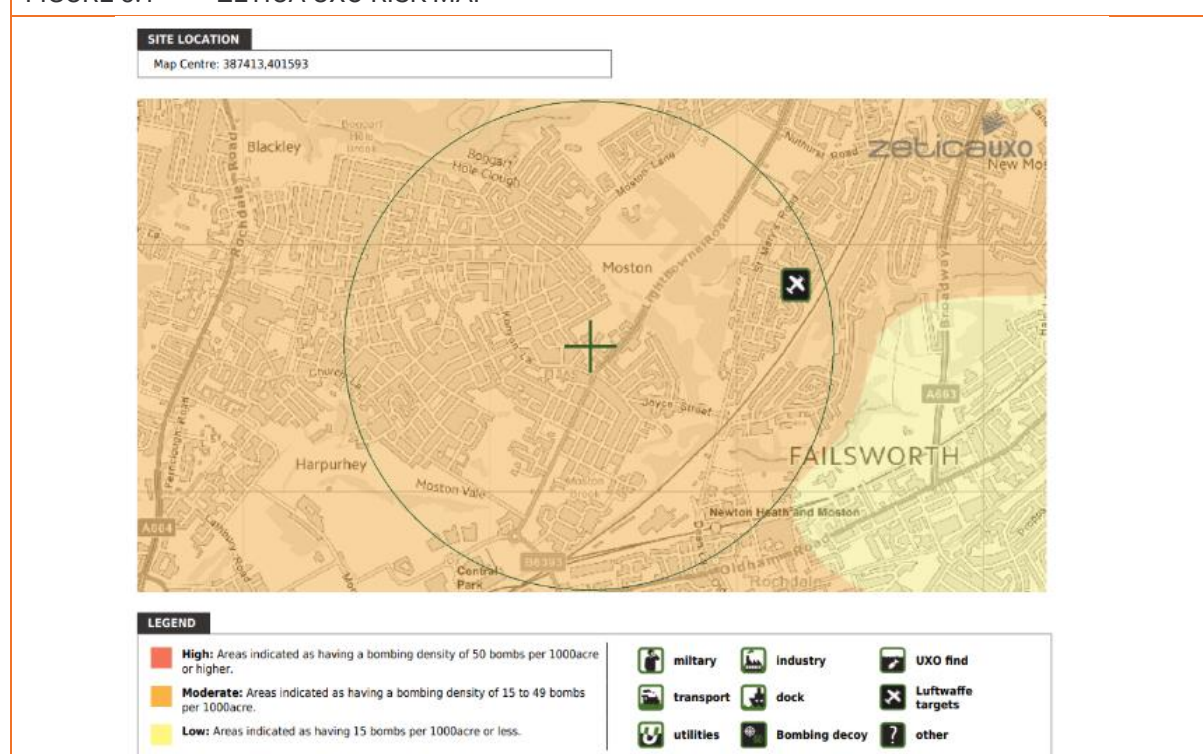
TABLE 5.2 SUMMARY OF ENVIRONMENTAL DATA

RECORD	ENTRIES WITHIN 250 m	DETAILS
Contaminated Land Register Entries and Notices	0	None Identified.
Authorised Industrial Processes (IPC/IPPC/LAPPC)	0	None Identified.
Fuel Stations Entries	0	None Identified.
Licensed Radioactive Substances	0	None Identified.
Enforcements, Prohibitions or Prosecutions	0	None Identified.
Discharge Consents	0	None Identified.
Pollution Incidents	0	None Identified.
Consents Issued Under the Planning (Hazardous Substances) Act 1990	0	None Identified.
Control of Major Accident Hazard (COMAH) Sites	0	None Identified.

5.3. UNEXPLODED ORDNANCE

The regional unexploded bomb risk map from Zetica (2014) indicates that the site is in an area at moderate risk from possible unexploded ordnance (UXO) resulting from the Second World War. The Zetica UXO Risk Map is presented in Figure 5.1.

FIGURE 5.1 ZETICA UXO RISK MAP



Source - <https://zeticauxo.com/downloads-and-resources/risk-maps/>



5.4. INITIAL CONCEPTUAL SITE MODEL

In accordance with EA LCRM (2019) and BSI 10175 (Code of Practice for Investigation of Potentially Contaminated Land), E3P has developed an initial conceptual site model (CSM) to identify potential contamination sources, migration pathways and receptors within the study area. This is summarised within Table 5.3.

ON-SITE SOURCES OF CONTAMINATION

The following potential on-site sources of contamination have been identified:

- ✳ Made Ground due to historical development (heavy metals, non-volatile PAH, hydrocarbon compounds, asbestos and potential ground gas).
- ✳ Infilled pond (heavy metals, non-volatile PAH, hydrocarbon compounds, asbestos and potential ground gas).

OFF-SITE SOURCES OF CONTAMINATION

The following potential off-site source of contamination have been identified:

- ✳ The former Public Wash House / Laundry.
- ✳ Infilled pond (heavy metals, non-volatile PAH, hydrocarbon compounds, asbestos and potential ground gas).
- ✳ Scrapyard (heavy metals, non-volatile PAH, hydrocarbon compounds and asbestos).
- ✳ Coal Yard (heavy metals, non-volatile PAH, hydrocarbon compounds, asbestos and potential ground gas).
- ✳ Mineral Water Works (heavy metals and asbestos).



5.5. CONCEPTUAL SITE MODEL

Following the completion of the intrusive site investigation, chemical analysis and risk assessment, the conceptual model shown in Table 5.3 has been prepared for the site.

TABLE 5.3 CONCEPTUAL MODEL

POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL1 PL2	Heavy Metals, non-volatile PAH, (Made Ground)	Dermal contact. Dermal contact and ingestion.	Future site users. Off-site receptors.	Likely	High	LOW
Assessment: Heavy metals and PAH are considered likely due to Made Ground from historical development and the infilled pond on the western boundary of the site. These sources may pose a short-term risk to construction workers, who may come into contact with impacted soils during earthworks. All construction works must be undertaken using the appropriate Personal Protective Equipment (PPE) to remove this potential risk. Recommendation: Intrusive site investigation to confirm conceptual site model.						
PL3	ACM in Made Ground	Inhalation of dust.	Future site users. Buildings. Off-site land users.	Likely	High	LOW
Assessment: ACM may be present in the Made Ground associated with the demolition of historical buildings that has occurred on site. This may pose a risk to future site users and site neighbours who may come into contact with fibres. These risks can be mitigated through the development of a detailed enabling works strategy following guidance and protocol specified within the Control of Asbestos Regulations (2012) and industry best practice as detailed in CIRIA733 (Asbestos in Soil and Made Ground: A guide to understanding risk). Recommendation: Intrusive site investigation to confirm conceptual site model.						



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL4	Volatile Contaminants such as hydrocarbons (Made Ground)	Inhalation of vapours. Migration through permeable strata and preferential pathways.	Future site users. Off-site receptors.	Likely	Moderate	To be determined
Assessment: No significant sources of volatile contamination have been identified at the site from historical mapping or the site walkover. However, hydrocarbon compounds and S/VOCs may be present in the Made Ground derived from potential fuel leakages from historic use as a carpark. If present, any hydrocarbon impact is likely to be localised and would require hotspot delineation and further assessment. All construction works must be undertaken using the appropriate Personal Protective Equipment (PPE) to remove this potential risk. Recommendation: Intrusive site investigation to confirm conceptual site model.						
PL5	Methane, carbon dioxide (potentially infilled features on and within 250 m of the site)	Inhalation of gas. Migration through permeable strata and preferential pathways. Explosion in confined spaces.	Future site users. Buildings. Off-site land users.	Low likelihood	Moderate	To be determined
Assessment: An infilled pond has been identified along the western boundary, along with others in the vicinity. Pond infill may contain degradable/putrescible organic material which may produce carbon dioxide and methane through anaerobic bacterial respiration. The historic landfill located 169 m northeast of the site also represents a source of ground gas. Glacial Till will likely restrict migration of any ground gas into shallow foundations which may reduce the risk to end-users. Recommendation: Intrusive site investigation and gas monitoring required.						



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL6	Mobile contaminants such as metals, PAHs, hydrocarbons, volatile compounds (Made Ground)	Surface runoff. Migration through permeable strata and preferential pathways. Perched waters migration.	Groundwater (secondary A aquifer).	Likely	Moderate	To be determined
Assessment: Significant sources of mobile contamination have not been identified. Given the absence of a nearby, surface watercourse, abstraction or source protection zone, the underlying secondary A and secondary undifferentiated aquifers would be the primary receptor. Clay within the superficial deposits will reduce the lateral migration of mobile contamination sources. Recommendation: Sampling of groundwater beneath the site.						
PL7	Sulphate (potential ash within Made Ground)	Sulphate attack on concrete.	Building structure.	Likely	Moderate/Low	
Assessment: Likely probability due to presence of Made Ground on site. Elevated sulphates may increase the chance of a sulphate attack and foundations. Recommendation: Intrusive site investigation to confirm conceptual site model.						
PL8	Organic contaminants such as hydrocarbons, solvents (Made Ground)	Ingestion of tainted water supply.	Future site users. Water pipes.	Likely	Moderate/Low	To be determined
Assessment: Likely probability as moderate contamination anticipated at pipeline depth across the west of the site (0.75–1.35 m). Recommendation: Intrusive site investigation to confirm conceptual site model.						



Main exposure pathways:

PL1 = soil ingestion, PL2 = dermal contact and ingestion, PL3 = dust inhalation; PL4/5 = Vapour/Gas Inhalation; PL5/6 = Vertical / Lateral Migration; PL7 = Corrosion of concrete; PL8=Tainting of water supply.



6. CONCLUSIONS AND RECOMMENDATIONS

6.1. SITE SUMMARY

Current Site Use	The subject site is a rectangular shaped parcel of land located to the south of Moston and is currently unoccupied. In the north of the site is the unoccupied St Luke's social club (a one-story brick building, with a mixture of a tiled and flat roof.)
Historical Site Use	The site comprised agricultural fields until 1908, with a pond located on the western boundary from 1893. From 1908, several structures are recorded in the southeast of the site and an embankment in the centre of the site. The pond is no longer marked from 1922. From 1931, the site was recorded as Tennis Grounds in the south and a Hall structure in the north. The Tennis Grounds were no longer recorded from 1950. From 1987, the Hall was recorded as St Luke's Men's Club. There appears to have been no further changes to the subject site, to the present day.
Site Sensitivity	The site is not situated within a Groundwater Source Protection Zone and the closest groundwater abstraction point is located 1.90km south west of the site. There are no surface watercourses located within 50m of the site boundary.

6.2. CONTAMINATED LAND ASSESSMENT

Human Health	The following sources of soil contamination have been identified on-site: ✿ Made Ground is associated with the site's development history and the presence of infilled ponds, which may be a source of heavy metals, PAHs, sulphates and asbestos. ✿ There is also a possibility that fuel spillage may have historically occurred on-site, associated with the former carpark, which may be a source of localised hydrocarbon contamination. ✿ The infilled pond located on the western boundary may also pose a risk of localised ground gas. The overall risk to residential end-users from on-site contamination is considered to be low-moderate.
Controlled Waters	Significant sources of mobile contamination have not been identified. Given the absence of a nearby, surface watercourse, abstraction or source protection zone, the underlying secondary A and secondary undifferentiated aquifers would be the primary receptor. Clay within the superficial deposits will reduce the lateral migration of mobile contamination sources.



Ground Gas	Infilled pond on-site and a historic landfill site 169 m northeast of the site are potential sources of hazardous ground gas. Carbon dioxide and methane have associated asphyxiation and explosive risks, respectively. If present, the risks can be appropriately mitigated through the careful design of building structures.
Potable Water	PE pipe is likely to be suitable for the proposed development. This will need to be confirmed following site enabling works.

6.3. GEOTECHNICAL ASSESSMENT

Geological	The BGS boreholes located within 250 m of the site boundary indicate clay drift deposits to be present to at least 10.00m bgl. There are no running sands noted to be underlying the site. There are no peat deposits noted within surrounding BGS boreholes, however, organic deposits may be present within the vicinity of the infilled pond feature.
Civil and Structural	Foundations and relict structures may be present beneath the present building and the footprint of the former buildings. There are no retaining walls or slopes present within the site boundary.
Abnormal Foundations	Further assessment will be required to determine an appropriate foundation solution.

END OF REPORT



APPENDIX I

LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between E3P and the client as indicated in Section 1.3.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover, reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover, no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials, this is for indicative purposes only and do not constitute or replace full and proper surveys.
8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
9. E3P cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by E3P is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by E3P in this connection without their explicit written agreement there to by E3P.
10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.



APPENDIX II

GLOSSARY

TERMS

ACM	Asbestos-containing material	MMP	Materials management plan
ADS	Acoustic design statement	ND	Not detected
AST	Above-ground storage tank	NDP	Nuclear density probe
BGS	British Geological Survey	NMP	Noise management plan
BSI	British Standards Institute	NPSE	Noise policy statement for England
BTEX	Benzene, toluene, ethylbenzene, xylenes	NR	Not recorded
CA	Coal Authority	PAH	Polycyclic aromatic hydrocarbon
CBR	California bearing ratio	PCB	Polychlorinated biphenyl
CIEH	Chartered Institute of Environmental Health	PI	Plasticity index
CIRIA	Construction Industry Research Association	PID	Photo ionisation detector
CLEA	Contaminated land exposure assessment	POS	Public open space
CML	Council of Mortgage Lenders	PPE	Personnel protective equipment
CoC	Contaminants of concern	ProPG	Professional practice guidance
CSM	Conceptual site model	QA	Quality assurance
DNAPL	Dense non-aqueous phase liquid (chlorinated solvents, PCB)	SGV	Soil guideline value
DWS	Drinking water standard	SPH	Separate-phase hydrocarbon
EA	Environment Agency	SPT	Standard penetration test
EQS	Environmental quality standard	SVOC	Semi-volatile organic compound
FFL	Finished floor level	TPH	Total and speciated petroleum hydrocarbon
GAC	General assessment criteria	TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group)
GL	Ground level	UKWIR	United Kingdom Water Infrastructure Risk
GSV	Gas screening value	UST	Underground storage tank
HCV	Health criteria value	VCC	Vibro-concrete column
ICSM	Initial conceptual site model	VOC	Volatile organic compound
LEL	Lower explosive limit	VRSC	Vibro-replacement stone columns
LMRL	Lower method reporting limit	VSC	Vibro-stone columns
LNAPL	Light non-aqueous phase liquid (petrol, diesel, kerosene)	WHO	World Health Organisation
MCV	Moisture condition value	WRAP	Waste and Resources Action Programme
MIBK	Methyl isobutyl ketone	WTE	Water table elevation



Sulby Street

Phase I Geoenvironmental Site Assessment

February 2022

m	Metres	ppm	Parts per million
km	Kilometres	mg/m³	Milligram per metre cubed
% v/v	Percent volume in air	m bgl	Metres below ground level
mb	Millibars (atmospheric pressure)	m bcl	Metre below cover level
l/hr	Litres per hour	mAOD	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts per billion)	kN/m²	Kilonewtons per metre squared
ppb	Parts per billion	µm	Micrometre
mg/kg	Milligrams per kilogram (parts per million)	SSRT	Site Specific Remediation Target
PSD	Particle Size Distribution	DD	Dry Density
CL:AIRE	Contaminated Land: Applications in Real Environments	Mc	Moisture Content
ρ	Bulk Density	GPR	Ground Penetrating Radar
NDP	Nuclear Density Probe	FFL	Finished Floor Level
LEL	Lower Explosive Limit	UKWIR	UK Water Industry Research
CIRIA	Construction Industry Research and Information Association	LOD	Limit of Detection



APPENDIX III

DRAWINGS

Sulby Street

Phase II Geoenvironmental Site Assessment

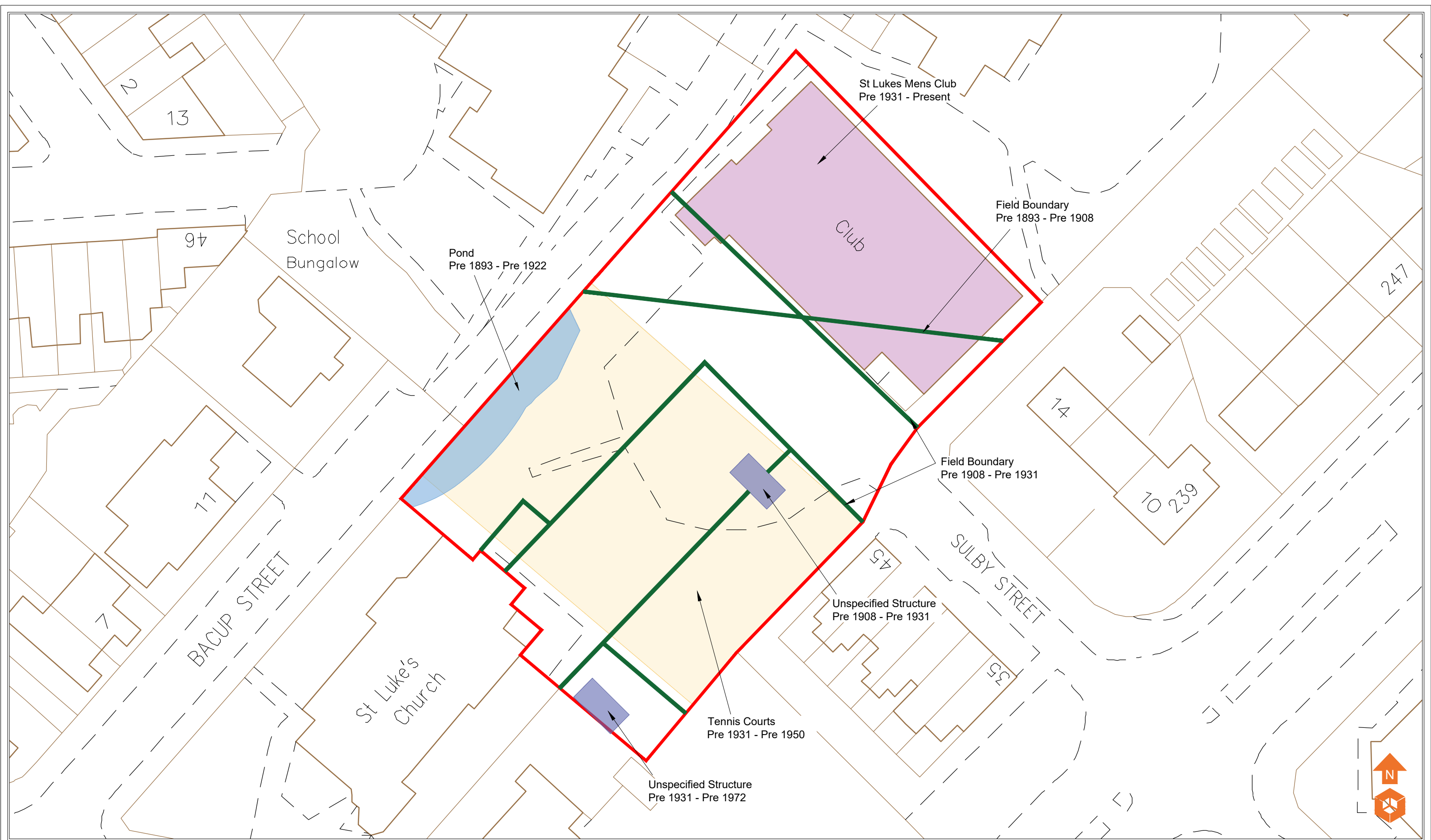
February 2022

DRAWING 15-395-001 – SITE LOCATION PLAN

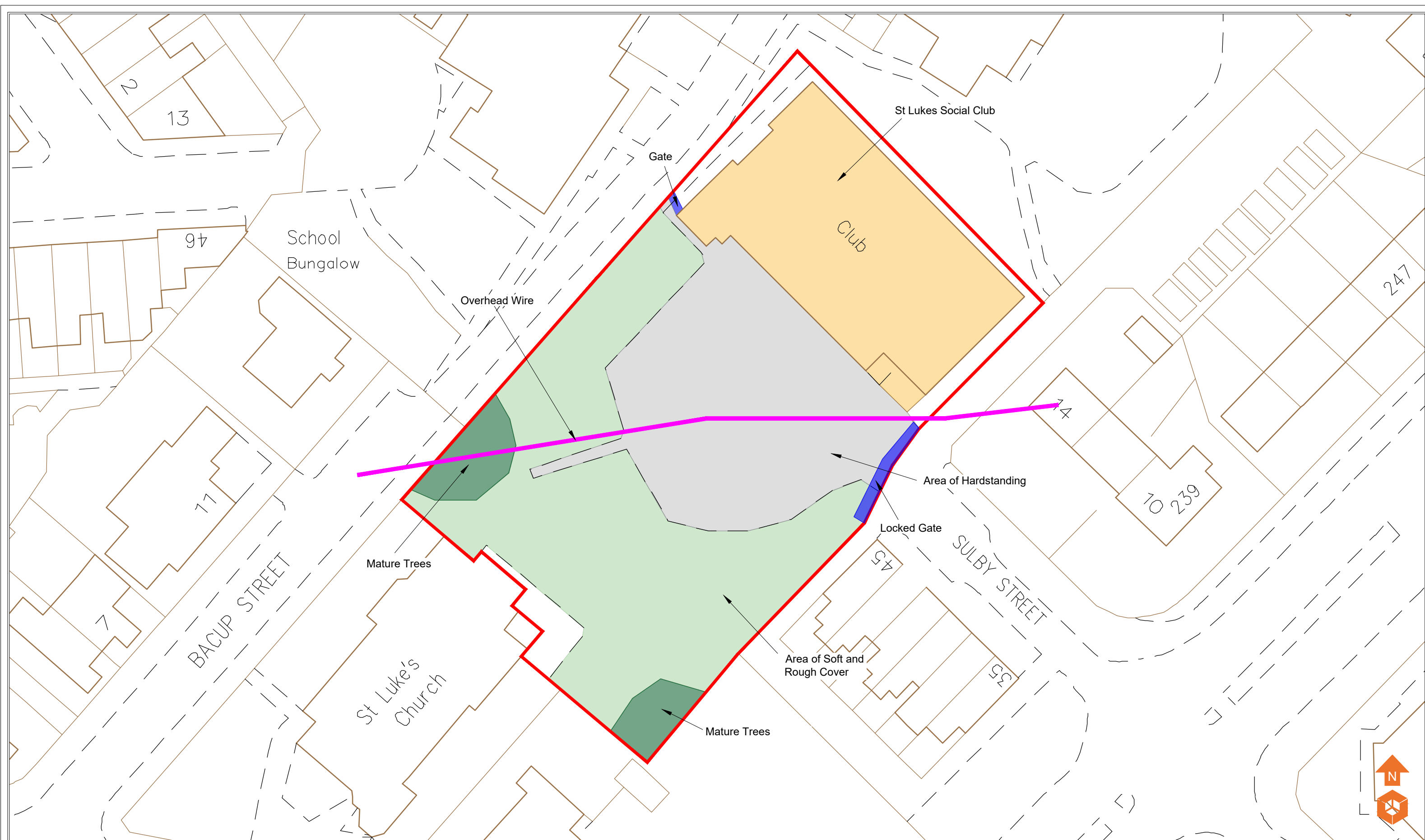




	Notes:					Client: Challenger Homes	Job No: 15-395	Date: 18.02.2022	 Environmental Engineering Partnership Ltd Taylor Road, Trafford Park Urmston, Manchester, M41 7JQ Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk	
							Drawing No: 002	Scale: NTS @ A3		
						Job Title: Sulby Street, Moston	Drawing Title: Proposed Development Plan			The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.
	P1 P1	REVB REVA	18.02.2022 20.01.2022	EB CB	BH BH					
	Phase	Issue	Date	Drawn	Checked					



Historical Features Former Pond Former Field Boundary Former Unspecified Structures Former Tennis Courts St Lukes Mens Club	Notes:					Client: Challenger Homes		Job No: 15-395		Date: 20.01.2022		e3p Environmental Engineering Partnership Ltd Taylor Road, Trafford Park Urmston, Manchester, M41 7JQ Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk													
								Drawing No: 003		Scale: NTS @ A3															
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P1	REVA	20.01.2022	CB	BH																					
Phase	Issue	Date	Drawn	Checked																					



Site Features St Lukes Social Club Overhead Wire Area of Hardstanding Area of Soft and Rough Cover Mature Trees Gate	Notes:					Client:		Job No:		Date:		e3p Environmental Engineering Partnership Ltd Taylor Road, Trafford Park Urmston, Manchester, M41 7JQ Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk															
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Phase	Issue	Date	Drawn	Checked																							
						Sulby Street, Moston			Site Features Plan																		

APPENDIX IV

PHOTOGRAPHS

PLATE 1 VIEW OF SITE FROM SULBY STREET



PLATE 2 VIEW OF SITE FACING SOUTH



PLATE 3 VIEW OF SITE FACING NORTH



PLATE 4 VIEW OF SITE FROM BACUP STREET



PLATE 5 VEGETATION IN THE SOUTH EAST OF THE SITE



PLATE 6 MANHOLE COVER ALONG THE EASTERN SIDE OF ST LUKES SOCIAL CLUB



APPENDIX V

HISTORICAL MAPS

Site Details:

SULBY STREET, MANCHESTER,
M40 5HY

Client Ref: 15-395-GC-A
Report Ref: GS-8381358
Grid Ref: 387410, 401565

Map Name: County Series

Map date: 1891

Scale: 1:10,560

Printed at: 1:10,560



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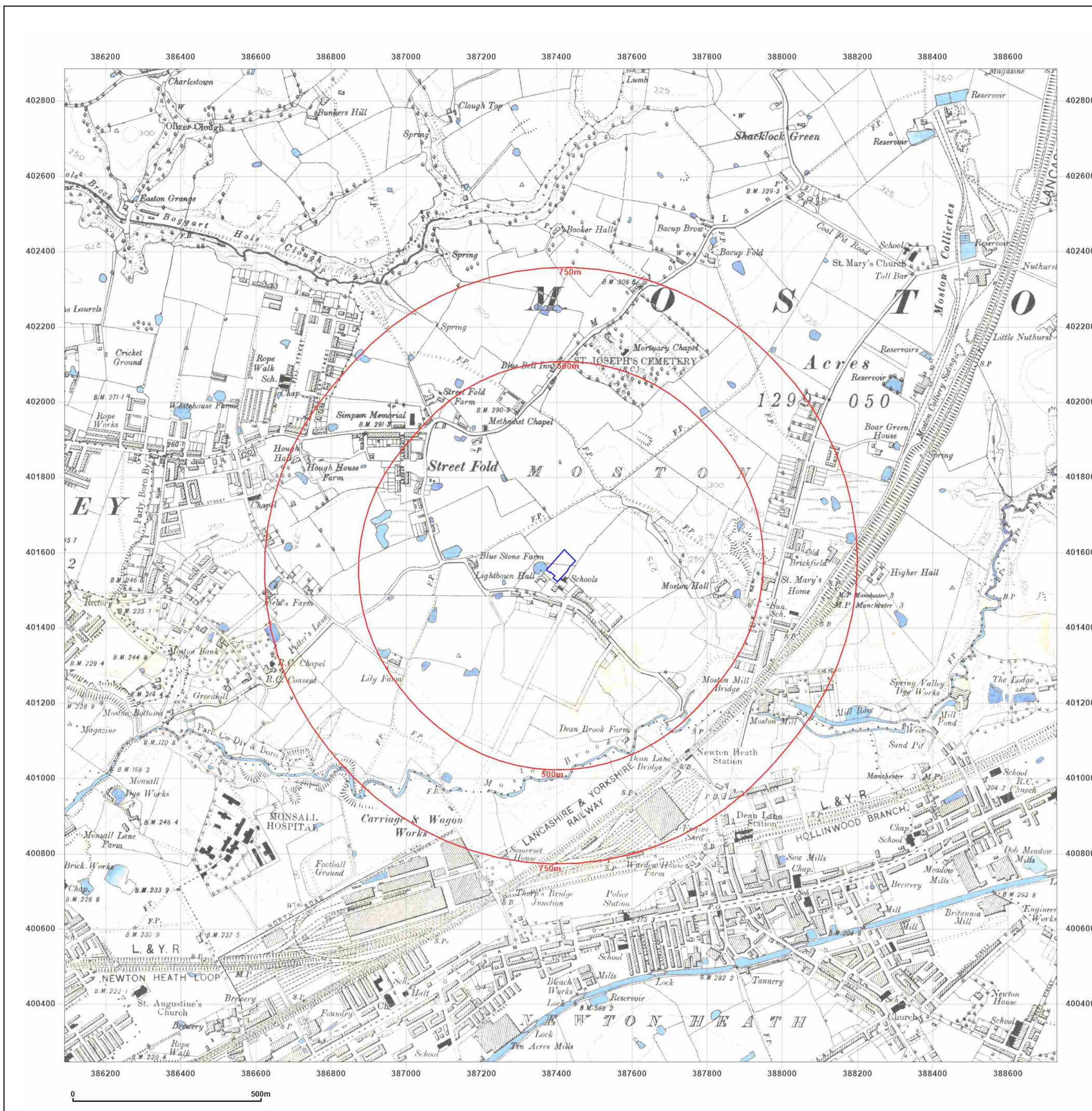


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Site Details:

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Client Ref: 15-395-GC-A
Report Ref: GS-8381358
Grid Ref: 387410, 401565

Map Name: County Series

Map date: 1906

Scale: 1:10,560

Printed at: 1:10,560



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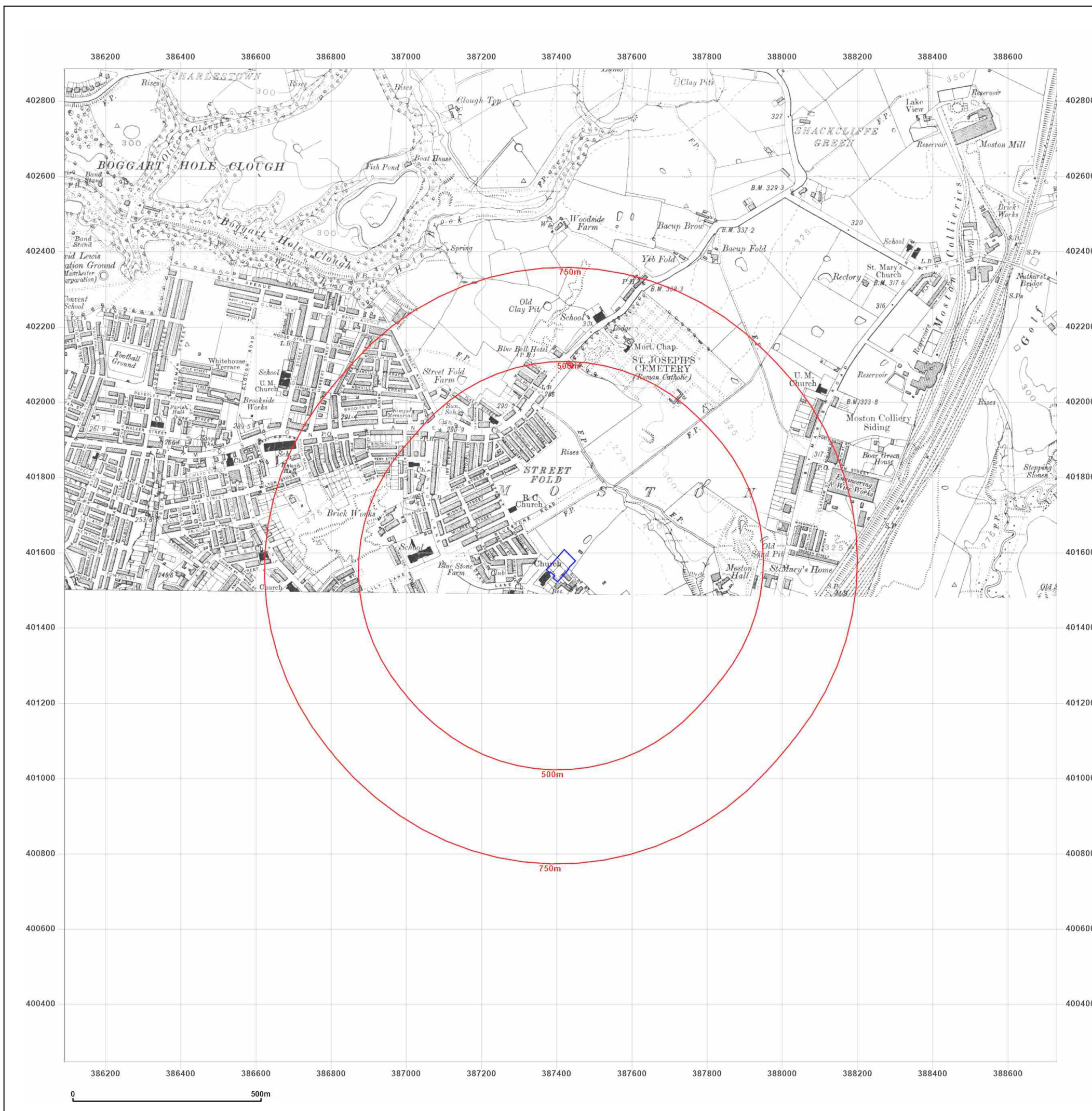


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Report Ref: GS-8381358
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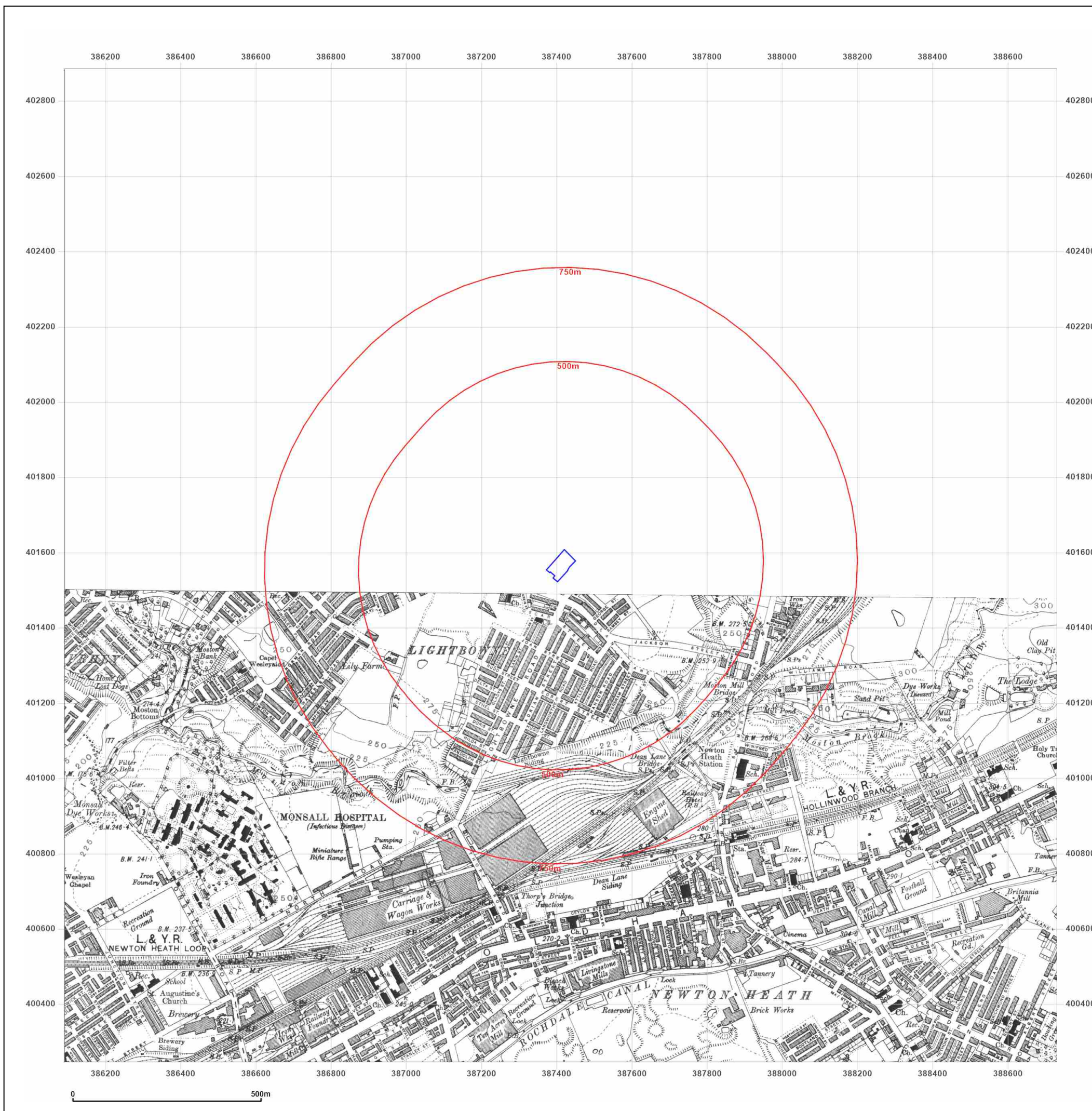


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Report Ref: GS-8381358
Grid Ref: 387410, 401565

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