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# 4Geo-Environmental Desk Study, Kenyon Lane, Moston, Manchester

## Prepared for
## Adelphi Developments Ltd

**July 2020** **10/1559/001 Rev. 04**

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# Executive Summary

| | |
|---|---|
| **Client** | Adelphi Developments Ltd |
| **Location** | 110 and 112 Kenyon Lane, Moston, Manchester, M40 9DH, at OS grid reference 387240, 401470. |
| **Description** | The site is an irregularly shaped parcel of land with an area of approximately 0.42 hectares. The site currently comprises a DIY store (Deanway DIY) within the largest building on the site, a former cinema, covering the majority of the site. On the west of the site is a plumbing supplies company (Steve Sutton Plumbing and Heating Supplies) within a converted residential building and sheds. There are also hardstanding 'yard' areas currently used for storing construction supplies. |
| **Development** | The proposed development comprises a four-storey apartment block with associated parking spaces, soft landscaping and a communal garden. |
| **Site History** | Historical OS maps dating back to 1850 indicate the site to have been part of agricultural land in the 1800s with a pond in the east of the site. The west of the site was part of a brick works in the early 1900s before later being the site of a cinema, which was later replaced by a newer cinema and the building that is currently used as a DIY store was constructed. In the wider area residential development dominates, although a number of clay pits were noted historically. |
| **UXO** | The site is indicated to be at 'moderate' risk from UXO. A pre-desk study assessment (PDSA) has been obtained from Zetica, which concluded that a "detailed desk study, whilst always prudent, is not considered essential in this instance. |
| **Geology** | Geological mapping indicates that the site is underlain by superficial deposits of Till (diamicton). Bedrock underlying the site comprises the Pennine Middle Coal Measures Formation (mudstone, siltstone and sandstone). |
| **Mining** | According to the Coal Authority, the site is located within a coal mining reporting area, a Consultants Coal Mining Report indicates that one seam was mined below the site at a depth of 447m, there are no shallow mining features on or in the vicinity of the site. Based on the depth of the mining, and lack of shallow mining activity, it is considered that the site is not at risk from coal mining.<br><br>There are three BGS recorded mineral sites located within 500m of the site, all of which were opencast mine removing clay.<br><br>A review of historical maps did identify evidence of historical mining activities in the area including a brick works on the site, although it is not clear whether extraction of clay occurred on the site or just the production of bricks. |
| **Flood Risk** | According to Environment Agency records, the site is located within an area not susceptible to flooding from rivers or the sea. The site is located within a BGS groundwater flood susceptibility mapping area and is in an area with limited potential for groundwater flooding to occur. |
| **Environmental Setting** | The closest surface water feature is located 442m north-east. Based on mapping this appears to be a small stream or brook located within a wooded area.<br>The superficial deposits underlying the site are classified as a Secondary Undifferentiated Aquifer and the bedrock is classified as a Secondary A Aquifer. The site is not located within a Groundwater Source Protection Zone and there are no groundwater abstraction points within 500m of the site. |

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**Landfill**

There are four historical landfill sites within 500m of the site and a further four within 1km, the closest of which is located 134m south-west of the site. Based on the age of infilling, the identified landfills could have a ground gas generation potential of 'moderate' to 'high'.

There are ten recorded instances of potentially infilled land, two non-water and eight water, located within 250m of the site. The closest area is a non-water entry recorded on the site which the mapping shows it affects the west of the site and is related to the former brickworks. The bulk of the entries are related to infilled ponds. Although not listed within the environmental database report, the historical mapping also shows a pond on the east of the site, possibly now infilled.

**Potential Geotechnical Constraints**

Potential geotechnical constraints on the site include the following:

- The potential infilled land associated with the former brickworks
- The potential infilled pond located in the north-east of the site

**Further Works**

The Phase I Risk Assessment and Preliminary Conceptual Site Model has identified plausible contaminant linkages. As a result, the following additional works / precautions are recommended as a minimum:

- Carry out an intrusive site investigation to confirm ground conditions at the site. The ground investigation should allow for excavations / boreholes to be taken through any Made Ground soils and into the underlying natural strata.
- In-situ testing / geotechnical soil sampling should be carried out during the intrusive investigation to provide adequate recommendations for foundation design.
- Chemical testing of shallow soils, to include heavy metals and metalloids, hydrocarbons and asbestos screening to confirm contaminant levels in the soils and to confirm whether pollutant linkages are present at the site.
- Combined gas and groundwater monitoring wells should be installed in selected boreholes with an initial 6 no. return monitoring visits undertaken to establish if gas protective measures are required for the proposed new structures

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Appendix V Mining and Ground Stability Report
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Appendix VII Site Sensitivity & Flood Risk Maps
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# 1.0 Introduction

## 1.1 Background

Clancy Consulting Limited has been instructed by Adelphi Developments Ltd to carry out a Geo-environmental Appraisal report for a site located at 110 and 112 Kenyon Lane, Moston, Manchester, M40 9DH.

The proposed development comprises a four-storey apartment block with associated parking spaces, soft landscaping and a communal garden.

A site location plan and proposed layout plan are presented in Appendix I.

## 1.2 Objectives

The objectives of this investigation are summarised below:

- Provide a review of the sites land use history by reference to ordnance survey maps of the area.
- Assess the environmental setting, geology, hydrology, hydrogeology, mining and subsidence history of the site and surrounding area.
- Develop a detailed 'preliminary risk assessment' and 'conceptual site model' with regard to potential contamination sources, pathways and receptors.
- Consider the potential risk to end users of the site from hazardous ground gas.
- Consider and assess the potential risk of the site from UXO.
- Provide recommendations regarding the requirement for further investigations, if required, to satisfy the Local Planning Authority.

## 1.3 Limitations of the Study

Clancy Consulting Limited cannot be held responsible for any omissions, misrepresentation, errors or inaccuracies with the supplied third party report information. The report is written in the context of an agreed scope of work and budget and should not be used in a different context. New information or improved practices and changes in legislation may require a reinterpretation of the report in whole or in part.

Clancy Consulting Limited reserves the right to amend either conclusions or recommendations in light of any further information that may become available. The report is provided for the sole use of Adelphi Developments Ltd for the objectives discussed previously only and is confidential to them.

The report may not be relied upon by any other party without prior written consent of Clancy Consulting Limited. Those using this information in subsequent assessments or evaluations do so at their own risk.

# 2.0 Desk Study

## 2.1 General

Background information was sought from the following sources:

- Ordnance Survey Historical Mapping (selected copies included in Appendix II)
- Zetica UXO Risk Mapping (Appendix III)
- British Geological Survey (BGS) Sheets (Appendix IV)
- Mining and Ground Stability Report (Appendix V)
- Coal Mining Reports (Appendix VI)

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- Site Sensitivity & Flood Risk Maps (Appendix VII)
- Environmental Datasheets (Appendix VIII)

## 2.2 Site Setting and Description

The site is located at 110 and 112 Kenyon Lane, Moston, Manchester, M40 9DH, at national grid reference 387240, 401470. The site is an irregularly shaped parcel of land with an area of approximately 0.42 hectares. The site currently comprises a DIY store (Deanway DIY) within the largest building on the site, a former cinema, covering the majority of the site. On the west of the site is a plumbing supplies company (Steve Sutton Plumbing and Heating Supplies) within a converted residential building and sheds. There are also hardstanding 'yard' areas currently used for storing construction supplies.

The site is situated in a predominantly residential area, with some commercial properties. The site is bound to the south by residential houses and a disused Scout Hut surrounded by overgrown land. To the east is a church, Lightbowne Evangelical Church. To the north is Kenyon Lane, with residential properties beyond and a salon, takeaway food restaurant, dentist and funeral home. To the west are further residential properties.

## 2.3 Site History

To investigate the development history and previous land uses at the site and surrounding area, historical Ordnance Survey (OS) maps were examined. Selected copies of the maps are presented in Appendix II.

Table 1 below is not intended to provide a comprehensive review of all the changes which have occurred at the site and instead provides a summary of the most salient points. The most significant historical land uses are highlighted in bold text for ease of reference.

**Table 1 – Site History**

| Date(s) | Site | Surrounding Land |
|---|---|---|
| 1848 | The site is part of an area of **agricultural land**. There is **road** shown cutting across the site from the north-west terminating on the south-east boundary of the site. | The surrounding area is predominantly **agricultural**, with a number of **farms** in the surrounding area, the closest is Bluestone Farm 60m north.<br>A road borders the north of the site running east-west.<br>There are number of **ponds** located in the surrounding area, the closest of which are located 70m east, 95m north-east and 103m north-west.<br>**Moston Brook** passes approximately 475m south of the site flowing from east to west.<br>There is a **railway** located 600m south. |
| 1893 | A **pond** is shown in the northeast of the site, approximately 35m in diameter. | The road directly north is named Dean Lane.<br>Further **ponds** are noted in the immediate surrounding area, the closest of which is 20m north.<br>**Residential** houses are shown from 15m east.<br>A **clay pit** is shown 291m north-west.<br>The railway to the south is named Lancashire and Yorkshire and has expanded to include **sidings, an engine shed and works**.<br>**Old Sand Pits** are shown 650m northeast and 700m to the east. |
| 1908 - 1909 | The road and pond are no longer shown on site.<br>The west of the site is within the site boundary of **a brick works**. | A **church** is shown immediately to the east and a **brick works** is shown 30m south.<br>A **club and bowling green** are shown 20m north.<br>Increased **residential development** is shown to the north-west, east and south-east.<br>The ponds in the surrounding area are no longer shown, with the exception of one pond located 95m north-east.<br>The railway has further expanded with additional **railway lines** and supporting buildings and is now present from 500m south of the site. |

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| Date(s) | Site | Surrounding Land |
|---|---|---|
| 1923 - 1933 | A **cinema building** is shown on the east of the site.<br>A track from Dean Lane to a triangular parcel of land on the south-west of the site, with a **number of buildings** present, is shown.<br>The brick works is no longer shown. | Further **residential development** is shown in the surrounding area.<br>The brick works to the northwest are no longer shown however the area is still labelled as a **clay pit**.<br>The railway has further expanded, with sidings located 410m south. |
| 1938 | No pertinent changes. | Brendon Street is shown immediately south, with further **residential development** shown in the surrounding area.<br>An unnamed building is shown 5m south.<br>A **clay pit** is shown 150m south-west.<br>A **brick works** is shown 290m north-west.<br>**Mineral Water Works** are shown 300m north-east. |
| 1948 - 1952 | The cinema building in the east is no longer shown.<br>The **Adelphi Cinema** is shown in the centre of the site, in its current location.<br>A triangular parcel of land in the south-west of the site appears to have a series of **small unnamed buildings** present. | Further **residential deve**lopment is shown in the surrounding area.<br>The building 5m south is Century Hall. The Moston Labour Hall is now present 15m south-east.<br>**Refuse heaps** are shown 180m south-west, in the location of the clay pit and 300m north-west associated with the brick works.<br>A **shelter** and **public wash house** are located 150m east and 50m north-east respectively. |
| 1975 – 1978 | No pertinent changes. | Dean Lane is now labelled as Kenyon Lane.<br>A **scrap metal** yard is shown 72m north.<br>A **coal yard** is shown 95m north.<br>Precast **concrete works** are shown 240m north-west.<br>The public wash house to the north-east is now a **public laundry.**<br>Bluestone Farm is now longer shown.<br>The sidings to the south are no longer present. |
| 1977 - 1988 | The cinema is listed as a **Hall**. | The brick works to the north-west are no longer shown. An **industrial estate** is located 230m north-west. |
| 1985 - 1992 | The cinema is now labelled as **Adelphi Social Club.** | Century Hall to the south is now **residential housing**. The Labour Hall to the south is no longer present.<br>A **Scout Hall** is shown 8m south.<br>More residential properties are shown to the south, including where allotment gardens were previously noted.<br>The coal yard to the north is no longer shown.<br>A **garage** is noted 48m east.<br>The Mineral Water Works is now listed as an **unspecified works.** |
| 2020 | No pertinent changes. | The garage to the east is no longer present.<br>Further **residential development** is shown in the surrounding area, including opposite the site, in the former location of the club,. |

An internet search for the site indicated that the current hardware store building was originally the Adelphi Cinema and was built in 1937 and closed in 1962. It was later used as a bingo club which later closed. It was more recently taken over as the hardware store.

## 2.4 Unexploded Ordnance (UXO) Risk Assessment

A review of publicly available bomb risk mapping from Zetica (accessed June 2019) indicates that the site is within a ‘moderate’ bomb risk zone. A pre-desk study assessment (PDSA) has been obtained from Zetica, which concluded that a “detailed desk study, whilst always prudent, is not considered essential in this instance.

The review of historical maps did not identify any damage on site or in the immediate surrounding area.

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A copy of the bomb risk mapping for the local area and the PDSA is presented in Appendix III.

## 2.5 Geology

The 1:50,000 British Geological Survey (BGS) scale map for the area indicates that the site is underlain by superficial strata comprising Till (Diamicton) over bedrock of the Pennine Middle Coal Measures Formation (mudstone, siltstone and sandstone).

Geological faults are noted in the surrounding area bedrock, the closest of which are located 170m east and 200m west of the site.

Artificial ground is noted in the surrounding area however the closest deposits are located 600m south of the site.

The nearest historical boreholes record by the BGS (SD80SE92/A to D) are located from 160m to 410m east of the site. The boreholes, undertaken as part of a sewer construction, identified Made Ground to depths between 0.38m and 1.83m below ground level (bgl) which was underlain by superficial strata to a maximum proven depth of 10.05m, generally comprising sandy clay, with bands of sand and silt. Another borehole record by the BGS (SD80SE46) located 360m north-west proved superficial soils to a depth of 33.22m bgl. Bedrock was not encountered.

Geological maps of the local area are provided in Appendix IV.

## 2.6 Soil Geochemistry

According to the BGS National Geoscience Information Service no elevated background concentrations of arsenic, cadmium, lead or zinc are anticipated in the natural soils beneath the site.

It is noted that the soil underlying the site may have chromium concentrations between 90 and 120 mg/kg however these concentrations are not considered to be significant.

It should be noted that the soil geochemistry has been estimated solely on the basis of published geology and is not based on empirical data.

## 2.7 Mining & Ground Stability

According to Coal Authority, the site is located within a coal mining reporting area and therefore a ‘Mining and Ground Stability’ report was obtained through Envirocheck. The report indicated the site may be at risk of mining instability and noted “inconclusive coal mining”. The mining report also noted four instances of potential mining areas within 1km of the site, all related to coal mining, with the closest located 404m east of the site.

In addition to the above; a Consultants Coal Mining Report was obtained from the Coal Authority. A non-residential CON29M was also provided. The Coal Authority reports indicate past underground mining of the Roger seam at a depth of 447m bgl, last worked in 1900. There are no recorded shallow workings and no probable unrecorded shallow workings. There are no outcrops, faults or spine roadways at shallow depth beneath the site. There are no mine entries recorded within 100m.

There are three BGS recorded mineral sites located within 500m of the site, all of which were opencast mine removing clay; Silton Street located 198m west, Tulketh Street Brickworks located 398m west and Moston Brickworks located 425m south-west.

The Envirocheck mining report notes the presence of extractive industries or potential excavations on site, namely the brick works noted on the 1908-1909 mapping which encroached onto the western part of the site. An unspecified pit is also noted as being located 70m south of the site in 1922.

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A review of historical maps did identify evidence of historical mining activities in the area, namely brick works and clay pits as noted above, including a brick works on the site, although it is not clear whether extraction of clay occurred on the site or just the production of bricks.

The environmental database report indicates that there are very low / no risks at the site from ground stability hazards including landslides, ground dissolution, collapsible ground, running sand hazards, compressible ground and shrinking or swelling clays.

Given the depth of the historic underground mining (447m bgl) and the absence of known and probable shallow mining activity at the site, it is considered that the site is not at risk from historic coal mining and no further coal mining risk assessment is required.

The Envirocheck Mining and Ground Stability report is provided in Appendix V and the Coal Authority CON29M and Consultants reports are provided in Appendix VI.

## 2.8 Hydrogeology

According to the Environment Agency groundwater vulnerability maps, the superficial deposits underlying the site are classified as a Secondary Undifferentiated Aquifer and the bedrock is classified as a Secondary A Aquifer.

The site is not located within a groundwater Source Protection Zone (SPZ).

There are no active groundwater abstraction points, including for potable water supply, recorded within 1km of the site.

There are no groundwater discharge consents recorded within 1km of the site.

## 2.9 Hydrology

The environmental database report identifies the closest surface water feature as being located 442m north-east of the site. A review of mapping indicates that this water feature is a small stream or brook located within a wooded area which may be connected to Moston Brook, located 750m south-west, via culverting.

No currently active surface water abstraction licences have been recorded within 1km of the site. Two surface water discharge consents have been recorded within 500m of the site the closest of which is located 451m north-east of the site and is associated with storm sewage overflow. This license is noted as being revoked.

There are no pollution incidents to controlled waters recorded within 500m of the site.

## 2.10 Flood Risk

According to Environment Agency records, the site is not located within an area susceptible to flooding from rivers or the sea. The site is located within a BGS groundwater flood susceptibility mapping area and is in an area with limited potential for groundwater flooding to occur.

However, the Local Authority may have the site listed under their Critical Drainage Area Plan and a Flood Risk Assessment may still need to be undertaken. Consultations should be undertaken with the Local Authority as part of the drainage strategy to verify their requirements.

Copies of the hydrological site sensitivity and flood risk maps are included in Appendix VII.

## 2.11 Radon Risk Potential

The Radon Guidance on protective measures for new dwellings indicates that the site is in a lower probability radon area, with less than 1% of homes estimated to be at or above the action level. As such, radon gas protective measures are not required in new buildings at the site.

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## 2.12 Landfill Sites

There are four historical landfill sites identified within 500m of the site and a further four within 1km. Historical landfills located within 500m of the site are:

- 'Land Adjacent to Church Lane North', located 134m south-west of the site. This site is listed as accepting commercial and household waste until 1977. No input start date is provided within the Envirocheck report.
- 'Land at Moston College', located 230m west of the site. This site is listed as accepting commercial and household waste from 1947. No last input date is provided.
- 'Land off Bluestone Road', located 339m northeast of the site. No information is supplied regarding deposited waste or waste acceptance dates.
- 'Lightbowne Phase II', located 418m southeast of the site. This site is listed as accepting inert and industrial waste and accepted waste between 1980 and 1981.

There are no BGS recorded landfill sites, registered landfill sites or local authority registered landfill sites within 1km of the site. There are no licenced waste management facilities within 500m of the site.

In accordance with BS8576:2013 'Guidance on Investigations for Ground Gas', based on the age of infilling the identified landfills could have a ground gas generation potential of 'moderate' to 'high'.

There are ten recorded instances of potentially infilled land within 250m of the site, two 'non-water' and eight 'water'. These are located:

- On-site (non-water) infilled circa 1990.
- 79m south-east (water) infilled circa 1848.
- 112m north-east (water) infilled circa 1910.
- 132m west (water) infilled circa 1909.
- 137m north-west (water) infilled circa 1894.
- 170m south (water) infilled circa 1956.
- 208m south-west (water) infilled circa 1923.
- 210m west (non-water) infilled circa 1990.
- 218m south (water) infilled circa 1848.
- 220m northwest (water) infilled circa 1894.

Whilst an area of infilled land (non-water) has been identified on the site, mapping indicates that this is likely associated with the former brickworks which were present in the west of the site. Historical mapping also shows a pond in the north-east of the site from circa 1893 to 1909.

In accordance with BS8576:2013 'Guidance on Investigations for Ground Gas', based on the age of infilling, the identified areas of infilled land (water and non-water) are likely to have a very low gas generation potential. However; infilling in 1990 on-site may have anywhere from a 'very low' to 'high' gas generation potential depending on the materials used for infilling. The infilled pond identified on historical mapping is likely to have a 'very low' gas generation potential.

In addition to this above, Made Ground associated with the construction of the buildings and car parking currently present on site is to be expected, though this is likely to be limited to construction materials and therefore would not be capable of producing hazardous ground gases.

It should also be noted that the site is underlain by coal measures strata which may be capable of producing hazardous ground gases, particularly $CO_2$.

## 2.13 Industrial Land Uses

One active contemporary trade directory entry is located within 250m of the site, identified as being 238m north-west of the site and comprising waste disposal services.

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There are no Local Authority Pollution Prevention and Control authorisations recorded within 250m of the site.

### 2.14 Sensitive Land Uses

The site is located within an area designated as a surface water nitrate vulnerable zone.

Ancient woodland and local nature reserves are located 818m and 771m north of the site.

### 2.15 Potential Geotechnical Constraints

Potential geotechnical constraints on the site include the following:

- The potential infilled land associated with the former brickworks
- The potential infilled pond located in the north-east of the site

# 3.0 PHASE 1 RISK ASSESSMENT

### 3.1 General

The “suitable for use” approach is adopted for the assessment of contaminated land and remedial measures are only undertaken where unacceptable risk to human health or the environment can be proven when considering the proposed use of the site and environmental setting.

A risk assessment process should be carried out to determine potential hazards to human health and the environment and be based on the “source” “pathway” “receptor” principal. For a potential risk to be present there must be a viable pollutant linkage whereby a contamination source may impact upon a receptor. The absence of one or more of these key components (source, pathway or receptor) prohibits a viable pollution linkage being formed.

### 3.2 Preliminary Conceptual Site Model

In accordance with CLR11 “Model Procedures for the Management of Land Contamination” (2004) and BSI 10175 “Code of Practice for Investigation of Potentially Contaminated Land” (2011), a Preliminary Conceptual Site Model was developed to identify potential contamination sources, migration pathways and receptors within the study area.

The following potential contamination sources have been identified:

- Possible Made Ground and contamination associated with historic development and demolition at the site.
- Possible Made Ground and associated mobile contamination in the area surrounding the site from historical and current land uses including railway lines, refuse tips, historic landfill sites, construction and demolition of nearby buildings, brick works, clay pits and infilled land (water and non-water).
- Possible mobile hazardous ground gas associated with Made Ground soils at the site and in the surrounding areas (including nearby historical landfilling and infilled land – water and non-water).
- Possible mobile hazardous ground gas associated with the underlying coal measures strata.
- Possible hazardous ground gas associated with organic deposits in the location of the former pond in the north-east of the site.

Based on the site history, the potential contaminants of concern include asbestos containing materials (ACMs) / fibres, heavy metals and metalloids, PAHs and TPHs. Ground gases of concern include carbon dioxide and methane.

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Potential pollutant pathways include:

- Dermal contact.
- Inhalation and ingestion of particulates.
- Migration of leachable contaminants (vertical).
- Migration of possible ground gas/vapours (and possible ingress into buildings).
- Aggressive ground conditions affecting building infrastructure.

The following contamination receptors have been identified:

- Future site users.
- Construction workers.
- Controlled waters (underlying aquifers).
- Buildings and infrastructure.

A preliminary risk assessment can be carried out using guidance outlined in Section 6.3 of CIRIA Document C552 “Contaminated Land Risk Assessment – A Guide to Good Practice” (2001).

For a risk to be present there must be a viable pollutant linkage whereby a contamination source can impact on a receptor via a pathway. To carry out the risk assessment an estimate must be made of the potential severity of the risk and the likelihood of the risk occurring. The following Tables set out the criteria for this principal.

**Table 2 - Severity of Risk**

| Severity | Description |
|---|---|
| **Severe** | Acute risk to human health likely to result in ‘significant harm’ i.e. very high concentrations of contamination or ground gases.<br>Catastrophic damage to building i.e. by explosion from high gassing sites or VOC concentrations.<br>Major pollution of controlled waters i.e. surface watercourses and Principal aquifers, source protection zones.<br>Short term damage to ecosystems. |
| **Medium** | Long term risk to human health likely to result in ‘significant harm’ i.e. elevated concentrations of contaminants or ground gases.<br>Pollution of sensitive controlled watercourses i.e. Principal or Secondary Aquifers.<br>Significant effects on sensitive ecosystems or species. |
| **Mild** | Pollution of non-sensitive waters i.e. smaller surface watercourses or unproductive strata.<br>Significant damage to crops, buildings, structures or services i.e. by explosion from sites with medium gassing potential, elevated concentrations of contaminants. |
| **Minor** | Non-permanent human health effects i.e. requirement for protective equipment during site works to mitigate health effects.<br>Damage to non-sensitive ecosystems or species.<br>Minor damage to buildings, structures or services. |

**Table 3 - Probability of Risk Occurring**

| Probability | Description |
|---|---|
| **High Likelihood** | Pollutant linkage may be present that appears very likely in the short term and risk is almost certain to occur in long term or evidence of harm to receptor exists. |
| **Likely** | Pollutant linkage may be present and is likely that the risk will occur over the long term. |
| **Low Likelihood** | Pollutant linkage may be present and there is a possibility of the risk occurring although no certainty that it will do so. |
| **Unlikely** | Pollutant linkage may be present but the circumstances under which harm would occur even in the long term are improbable. |

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**Table 4 - Comparison of Risk & Probability**

| Probability | Severity | | | |
|---|---|---|---|---|
| | Severe | Medium | Mild | Minor |
| **High Likelihood** | Very High | High | Moderate | Moderate/Low |
| **Likely** | High | Moderate | Moderate/Low | Low |
| **Low Likelihood** | Moderate | Moderate/Low | Low | Very Low |
| **Unlikely** | Moderate/Low | Low | Very Low | Very Low |

A summary of potential pollutant linkages and perceived risks for this site are outlined in the Table below:

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**Table 5 - Pollutant Linkages & Perceived Risk**

| Sources of Contamination | Pathways | Receptors | Severity | Probability | Risk | Justification | Further Action Required |
|---|---|---|---|---|---|---|---|
| On site: Possible Made Ground and contamination associated with historic development demolition and infilling at the site. | Inhalation, ingestion and dermal contact of soil or particulates | Future site users | **Medium**<br>Long term risk to human health | **Likely** | **Moderate** | Made Ground associated with the former construction and demolition of buildings at the site and from the development of the surrounding area is likely to be present, however its location, depth and composition are not known. There is also the possibility for relatively deep Made Ground deposits associated with potentially infilled land on the site (the former brick works on the west and the infilled pond in the north-east).<br>It is possible that any contamination associated with historical development at the site could have dispersed and diluted over time, however, this is less likely is deeper deposits are encountered.<br>The future development comprises residential land use with soft landscaping and a communal garden. | Intrusive investigation with chemical testing of shallow soils undertaken to assess whether contamination is present underlying the site. |
| | | Construction workers during development | **Mild**<br>Human health effects limited by short term occupational exposure scenario | **Likely** | **Moderate / Low** | Made Ground associated with the former construction and demolition of buildings at the site and from the development of the surrounding area is likely to be present, however its location, depth and composition are not known. There is also the possibility for relatively deep Made Ground deposits associated with potentially infilled land on the site (the former brick works on the west and the infilled pond on the east).<br>Construction workers are expected to come into direct contact with potentially contaminated soils during demolition, earthworks and an initial construction phase. Such contact will likely be short term and occupational, limiting potential exposure. | |
| | Acidic ground conditions affecting future site buildings | Building Infrastructure | **Minor**<br>Minor damage to buildings | **Low Likelihood** | **Very Low** | If contamination associated with Made Ground is present underlying the site, it is considered possible that damage could be caused to subsurface structures associated with any new buildings. Chemical testing for water soluble sulphate and pH should be undertaken to inform concrete classification for foundations at the site. | |
| | Vertical migration | Underlying superficial Secondary Undifferentiated Aquifer and underlying bedrock Secondary A Aquifer | **Medium**<br>Pollution of sensitive waters | **Low Likelihood** | **Moderate / Low** | Made Ground associated with historical development and potentially infilled features is likely to be present, although the depth and composition are not known. It is possible that any contamination associated with the Made Ground at the site could have dispersed and diluted over time.<br>The presence of the cohesive soils underlying the site could limit the vertical migration of contamination to the underlying aquifers, however it is unknown whether sufficient cohesive soils underlie the site to prohibit this movement. | |
| Off site: Possible Made Ground and associated mobile contamination associated with development of the surrounding area, nearby landfilling and infilled land. | Lateral migration onto site with subsequent dermal contact of soils | Future site users | **Medium**<br>Long term risk to human health | **Unlikely** | **Low** | Made Ground associated with historical development of the surrounding area could be present, although it is considered to be limited in nature.<br>The presence of cohesive deposits underlying the site is likely to the migration potential of contamination onto the site however if present contamination could pose a chronic health risk to future site users. | |
| Ground Gas: Possible ground gas generation associated with potential Made Ground both on and off site, potentially infilled land on site and in the surrounding area, historic landfills and underlying mine workings and coal measures. | Migration of ground gas | Future site users | **Severe**<br>Acute risk to human health (asphyxiation) | **Low Likelihood** | **Moderate** | Made Ground associated with the historical development of the site, the possible infilled features on the site is likely to be present and may have a gas generation potential. The age of the infilled features generally indicates a low gas generation potential, however some more recent areas of infilling could have a 'high' gas generation potential.<br>The underlying coal mines and coal measures are unlikely to affect the site based on the depth and the presence of clay underlying the site, however it does remain a possibility if faults / granular bands are present.<br>Given the distance from site of the identified landfills and the likely presence of clay underlying the site, there is a low likelihood that ground gas could accumulate in such volumes as to affect future site users or buildings at the site. | Intrusive investigation to confirm extent and nature of Made Ground and natural deposits at the site. Installation of monitoring wells to assess the ground gas regime at the site. |
| | | Building Infrastructure | **Mild**<br>Significant damage to buildings (explosion) | **Low Likelihood** | **Low** | | |

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# 4.0 Desk Study Conclusions

The site is located at 110 and 112 Kenyon Lane, Moston, Manchester, M40 9DH, at national grid reference 387240, 401470. The site is an irregularly shaped parcel of land with an area of approximately 0.42 hectares. The site currently comprises a DIY store within the largest building on the site, a former cinema. On the west of the site is a plumbing supplies company, Steve Sutton Plumbing and Heating Supplies, within a converted residential building and sheds. There are also hardstanding 'yard' areas currently used for storing construction supplies.

The proposed development comprises a four-storey apartment block with associated parking spaces, soft landscaping and a communal garden.

Historical OS maps dating back to 1850 indicate the site to have been part of agricultural land in the 1800s, with a pond in the east of the site. The west of the site was part of a brick works in the early 1900s before later being the site of a cinema, which was later replaced by a newer cinema and the building that is currently used as a DIY store. In the wider area residential development dominates, although a number of clay pits were noted historically.

Given the development history of the site and the surrounding land, it is considered possible that Made Ground deposits and associated ground contamination may be present. The potential presence of asbestos should also be considered during any future site investigation/development works.

Geological mapping indicates that the site is underlain by superficial deposits of Till (diamicton). Bedrock underlying the site comprises the Pennine Middle Coal Measures Formation (mudstone, siltstone and sandstone).

According to the Coal Authority, the site is located within a coal mining reporting area, a Consultants Coal Mining Report indicates that one seam of coal was mined below the site at a depth of 447m however there are no shallow mining features on or in the vicinity of the site. Based on the depth of the mining, and lack of shallow mining activity, it is considered that the site is not at risk from coal mining hazards and further coal mining risk assessment is not required.

There are three BGS recorded mineral sites located within 500m of the site, all of which were opencast sites removing clay. A review of historical maps did identify a brick works on the site, although it is not clear whether extraction of clay occurred on the site or just the production of bricks.

The closest surface water feature is located 442m north-east. Based on mapping this appears to be a small stream or brook located within a wooded area.

The superficial deposits underlying the site are classified as a Secondary Undifferentiated Aquifer and the bedrock is classified as a Secondary A Aquifer. The site is not located within a Groundwater Source Protection Zone and there are no groundwater abstraction points within 500m of the site.

There are four historical landfill sites within 500m of the site and a further four within 1km, the closest of which is located 134m south-west of the site. Based on the age of infilling, the identified landfills could have a ground gas generation potential of 'moderate' to 'high'.

There are ten recorded instances of potentially infilled land, two non-water and eight water, located within 250m of the site. The closest area is a non-water entry recorded on the site which the mapping shows it affects the west of the site and is related to the former brickworks. The bulk of the entries are related to infilled ponds. Although not listed within the environmental database report, the historical mapping also shows a pond on the east of the site, possibly now infilled.

With regard to hazardous ground gas there are identified areas of potentially infilled land (non-water and water) located on the site (associated with the pond and former brick works) and within the surrounding area. Landfills

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have been identified in close proximity to the site. The underlying coal measures and mining also present a potential ground gas source. Given the potential ground gas sources present both on and in the vicinity of the site, it is considered that gas monitoring is necessary to adequately assess the ground gas regime at the site.

Based on the desk study information the environmental setting of the site is considered to be of 'moderate' risk with the underlying Secondary A bedrock aquifer identified as the most sensitive receptor. The proposed development will include areas of soft landscaping which could increase infiltration of surface water and mobility of any shallow contamination present at the site.

Given the proposed development (residential apartments), the risk to human health is considered to be 'moderate' as the development plans include a communal garden and areas of soft landscaping which would provide direct contact for future site users if contamination is present.

The Phase I Risk Assessment and Preliminary Conceptual Site Model has identified plausible contaminant linkages. As a result, the following additional works / precautions are recommended as a minimum:

- Carry out an intrusive site investigation to confirm ground conditions at the site. The ground investigation should allow for excavations / boreholes to be taken through any Made Ground soils and into the underlying natural strata.
- In-situ testing / geotechnical soil sampling should be carried out during the intrusive investigation to provide adequate recommendations for foundation design.
- Chemical testing of shallow soils, to include heavy metals and metalloids, hydrocarbons and asbestos screening to confirm contaminant levels in the soils and to confirm whether pollutant linkages are present at the site.
- Combined gas and groundwater monitoring wells should be installed in selected boreholes with an initial 6 no. return monitoring visits undertaken to establish if gas protective measures are required for the proposed new structures

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**APPENDIX I**

**DRAWINGS**

| Rev | Date | Description | By | Check | App. |
|---|---|---|---|---|---|
| A | 05/06/2020 | Site Location Plan | RAP | DK | NR |

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DO NOT TURN ON LAYERS THAT HAVE BEEN TURNED OFF.
DO NOT THAW LAYERS THAT HAVE BEEN FROZEN.

| | |
|---|---|
| Client | Adelphi Developments Ltd |
| Project | Kenyon Lane<br>Moston<br>Manchester |
| Office | Altrincham |
| Discipline | GeoEnvironmental |
| Title | Site Location Plan |
| Scale @ A3 | NTS |
| Status | FINAL |

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| Originator | Job Number | Discipline | Building/Zone |
|---|---|---|---|
| CCL | 10/1559 | GEO | - |
| **Type** | **Level** | **Drawing No.** | **Revision** |
| GA | 00 | 001 | A |

Birmingham 0121 200 7800 . Glasgow 0141 222 1720 . Liverpool 0151 227 5300 . London 020 3077 0970 . Manchester 0161 613 6000 . Newcastle 0191 221 0702 . Norwich 01603 305 190 . Prestwick 01292 475 375 . Reading 0118 941 7888

Kenyon Lane

cycle store
24 no. spaces

resident's parking
37 no. spaces

resident's garden

N

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HALL

| | | |
|---|---|---|
| Rev C | 15.07.2020 | Car park layout updated |
| Rev B | 03.07.2020 | Issued for Planning |
| Rev A | 17.06.2020 | Refuse store included adjacent to entrance lobby |

Project Title
Kenyon Lane, Moston

Drawing Title
Proposed: Site Plan

Client
GDMJ LTD

Drawn By: AW
Date: March 2020
Project No.: P19-008
Scale: 1:200 @ A1
Drawing No.: 02-01-002C

FCH
London | Liverpool | Manchester | Kuala Lumpur | Telephone +44(0)151 243 5800 www.fcharchitects.com
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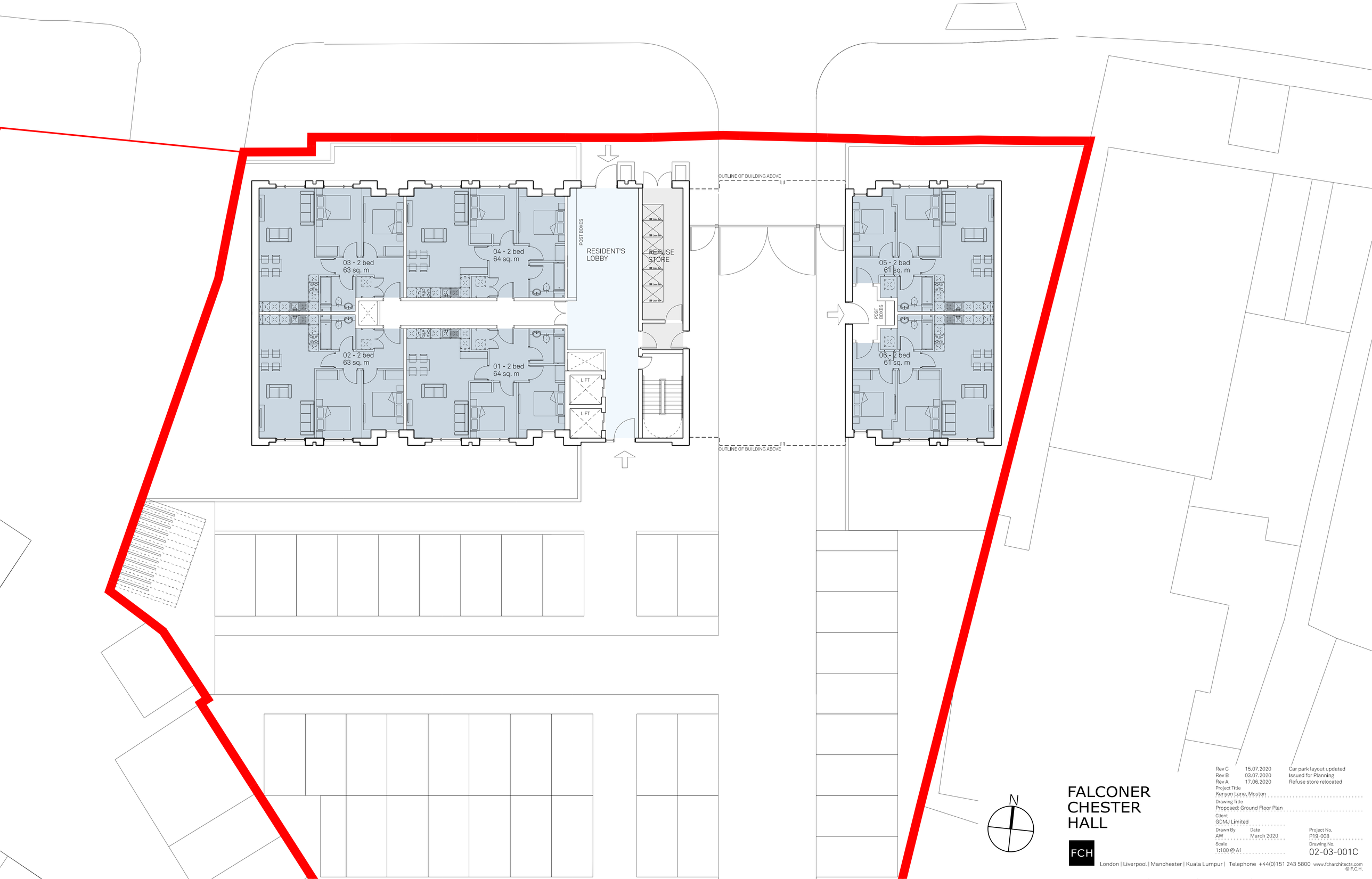
# Kenyon Lane




FALCONER
CHESTER
HALL

| | | |
|---|---|---|
| Rev C | 15.07.2020 | Car park layout updated |
| Rev B | 03.07.2020 | Issued for Planning |
| Rev A | 17.06.2020 | Refuse store relocated |

Project Title
Kenyon Lane, Moston

Drawing Title
Proposed: Ground Floor Plan

Client
GDMJ Limited

| Drawn By | Date | Project No. |
|---|---|---|
| AW | March 2020 | P19-008 |

Scale
1:100 @ A1

Drawing No.
02-03-001C

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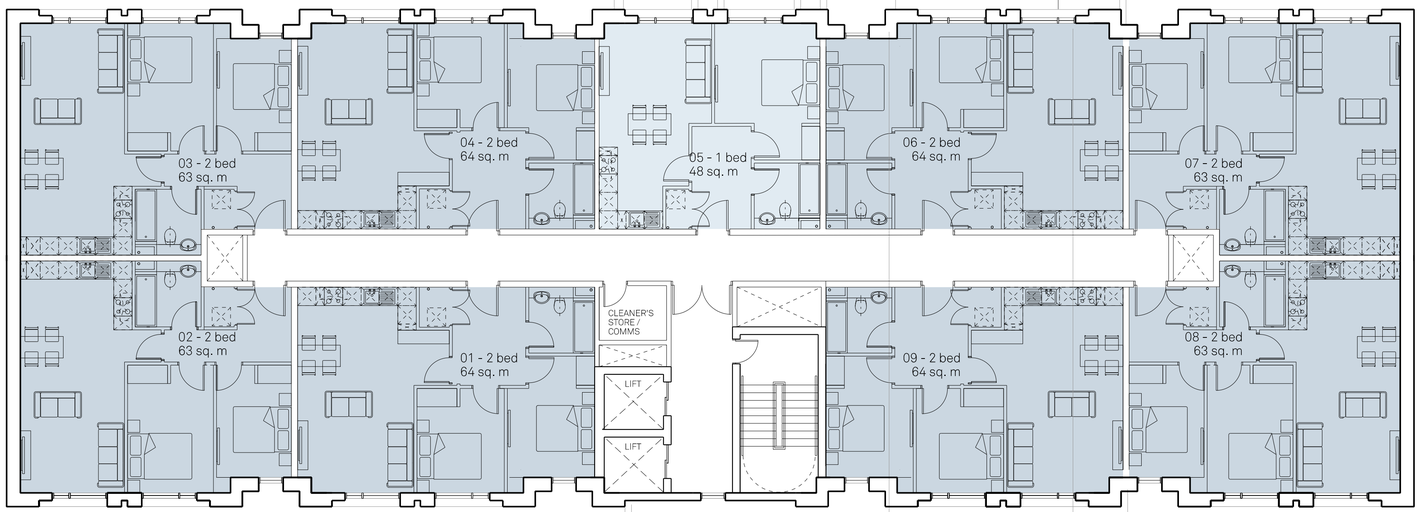
Kenyon Lane




N

FALCONER
CHESTER
HALL

| | | |
|---|---|---|
| Rev D | 20.07.2020 | Car park arrangement updated |
| Rev C | 09.07.2020 | Drawing title amended |
| Rev B | 03.07.2020 | Issued for Planning |
| Rev A | 17.06.2020 | Landscaping updated. |

Project Title
Kenyon Lane, Moston

Drawing Title
Proposed: First, Second and Third Floor Plan

Client
GDMJ Limited

| Drawn By | Date | Project No. |
|---|---|---|
| AW | March 2020 | P19-008 |

Scale
1:100 @ A1

Drawing No.
02-03-002D

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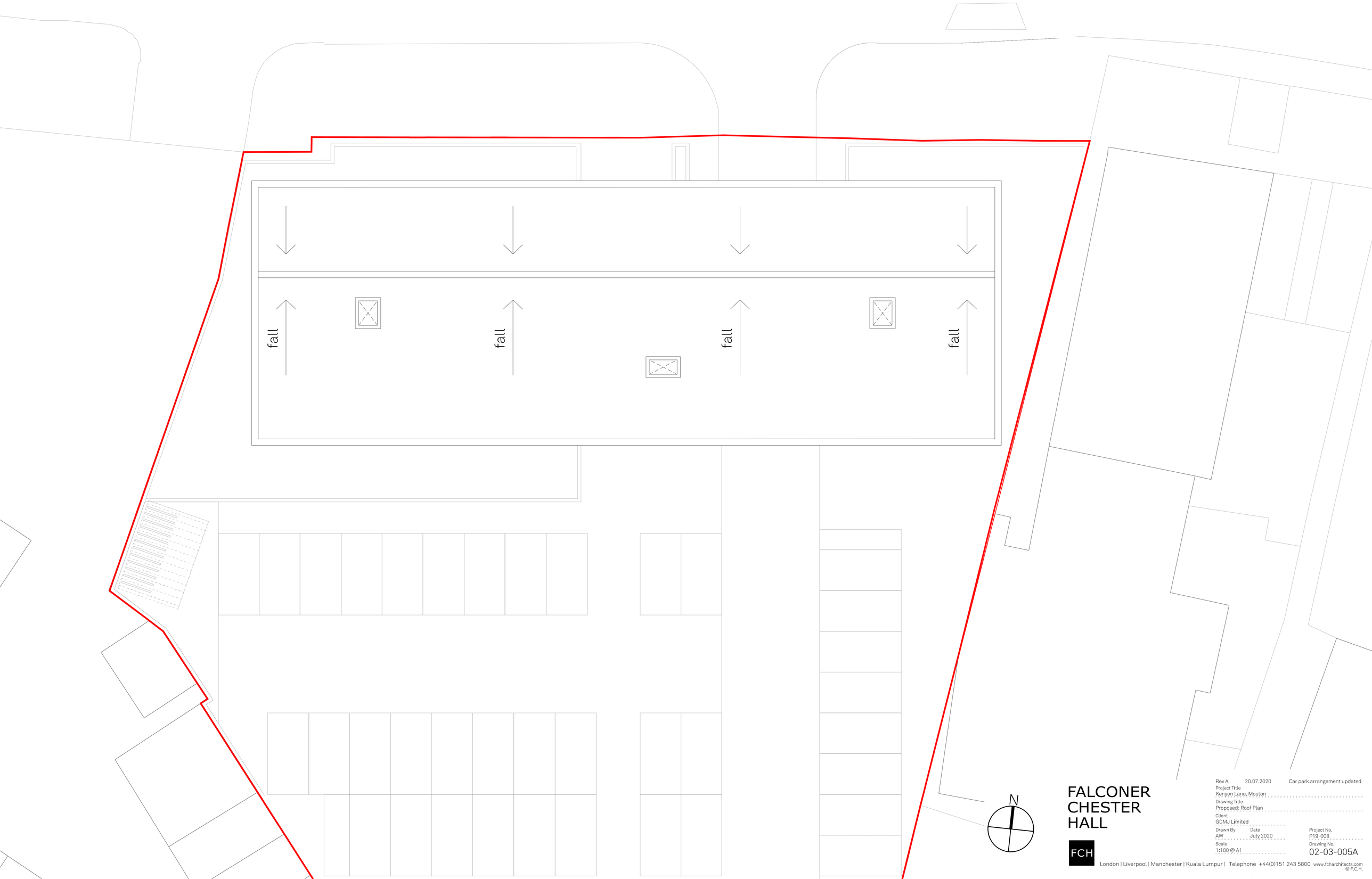
Kenyon Lane

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HALL

| | | |
|---|---|---|
| Rev A | 20.07.2020 | Car park arrangement updated |
| Project Title | Kenyon Lane, Moston | |
| Drawing Title | Proposed: Roof Plan | |
| Client | GDMJ Limited | |
| Drawn By | Date | Project No. |
| AW | July 2020 | P19-008 |
| Scale | | Drawing No. |
| 1:100 @ A1 | | 02-03-005A |

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## APPENDIX II

## ORDNANCE SURVEY HISTORICAL MAPPING

# Historical Mapping Legends

## Ordnance Survey County Series 1:10,560

Gravel Pit
Sand Pit
Other Pits
Quarry
Shingle
Orchard
Osiers
Reeds
Marsh
Mixed Wood
Deciduous
Brushwood
Fir
Furze
Rough Pasture
Arrow denotes flow of water
Trigonometrical Station
Site of Antiquities
Bench Mark
Pump, Guide Post, Signal Post
Well, Spring, Boundary Post
·285 Surface Level
Sketched Contour
Instrumental Contour
Main Roads
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
Sunken Road
Raised Road
Road over Railway
Railway over River
Railway over Road
Level Crossing
Road over River or Canal
Road over Stream
Road over Stream
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)
R.D. Bdy. Rural District Boundary
Civil Parish Boundary

## Ordnance Survey Plan 1:10,000

Chalk Pit, Clay Pit or Quarry
Gravel Pit
Sand Pit
Disused Pit or Quarry
Refuse or Slag Heap
Lake, Loch or Pond
Dunes
Boulders
Coniferous Trees
Non-Coniferous Trees
Orchard
Scrub
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Pylon
Electricity Transmission Line
Sloping Masonry
Cutting
Embankment
Standard Gauge Multiple Track
Road Under
Road Over
Level Crossing
Foot Bridge
Standard Gauge Single Track
Siding, Tramway or Mineral Line
Narrow Gauge
Geographical County
Administrative County, County Borough or County of City
Municipal Borough, Urban or Rural District, Burgh or District Council
Borough, Burgh or County Constituency
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

| | | | |
|---|---|---|---|
| BP, BS | Boundary Post or Stone | Pol Sta | Police Station |
| Ch | Church | PO | Post Office |
| CH | Club House | PC | Public Convenience |
| F E Sta | Fire Engine Station | PH | Public House |
| FB | Foot Bridge | SB | Signal Box |
| Fn | Fountain | Spr | Spring |
| GP | Guide Post | TCB | Telephone Call Box |
| MP | Mile Post | TCP | Telephone Call Post |
| MS | Mile Stone | W | Well |

## 1:10,000 Raster Mapping

Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or community boundary
District, Unitary, Metropolitan, London Borough boundary
Constituency boundary
Area of wooded vegetation
Non-coniferous trees
Non-coniferous trees (scattered)
Coniferous trees
Coniferous trees (scattered)
Positioned tree
Orchard
Coppice or Osiers
Rough Grassland
Heath
Scrub
Marsh, Salt Marsh or Reeds
Water feature
Flow arrows
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m Bench mark (where shown)
Triangulation station
Point feature (e.g. Guide Post or Mile Stone)
Pylon, flare stack or lighting tower
Site of (antiquity)
Glasshouse
General Building
Important Building

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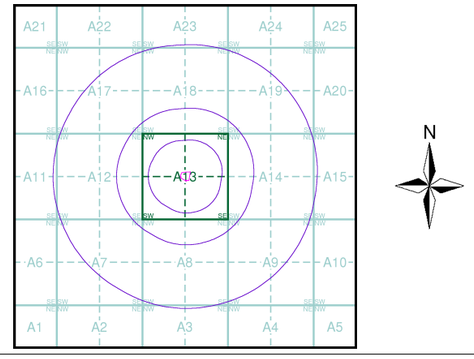
## Historical Mapping & Photography included:

| Mapping Type | Scale | Date | Pg |
|---|---|---|---|
| Lancashire And Furness | 1:10,560 | 1848 | 3 |
| Cheshire | 1:10,560 | 1882 | 4 |
| Lancashire And Furness | 1:10,560 | 1894 | 5 |
| Lancashire And Furness | 1:10,560 | 1909 - 1910 | 6 |
| Lancashire And Furness | 1:10,560 | 1923 | 7 |
| Lancashire And Furness | 1:10,560 | 1932 - 1933 | 8 |
| Lancashire And Furness | 1:10,560 | 1938 | 9 |
| Ordnance Survey Plan | 1:10,000 | 1956 | 10 |
| Ordnance Survey Plan | 1:10,000 | 1966 | 11 |
| Manchester | 1:25,000 | 1975 | 12 |
| Ordnance Survey Plan | 1:10,000 | 1978 | 13 |
| Ordnance Survey Plan | 1:10,000 | 1982 | 14 |
| Ordnance Survey Plan | 1:10,000 | 1990 | 15 |
| 10K Raster Mapping | 1:10,000 | 1999 | 16 |
| 10K Raster Mapping | 1:10,000 | 2006 | 17 |
| VectorMap Local | 1:10,000 | 2020 | 18 |

## Historical Map - Slice A




## Order Details

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| Customer Ref: | 10/1559 |
| National Grid Reference: | 387240, 401470 |
| Slice: | A |
| Site Area (Ha): | 0.42 |
| Search Buffer (m): | 1000 |

## Site Details

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# Russian Military Mapping Legends

## 1:5,000 and 1:10,000 mapping

a. Not drawn to scale b. Drawn to scale

- Government and Administrative Buildings
- Military and Industrial Buildings
- Military and Communication Areas
- Subway Entrance
- Fireproof Building
- Prominent Fireproof Building
- Non-fireproof Building
- Non-fireproof Building (non-dwelling)
- Factory, mill, and flour mill, with chimneys
- Factory, mill, and flour mill, without chimneys
- Power Station, drawn to scale
- Hydroelectric Power Station
- Radio Station, drawn to scale
- Telephone Station, drawn to scale
- Abandoned Open-pit Mine or Quarry
- Open-pit Salt Mine
- Pit
- Oil Deposit or Well
- Oil Seepage
- Tailings Pile
- Fuel Storage Tanks
- Natural Gas Tank
- Bench Mark
- Drill Hole
- Burial Mound
- Triangulation Point on Burial Mound
- Single-track Railroad
- Double-track Railroad and Station Building
- Coniferous Forest
- Deciduous Forest
- Mixed Forest
- Lawns
- Citrus Orchard
- Wet Ground
- Scattered Vegetation

243,8 — Values for prominent elevations

186.0 — Numbers for spot elevations, depth soundings, contour lines, etc.

0,2 — Velocity of the current, width of river bed, depth of river

Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

### Russian Alphabet (For reference and phonetic interpretation of map text)

| | | | |
|---|---|---|---|
| А а (A) | З з (Z) | П п (P) | Ч ч (CH) |
| Б б (B) | И и (I) | Р р (R) | Ш ш (SH) |
| В в (V) | Й й (Y) | С с (S) | Щ щ (SHCH) |
| Г г (G) | К к (K) | Т т (T) | ъ (–) |
| Д д (D) | Л л (L) | У у (U) | ы (Y) |
| Е е (E) | М м (M) | Ф ф (F) | ь (') |
| Ё ё (YO) | Н н (N) | Х х (KH) | Э э (E) |
| Ж ж (ZH) | О о (O) | Ц ц (TS) | Ю ю (YU or IU) |
| | | | Я я (YA or IA) |

## 1:25,000 mapping

a. Not drawn to scale b. Drawn to scale

- Government and Administrative Buildings
- Military and Industrial Buildings
- Military and Communication Areas
- Subway Entrance
- Partly Demolished Buildings
- Demolished Buildings
- Built-Up Area with Fireproof Buildings Predominant
- Built-Up Area with Non-Fireproof Buildings Predominant
- Individual Fireproof Building
- Prominent Industrial Building
- Individual Dwelling, Fireproof
- Ruins of an Individual Dwelling
- Factory or Mill Chimney
- Factory or Mill with Chimney
- Factory or Mill without Chimney
- Mine or Open Pit Mine
- Operating Shaft or Mine
- Non-Operating Shaft or Mine
- Salt Mine
- Tailings Pile
- Pit
- Stone Quarry
- Gas Pump or Service Station
- Fuel Storage or Natural Gas Tank
- Oil or Natural Gas Derrick
- Small Hydroelectric Power Station
- Power Station
- Transformer Station
- Cemetery
- Burial Mound (height in metres)
- Triangulation Point on Burial Mound
- Triangulation Point
- Bench Mark
- Bench Mark (monumented)
- Telegraph Office
- Telephone Station
- Radio Station
- Radio Tower
- Airfield or Seaplane Base
- Landing Strip
- Main Highway
- Highway under Construction
- Improved Dirt Road (former truck road)
- Double-track Railroad with First Class Station
- Dismantled Railroad
- Railroad Under Construction
- Shore Embankment
- River or Ditch with Embankment
- Direction and velocity of current
- Well
- Water Reservoir or Rain Water Pit
- Spring
- Isobath with value
- Heavy (Index) Contour Line
- Contour Line and Value
- Half Contour Line
- Spot Elevation Value
- Coniferous
- Deciduous
- Mixed
- Scrub

## Key to Numbers on Mapping

### SD80_Manchester

| No. | Description |
|---|---|
| 24 | Depot (Railway) |
| 75 | Factory (Locomotives And Railway Carriage Repairs) |
| 111 | Factory (Radio Electronics) |
| 233 | Factory (Textiles) |

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## Historical Mapping & Photography included:

| Mapping Type | Scale | Date | Pg |
|---|---|---|---|
| Lancashire And Furness | 1:10,560 | 1848 | 3 |
| Cheshire | 1:10,560 | 1882 | 4 |
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| Lancashire And Furness | 1:10,560 | 1909 - 1910 | 6 |
| Lancashire And Furness | 1:10,560 | 1923 | 7 |
| Lancashire And Furness | 1:10,560 | 1932 - 1933 | 8 |
| Lancashire And Furness | 1:10,560 | 1938 | 9 |
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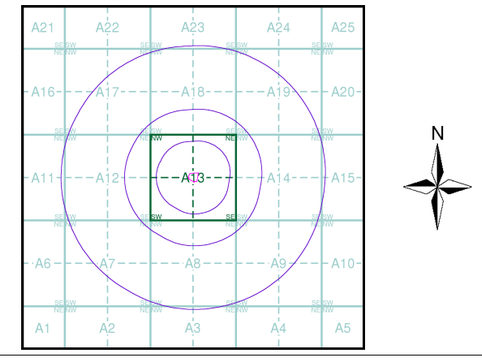
| Ordnance Survey Plan | 1:10,000 | 1990 | 15 |
| 10K Raster Mapping | 1:10,000 | 1999 | 16 |
| 10K Raster Mapping | 1:10,000 | 2006 | 17 |
| VectorMap Local | 1:10,000 | 2020 | 18 |

## Russian Map - Slice A

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|---|---|
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