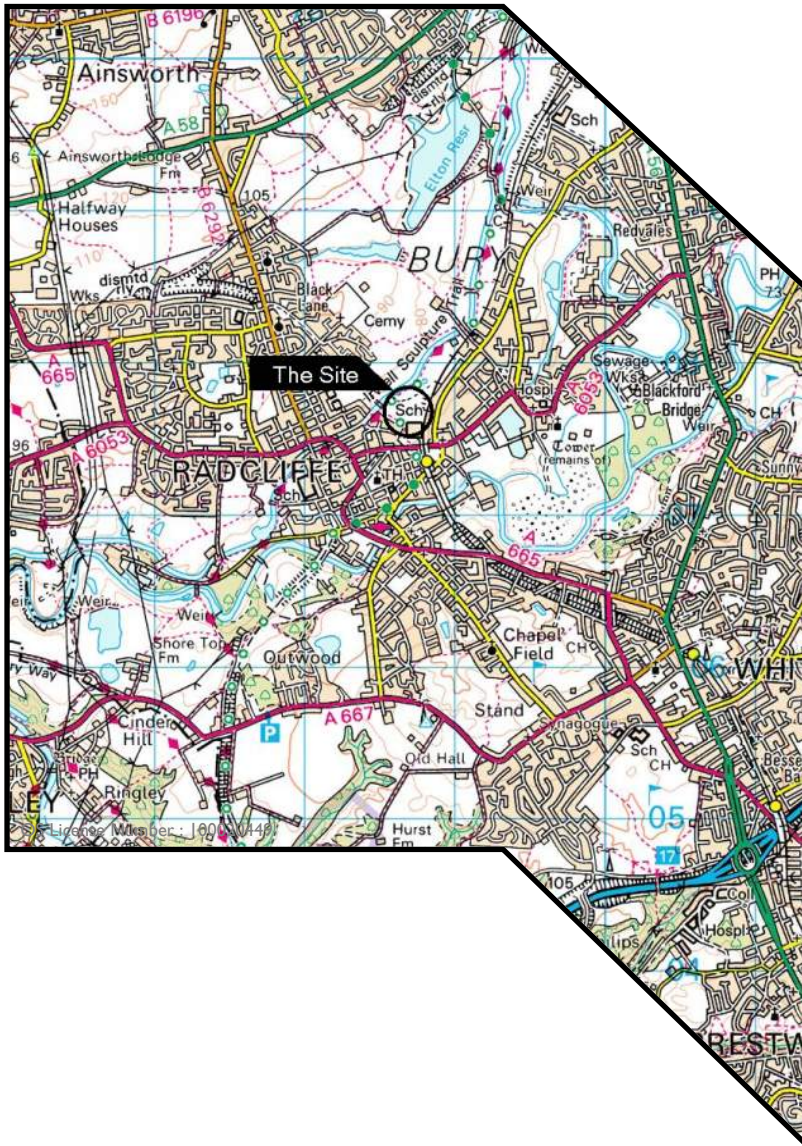


Desk Study



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Star Radcliffe

for
Department for Education

Engineer : Mott MacDonald Limited

Project Number PC228400

May 2022

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Desk Study Report
at

Star Radcliffe
for
Department for Education

Desk Study

Engineer :
Mott MacDonald Limited

Project No:
PC228400
May 2022

DOCUMENT CONTROL

Issuing Office	The Geotechnical Centre, 203 Torrington Avenue, Tile Hill, Coventry, CV4 9UT
Project Number	PC228400
Project Title	Star Radcliffe
Document Title	PC228400 Geotechnical and Geo-environmental Desk Study Report at Star Radcliffe
Client	Department for Education
Engineer	Mott MacDonald Limited
Document Status	FINAL

Revision History

Rev No.	Issue No.	Issue Date	Author	Authoriser
DRAFT	I	11/02/2022	J Knowles	N Frost
1.0	I	04/05/2022	J Knowles	N Frost

Distribution

Rev No.	Issue No.	Reason for Issue	Organisation	Format
DRAFT	I	Issue for review	Mott MacDonald Limited	PDF
1.0	I	Issue as final	Mott MacDonald Limited	PDF

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We have prepared this report in our professional capacity using reasonable skill, care and diligence. The assessments, conclusions and recommendations within this report pertain to the study site defined herein, and the immediate area in continuity with the Site. They are based on the established historical uses, and information available at the time of writing and the proposed use of the Site. Where any information supplied by the client or other sources have been utilised, it has been assumed that the information is correct. No responsibility can be accepted by Geotechnics for inaccuracies in data supplied by any other party.

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APPENDIX 6	Proposed Development Option
APPENDIX 7	Proposed Exploratory Hole Location Plan

I.0 INTRODUCTION AND CLIENT'S BRIEF

This Phase I Desk Study was carried out to the instruction of Mott MacDonald on behalf of The Department for Education, the Client. The purpose of the Desk Study is to provide a geotechnical and geo-environmental assessment for the proposed redevelopment of an existing Secondary School and adjacent Leisure Centre.

The proposed redevelopment consists of the demolition of the existing Spring Lane School and an adjacent Radcliffe Leisure Centre (also known as Coney Green Leisure Centre) which includes a swimming pool. Following these demolition works it is proposed to construct new school buildings including a Superblock and a Sports Hall, along with a new artificial grass pitch, a Multi-Use Games Area (MUGA), a grass pitch, new car parking areas and access roads.

A summary of the location of the site in relation to the proposed Sketch Option 02 is shown below:

Site Layout	Description
Drawing provided by Star Academies. Full drawing of Sketch Option 02 is presented in Appendix 6.	The proposed development of the site is understood to comprise: • Demolition of the existing Spring Lane School. • Demolition of the existing Radcliffe Leisure Centre including swimming pool. • Construction of new school buildings including a Superblock and a Sports Hall. • Construction of a new artificial grass pitch, MUGA, and a grass pitch. • New car parking areas and access roads. • The removal from site or the treatment of any contaminated material encountered during demolition. NB: The boundary of the new development is shown by the red line. Investigative works for the proposed new access road (although outside of the development boundary) are considered within this desk study report.

This report comprises a geo-environmental and geotechnical Site Survey undertaken in accordance with Stage I of RIBA Plan of Work 2020 Overview. It is intended to be used by the developer to aid in later Stages of the design and construction of the proposed development. In addition, this report has been devised to generally comply with the relevant principles and requirements of a range of guidance including:

- Part IIA of the Environment Protection Act, 1990;
- Contaminated Land (England) (Amendment) Regulations 2012 and Contaminated Land Statutory Guidance (DEFRA, April 2012);
- National Planning Policy Framework (HCA, July 2021);
- BS EN 1997-1:2004+A1:2013: “Eurocode 7. Geotechnical Design”
- BS5930:2015+A1:2020: “Code of Practice for Ground Investigations”;
- BS10175: 2011 +A2:2017 “Investigation of Potentially Contaminated Sites - Code of Practice”;
- The Building Regulations 2010. Part C (HM Government 2013);
- Environment Agency (2020) “[Land Contamination Risk Management](#)”;
- Environment Agency (2011) Report GPLCI “Guiding Principles for Land Contamination”;
- Environment Agency (2017) “The Environment Agency’s Approach to Groundwater Protection” November 2017 Version 1.1; and
- Sustainable Remediation Forum UK (SuRF) Framework

2.0 THE SITE

Site Location

A Site Location Plan and Site Plan can be found in Appendix A and the site location is summarised in the table below.

Location	Spring Lane School, Spring Lane, Radcliffe, Manchester.
Grid Reference	378700, 407630
Post Code	M26 2SZ
Site Area	Approximately 6.39 Ha
Site Shape	The site is roughly triangular-shaped, with truncated apices. The site fronts east-west onto the A6053 Spring Lane over a distance of 85m from the remains of a former railway bridge abutment to the southeast corner of the site near to the existing Metrolink bridge. The eastern side of the site runs broadly north-south following the base of the Metrolink embankment (the former Lancashire & Yorkshire Railway’s Radcliffe East Fork) over a distance of 330m. The northern edge of the site curves east-west over 240m following the base of the embankment of the former Lancashire & Yorkshire Railway’s Radcliffe West Fork to its intersection with the northeast to southwest running Manchester, Bolton & Bury Canal. The north-western site boundary runs over 120m of the canal towpath towards the site of Whittaker’s Bridge (which previously carried a northwest to southeast running railway over the canal). The western site boundary roughly follows the line of the former northwest to southeast running Lancashire & Yorkshire Railway’s Prestwich Branch over a distance of 320m.
Topography and Site Levels	The site generally slopes down from the Manchester, Bolton & Bury Canal towpath (Photo 20) in the north at an elevation of 76.8m OD towards Spring Lane in the southeast at an elevation of 71.6m OD. The site is bifurcated by a sharp break in slope formed by the cutting of the northeast to southwest running former Lancashire & Yorkshire Railway’s Clifton, Accrington & Colne Line. To the northwest of this 3m to 4m high scarp, the ground slopes very gradually, whereas to the southeast of it the ground is relatively level. The steep embankment slopes of the L. & Y. R. Radcliffe East and West Forks lie immediately off-site. Steeper slopes and a low stone retaining wall exists along the site’s western boundary, where the ground rises up towards the former route of southeast to northwest running L. & Y. R. Prestwich Branch (near to the present-day Banana Path).

Site Description

A site visit was undertaken on 24th January 2022. A summary of observations made is presented in the table below and photographs are presented in Appendix I.

Current Use	The lower, south-eastern part of the site currently comprises a secondary school (Spring Lane School) and a leisure centre with swimming pool (Radcliffe Leisure Centre) including various car parks and access roads, footpaths, landscaped grounds and an overgrown, disused athletics ground to the north (including the remains of a hammer and discus throwing area). It is understood that the new car parking areas to the rear (north) of Spring Lane School and their access roads are associated with the provision of a temporary parking facility until expansion works at the nearby Metrolink Radcliffe Park and Ride are completed. This is explained on the Transport for Greater Manchester website: https://news.tfgm.com/news/temporary-park-and-ride-site-set-to-open-as-part-of-programme-to-increase-metrolink-parking The upper, north-western part of the site currently comprises an overgrown, derelict sports field (including the remains of an artificial turf cricket square and rusty rugby goal posts).
Access	The site lies north of the A6053 Spring Lane. There are two vehicular entrances off Spring Lane onto the site, the western one heads to car parks to the north of Spring Lane School whilst the eastern one head directly into the car park in front of the Radcliffe Leisure Centre (Photos 1-5). Access to both Spring Lane School and Radcliffe Leisure centre is restricted to gateways within the steel mesh security fencing around their perimeters (Photos 6 & 45). Steel railings and palisade fences also traverse the site (Photos 14 & 18) , with one line running along the crest of the scarp dividing the upper former sports field area from the lower area including the school, leisure centre and car parks (Photo 41). The temporary car park serving the Metrolink Radcliffe Park and Ride facility is also enclosed by steel mesh security fencing with a yellow height restriction barrier at its entrance (Photos 35 & 36). The gravel-surfaced car park extension is currently enclosed with temporary HERAS-type fencing (Photos 32-34).
Existing Buildings & Structures	Existing Spring Lane School The various buildings which make up the existing Spring Lane School (Photos 42-47) are shown on the Fire Alarm Zone Mimic Layout Plan (Photo 48). The main school building has a pitched roof with skylights and measures 60m by 20m in plan, orientated east-west along its long axis. The building is extended along much of its northern side by an additional 10m. To the east of the main building lies a sports hall measuring 30m by 20m in plan, again orientated east-west. The gap between the main building and sports hall is infilled with a Plant Room (boiler house) and a 20m long southern extension. Off the southwest corner of the main school building is a 10m square flat-roofed reception building. The school buildings are all single-storey largely constructed of concrete blocks with green prefabricated window units. The sports hall construction largely comprises concrete blocks and some steel cladding near to the roof The school building heights vary from lower flat-roofed sections to the main pitched roof building to the high flat roofed sports hall. Existing Radcliffe Leisure Centre The existing Radcliffe Leisure Centre buildings (Photos 10-13) form a horseshoe around a tarmac-surfaced courtyard, with its main entrance building linking up to the southern extension of the existing Spring Lane School. On the eastern side of the entrance courtyard lies a sports hall with a shallow pitched roof, measuring 20m by 10m in plan, orientated east-

	west. To the east of this sports hall separated by a narrow covered passage lies a blue steel swimming pool building measuring 40m by 15m in plan, orientated north-south. The building has a lightweight shallow pitched roof constructed of metal and translucent plastic sheets. From the covered passage, the demountable, modular, prefabricated nature of the swimming pool is evident, with old tarmac surfacing noted below the adjustable supports of the above ground swimming pool structure (Photo 74). Immediately east of the swimming pool building, pipework runs to a filtration unit housed in a blue shipping container placed on an old cobbled roadway (Photos 70-73 & 75). The gap between the leisure centre sports hall and the Spring Lane School sports hall, to the east of the school's southern extension is infilled with further leisure centre buildings. A narrow passageway runs east west and separates the leisure centre sports hall and swimming pool buildings from the boiler house block which fronts onto the leisure centre car park. A high square section pre-cast concrete chimney connected to the boiler house is located in the passageway. This chimney is now disused and showing signs of corrosion to the steel reinforcing bars and concrete (Photo 61). The east end of the boiler house block houses the Spring Lane School Electricity Sub Station (Access restricted to Electricity North West utility company personnel). The school buildings are all single-storey largely constructed of concrete blocks. The school building heights vary from lower flat-roofed sections to the higher pitched roofs of the leisure centre sports hall and swimming pool building. Disused Radcliffe Sub Station Near to the Spring Lane School Electricity Sub Station and the blue swimming pool building, set back into the site's eastern boundary, lies an elongate steel-clad building. This is the former Radcliffe Sub Station now used for storage by the leisure centre (Photo 11).
Demolished Buildings & Structures	A quadrangle of school buildings relating to the former Coney Green High School once lay to the south of the main building of the existing Spring Lane School. With the exception of the eastern edge of the quadrangle (which now forms part of the Radcliffe Leisure Centre), these buildings were demolished and the area is now covered by a rubber-surfaced MUGA and lawns (Photo 15). Details and photographs showing this demolition work are presented on the following websites: https://www.geograph.org.uk/photo/4541992 https://www.geograph.org.uk/photo/4541988 https://www.geograph.org.uk/photo/4541985
Site Surface	There are some areas of rough ground to the south of the Spring Lane School grounds where bare soil is exposed, containing some rubble possibly derived from the demolition of old school buildings (Photos 15-17). The car parks and access roads in the vicinity of the existing school and leisure centre are surfaced with asphalt. The footpaths and courtyards in the lower southern corner of the site consist of tarmac or paving flags. A rubber-surfaced MUGA and lawns lie to the south of the main building of the existing school. Further lawns extend southwards beyond the school's mesh boundary fence towards Spring Lane (Photo 15). The asphalt-surfaced car parking area immediately north of the existing school was constructed over former tennis courts. Further north lies a new gravel-surfaced car parking area with rows of car parking spaces marked out using plastic red and white barriers. Beyond

	this lies an area where a thickness of construction rubble has been placed (presumably as part of further car park expansion work). The new gravel-surfaced car parking area (Photos 32-34) and the area of construction rubble (Photo 31) lie over parts of a former area of hardstanding used as a running track and athletics ground. The low, north-eastern corner of the site includes a former hammer and discus throwing area and much of this part of the site is covered in rough grass. In places here the ground is notably soft and wet, with some water-filled wheel ruts evident (Photos 28-30). The former sports field that occupies the higher, north-western part of the site is largely overgrown with rough grass, a notable exception being a northeast to southwest running 30m long by 3m wide strip of artificial turf (a former cricket square) with some concrete exposed in places (Photos 19-27).
Evidence of surface staining	Possible oil stains were noted on the Plant Room (boiler house) floor at Spring Lane School (Photo 50).
Ecology / Vegetation	The higher, north-western part of the site is largely overgrown with rough grass. The lawns of Spring Lane School are well maintained. To the south and west of the existing school/leisure centre are landscaped areas including several tall mature deciduous trees. The steep embankment slopes of the L. & Y. R. Radcliffe East and West Forks, which lie immediately off-site, are also lined with various mature deciduous trees along with various smaller bushes. In places, along the western perimeter of the site and also adjacent to the embankment of the L. & Y. R. Radcliffe West Fork are areas of brambles, bracken and other weeds. The far western corner of the site is densely vegetated including several very tall deciduous trees. A stand of Japanese Knotweed was noted along the central part of the western perimeter of the site. Whilst the proposed school development (as defined by the red line on Site Layout drawing in Appendix 6) does not extend over this area, it is likely that the northern end of the proposed new access road will encroach upon it. NB – This should not be considered as an ecological survey. The presence/extent of any Japanese Knotweed should be confirmed by a suitable qualified and experienced ecologist.
Storage Tanks	No above ground or below ground fuel storage tanks were observed on site. Some cylindrical tanks were noted in the filtration unit housed in the blue shipping container adjacent to the swimming pool building. The site maintenance staff stated that these are filled with sand used as part of the water filtration system.
Services	Numerous service covers, areas of surface reinstatement and services were observed across the existing school/leisure centre site. Both the existing Spring Lane School and Radcliffe Leisure Centre are heated by gas boilers. The site maintenance staff stated that these were installed in 2015 and 2019, respectively. The gas boilers serving the school are housed in a Plant Room (Photos 49-56) located between the main school building and the school sports hall. Exhaust flues from the boilers extend up the exterior of the school sports hall (Photo 43). The gas boilers serving the leisure centre are housed in a separate boiler house block (Photos 57-68). An exhaust flue from this boiler rises from the roof of the boiler house. The high chimney that served a previous boiler is now disused. The Spring Lane School Electricity Sub Station (Photo 69) is housed in the east end of the leisure centre's boiler house block. In the asphalt-surfaced car park north of Spring Lane School several grey electrical service boxes exist (Photos 37 & 38). Surrounding both this car park, and the adjacent new gravel-surfaced car parking area further north, various lighting columns were noted. Electrical cables

	to both the service boxes and lighting columns lie above ground in plastic ducts or fixed to fencing around the car park perimeter (Photos 34 & 38). Whilst carrying out the walkover survey, personnel from the Greenhatch Group were carrying out an underground utilities survey of the site and they stated that there were many buried services present, with some below the former sports field.
Asbestos	It is understood from the Radcliffe Leisure Centre maintenance staff that all potential Asbestos Containing Materials (ACMs) have been removed from Spring Lane School. However, the maintenance staff pointed out that some ACMs still exist within the Radcliffe Leisure Centre, both in the ceiling tiles (Photos 7 & 8) and also in the adhesive compound used below the floor tiles (No ACM's were observed exposed on the ground surface). The inside of buildings have not been formally assessed by Geotechnics Ltd for the possible presence of ACMs.
Waste Disposal/ Materials Storage	A bin store is located on the access road near to the entrance to the existing Spring Lane School (Photos 39 & 40). Further recycling bins were noted near to the entrance to Radcliffe Leisure Centre (Photos 12 & 13). The school/leisure centre site was observed to be clean and tidy, with only limited outdoor storage of materials seen. There is a single blue shipping container on the north side of Spring Lane School near to the Plant Room (boiler house). No evidence of burning was observed on-site. However, some small fires were noted in wooded areas immediately off-site.
Surrounding Area	Beyond low steel railings the site is bordered to the south by Spring Lane. The recently expanded Metrolink Radcliffe Park and Ride facility lies immediately opposite with its new raised parking deck. The Metrolink Radcliffe tram station lies off the southeast corner of the park and ride facility upon the embankment of the former L. & Y. R Radcliffe East Fork. Immediately east of the site, separated by steel mesh security fencing lies the 5m to 6m high embankment of the former L. & Y. R. Radcliffe East Fork, which now forms part of the Metrolink tram network. Further east lies a mixture of terraced residential properties and business premises including light industrial and retail units, such as garages (Kwik-Fit), transport depots, warehouses and a Texaco petrol filling station. The northern site boundary is formed by the disused railway embankment of the former L. & Y. R. Radcliffe West Fork. Further north, between the disused railway embankment and the Manchester, Bolton & Bury Canal lies a densely wooded area leading onto several large ponds. To the northwest, low steel railings border the towpath of the canal. On the northern side of the canal, lies an area of landscaped open space with a sinuous footpath running through its centre (Banana Path). This area is bounded by the former routes of two dismantled railways, namely the L. & Y. R. Radcliffe West Fork to the northeast and the L. & Y. R. Prestwich Branch to the southwest. Northeast of the former Radcliffe West Fork lies open farmland used for livestock. Southwest of the former Prestwich Branch lies residential properties (Great Hall Close) and St. Mary's R.C Primary School. Banana Path crosses the canal via Bridge 17e and continues southwards along the site's eastern boundary largely following the route of the former L. & Y. R. Prestwich Branch. Steel railings line Banana Path separating it from much of the site. South of the canal and to the west of Banana Path lie residential properties of (from north to south) Whittaker Street, Shirebrook Drive and Heap Street.

	To the southwest of the site lie terraced residential properties and light industrial business premises including Radcliffe Car Auctions.
Local Water Features	No water features were observed on site. The nearest off-site water feature is the Manchester, Bolton & Bury Canal which lies 4m to the northwest, at the highest part of the site.
Potential Off-Site Receptors	Residential properties and the surfacewater of the Manchester, Bolton & Bury Canal.
Potential Off-Site Sources	Potential contaminants within the former railway embankments along the perimeter of the site.
Local / Background Knowledge	Disused Radcliffe Central Station on the former Prestwich Branch Line Information relating to the disused Radcliffe Central Station situated to the south of Spring Lane on the former Prestwich Branch line is included in the following website: http://www.disused-stations.org.uk/r/radcliffe/index.shtml This website includes an aerial photograph of the site taken in 1935 showing the surrounding Lancashire & Yorkshire Railway network (generally on embankments) and in particular the southwest to northeast running Clifton, Accrington & Colne Line with a cut slope on its northwest side. This railway line bifurcates the site into the lower area of railway sidings and goods station to the southeast and the upper area of allotments and cricket pitch to the northwest Initial news of proposed plans for a new school at the site put forward by the Star Academy Trust and the Department for Education are outlined in the following website: https://www.manchestereveningnews.co.uk/news/greater-manchester-news/new-radcliffe-high-school-unlocked-22205689 Radcliffe Riverside High School Coney Green High School was built in the early 1970s as the Coney Green Technology School, and was merged with Radcliffe High School in 2003 to create Radcliffe Riverside High School. It closed in July 2014. Refer to following website: https://www.geograph.org.uk/photo/4541988 Historical photographs showing the Coney Green Secondary High School under construction are included in the following website: https://www.google.com/search?q=coney+green+high+school+radcliffe&sa=X&rlz=1C1GG RV_enGB794GB794&tbm=isch&source=iu&ictx=1&vet=1&ved=2ahUKewjViLjCvNnIAhW0QkEAHSajD8kQuqlBegQIlxAD&biw=1920&bih=969&dpr=1#imgsrc=vglewuptGPZTWM The boiler house chimney provides a useful landmark in the photographs. One photograph includes the railings of the present-day Banana Path in the foreground and the Metrolink embankment in the background. Another photograph shows the north elevation of the existing Spring Lane School and its adjoining sports hall. Spring Lane School (Bury Secondary PRU) In March 2015 it was planned to use part of the empty closed former Radcliffe Riverside High School as a pupil referral unit (PRU). Refer to website below: https://www.burytimes.co.uk/news/11831930.new-lease-of-life-for-empty-radcliffe-riverside-as-school-for-the-boroughs-most-difficult-pupils/.

Spring Lane School forms part of the Bury Secondary Pupil Referral Unit (PRU), providing secondary education for children who are not able to attend a mainstream school. Further details are given on the following website:

<https://springlaneschool.weebly.com/>

Radcliffe Leisure Centre (formerly known as Coney Green Leisure Centre)

A swimming pool and leisure centre opened on the site of the former Radcliffe Riverside (previously Coney Green) High School. A photograph showing the entrance to the Radcliffe Leisure Centre from Spring Lane is presented on the following website:

<https://www.geograph.org.uk/photo/4835487>

New Temporary Swimming Pool

The former main swimming pool at the 47-year-old Radcliffe Leisure Centre closed in December 2013 after severe weather damaged windows and dislodged asbestos. Further details relating to corrosion of its concrete columns due to exposure to water and chemicals are given on the following website:

<https://www.burytimes.co.uk/news/12876808.new-radcliffe-swimming-pool-to-open-by-mid-may/>

Remnant contaminants from the former swimming pool present a potential source of contamination.

Details of the opening of the temporary demountable above ground swimming pool in June 2015 are given on the following website:

<https://www.mynewsdesk.com/uk/bury-council/pressreleases/now-open-the-new-radcliffe-leisure-centre-1185137>

Further details of the temporary modular nature of the swimming pool are given on the following website:

<https://www.totalswimming.co.uk/modular-pools-radcliffe>

More recent leakages or spills of chemicals associated with the new temporary swimming pool present a potential source of contamination.

Temporary Metrolink Radcliffe Park and Ride Car Parking Facility

The following websites provide information on the use of the current use of part of the site as a temporary car park serving the Metrolink Radcliffe Park and Ride:

<https://www.railstaff.co.uk/2020/11/12/park-and-ride-expansion-for-manchester-metrolink/>

<https://news.tfgm.com/news/temporary-park-and-ride-site-set-to-open-as-part-of-programme-to-increase-metrolink-parking>

<https://www.manchestereveningnews.co.uk/news/greater-manchester-news/new-park-ride-open-bury-21398042>

Spillages or leakages of hydrocarbons from vehicles parked over the car park, along with bituminous substances used in the car park surfacing, present potential sources of contamination.

3.0 SITE HISTORY

A search of available historic maps was undertaken to establish the previous land uses of the site. The maps discussed below are presented in Appendix 2 of this report.

Summary of Site History

On Site

The following table summarises the significant changes in historical use on site:

On Site		
Feature & description	Date Appears on OS mapping	Date No longer shown on OS Mapping
The site is shown to lie immediately southeast of Whittaker's Bridge on the Manchester, Bolton & Bury Canal, lying between the canal and Spring Lane in the south. The southwest to northeast running Lancashire & Yorkshire Railway's Clifton, Accrington & Colne Line traverses the centre of the site and near to the site's western boundary, a watercourse is shown to run in a culvert below the railway.	1850	
Midway between the canal and the railway a further field boundary is shown running from a pond in the northeast towards "Whittaker's" in the west.	1850	1975
A wind pump (WP) is labelled near to the railway on its south-eastern side. The southern margin of the site, near to Spring Lane is labelled as "Ousel Fold" with a couple of buildings shown. From Ousel Fold a track/path runs north-eastwards passing below the railway and extended by a field boundary towards the canal.	1850	1891
The 1891 and 1893 maps can be examined together and show the greatest coverage of the Lancashire and Yorkshire Railway's local network. The southeast to north west running Prestwich Branch is shown along the site's western boundary, crossing over the existing southwest to northeast running Clifton, Accrington & Colne Line. These two lines are linked by the Radcliffe West Fork (along the site's northern boundary) and the Radcliffe East Fork (along the site's eastern boundary).	1891/1893	
The lower, south-eastern half of the site is shown to be a <i>Goods Station</i> with <i>cranes</i> and a <i>Goods Shed</i> served by numerous sidings heading south off the Clifton, Accrington & Colne Line. From the bridge carrying the Prestwich Branch over Spring Lane, a sinuous path heads north-westwards to cross the Manchester, Bolton & Bury Canal at Bridge 17e. Whittaker's Bridge is shown carrying the Prestwich Branch across the canal, with a rectangular building shown nearby in the site's far western corner.	1891/1993	1975
Rectangular building shown nearby in the site's far western corner reduced in size.	1895	1957
The 1909 map shows an additional Goods Shed within the sidings heading towards the Goods Station.	1909	1975
Several small buildings (possibly sheds) shown between the footpath and the Prestwich Branch on the western edge of the site.	1909	1975

Sothorn extension of Goods Shed over sidings to the north of the Goods station. Weighing Machines (WM) shown at Goods Station. L. & Y. R. network labelled as part of the London, Midland and Scottish Railway. Several new small buildings (possibly sheds) shown on the western edge of the site.	1929	1975
The southwest to northeast running field boundary traversing the north-western half of the site is shown as a footpath (FP) and the land between this path and the canal towpath to the north is labelled as a "Cricket Ground". Small buildings (possibly sheds) shown on the western edge of the site reduced in number.	1937	1978
Western edge of the site (area with small buildings) and also far western corner now labelled as "Allotment Gardens".	1957	1978
Area between <i>Cricket Ground</i> and Clifton, Accrington & Colne Line labelled as <i>Allotment Gardens</i> .	1957	1978
Local railway network shown to be dismantled with the exception of the Radcliffe East Fork. Railway bridges over the canal (including Whittaker's Bridge) have been removed. Bridge carrying former Prestwich Branch over Spring Lane has also been removed. <i>Coney Green Comprehensive School</i> built over former <i>Goods Station</i> and railway sidings. Boiler house chimney is labelled. <i>Tennis courts</i> are shown to the north of the school with the former <i>Cricket Ground</i> and <i>Allotment Gardens</i> on the higher ground to the northwest labelled as a <i>Sports Ground</i> . School labelled as <i>Coney Green High School</i> on 1988 map. There do not appear to be any major changes in site levels with the school built over the lower, level area of former railway sidings to the southeast of the former railway cutting/scarp and the higher, gently sloping ground to the northwest now used as a sports field.	1978	-
Spring Lane School Sub Station (east end of boiler house block) and adjacent Radcliffe Sub Station both labelled.	1988	-
The aerial photograph taken in 2000 shows the school layout with an athletics ground to the north of the tennis courts (including a hammer and discus throwing area) and an artificial grass cricket square on the sports field.	2000 (Aerial Photograph)	-
Main quadrangle of school buildings removed and replaced with lawns and a MUGA. Sports field and athletics ground disused and overgrown. New blue temporary demountable swimming pool building constructed on eastern side of former high school.	2017 GoogleEarth Aerial Photograph	-
Former school site labelled as <i>Radcliffe Leisure Centre</i> .	2021	-

Surrounding Area

The following table summarises the significant changes in historical use on land surrounding the site:

Off Site				
Feature & description	Distance from site (m)	Direction from site	Date Appears on OS mapping	Date No longer shown on OS Mapping
Ponds	20	N	1850	-
Gravel Pit	80	SE	1850	1891/1893
<i>Radcliffe Station</i> (labelled as <i>Radcliffe New Station</i> from 1909)	60	SE	1891	-
<i>Whittaker's Bridge Colliery</i>	60	W	1891	1909

Air Shaft (to former Colliery)	50	W	1909	1975
Chimney (to former Colliery)	95	W	1909	1929
Reservoir (to Colliery)	100	W	1891	1929
Shaft (<i>Withins Lane Colliery</i>)	180	NE	1893	1909
Mineral Water Works	40	E	1893	1909
<i>Spring Lane Brewery</i> (labelled as "Disused" on 1957 map)	50	E	1891	
<i>Radcliffe Wagon Works</i> (Tank and Warehouse shown on 1957 map)	60	SW	1891	
Dye Works	40	E	1909	
Iron Works on site of former Mineral Water Works (<i>Seed Street Iron Works</i> on 1957 map)	40	E	1909	
<i>Bury Road Ventilation Engineering Works</i> on site of former Dye Works	40	E	1957	
Engineering Works (labelled as <i>Station Works</i> from 1937 and simply as <i>Works</i> on 2006 map)	90	E	1929	-
Filter Beds	120	W	1909	1957
Large rectangular building on north side of <i>Radcliffe West Fork</i> embankment (labelled as <i>Radcliffe Electricity Sub Station</i> from 1957)	25	N	1929	1989
Garage	40	E	1957	
Scrap Metal Yard	40	W	1957	1989
<i>Progress Chemical Works</i>	40	W	1957	1989
<i>Progress (Sheet Metal) Works</i>	40	W	1957	1989
Residential properties (<i>Great Hall Close</i>) built on site of former <i>Whittaker's Bridge Colliery</i>)	60	W	1978	-
Residential properties (<i>Kingmoor Avenue, Shirebrook Drive</i> and <i>Landor Close</i>) built on site of former <i>Radcliffe Wagon Works, Scrap Metal Yard, Progress Chemical Works</i> and <i>Progress Sheet Metal Works</i>)	40	W	1992	-
Area opposite the site shown in use as a car parking area for <i>Radcliffe Station</i> including single elevated parking deck	20	S	2000 (Aerial Photograph)	-
Area to northwest of canal now landscaped as public open space including the <i>Banana Path</i>	20	S	2000 (Aerial Photograph)	-
Gantries and overhead power lines shown along <i>Radcliffe East Fork</i> (<i>Metrolink</i> tram network)	10	E	2003 GoogleEarth Aerial Photograph	
Former <i>Station Works</i> reduced in size and used as a transport depot in 2018 GoogleEarth Aerial Photograph	90	E	2013 GoogleEarth Aerial Photograph	-

4.0 GEOLOGY

The following section details information published by the British Geological Survey (BGS) on geological maps of the area. Where readily available and relevant, Geological memoirs and other literature have been consulted along with the BGS Geology of Britain Viewer website <https://www.bgs.ac.uk/map-viewers/geology-of-britain-viewer/> and BGS GeoIndex (onshore) website <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/>.

Published Geology

The documented geology of the site is summarised below:

	Map Reference	Geology
Drift	BGS 1:50,000 Sheet 85 Manchester, 2011 Bedrock and Superficial Edition	The BGS map for Manchester indicates that the superficial deposits over the upper, north-western half of the site comprise Glacial Till described as <i>clay to sandy clay, unsorted, with common pebbles, cobbles and some boulders (diamicton)</i>. Over the lower, south-eastern half of the site, the superficial deposits are shown to comprise Glaciofluvial Deposits described as <i>undifferentiated sand and gravel with lenses of clay and stony clay</i>. (Over the site area, the southwest to northeast running former railway cutting/scarp roughly forms the boundary between these natural superficial deposits). No artificial ground is indicated on the site. However, given that the south-eastern half of the site has previously been developed (initially as railway with sidings and goods station and latterly as a school and leisure centre), a thickness of Made Ground should be expected. The nearest area of Worked Ground (brick pit/gravel pit/quarry, etc) shown on the BGS map lies 300m to the east of the site. The nearest area of Made Ground (spoil tips and landfill sites) shown on the BGS map lies 700m to the southeast of the site on the Alluvium of the flood plain of the River Irwell. The Alluvium of the flood plain of the River Irwell is shown to lie 250m to the south of the site. This Alluvium is described as <i>silt, clay and sand with gravel and peat lenses</i>. Glaciolacustrine Deposits (laminated clay and silt) are indicated 150m to the north of the site. The BGS Geology of Britain Viewer and GeoIndex (onshore) websites confirm the above superficial geology, with the glacial deposits being referred to as being of Devensian age. The websites refer to the Glaciofluvial Deposits as “Glaciofluvial Sheet Deposits”

Solid	BGS 1:50,000 Sheet 85 Manchester, 2010 Bedrock Edition	The BGS map indicates that the site is underlain by Upper Carboniferous (Pennsylvanian) strata of the Pennine Middle Coal Measures Formation which are described as <i>mudstone and siltstone interbedded with fine- to medium grained sandstone, subordinate seatearths, marine bands and coal seams</i>. The strata form part of the Duckmantian (Westphalian B) Series. A coal seam is shown outcropping across the site running from northeast to southwest following the course of the former Clifton, Accrington & Colne Railway line. Another (older) coal seam is shown with a similar strike beyond the Manchester, Bolton & Bury Canal to the north of the site. This older seam is expected to lie at some depth below the site. Based on the Coal Authority's Interactive Map and the Summary of Findings Plan appended to the Coal Authority Consultant's Coal Mining Report it is evident that not all of the recorded coal seams are presented on the BGS mapping at this scale (Refer to Coal Section below). Between 250m and 500m to the southeast of the site, a sandstone unit known as the <i>Nob End Rock</i> is shown to outcrop, with a (younger) Marine Band indicated further to the southeast away from the site. The strata dip towards the southeast. Locally, to the south of the site the strata are indicated as dipping at 22 degrees to the southeast. It should be realised that this measurement is for similar Coal Measures strata but within a different faulted block. The dip of the seams recorded in the Coal Authority Consultant's Coal Mining Report are relevant to the site under investigation (Refer to Coal Section below).
Structural	BGS 1:50,000 Sheet 85 Manchester, 2010 Bedrock Edition	The site lies between two southeast to northwest trending faults, one located near to the north-eastern corner of the site and the other situated 200m to the west of the site. In both cases the strata to the southwest are shown to be downthrown.

The nearest available BGS Borehole Record to the site relates to the 304.19m deep pit at Withins Lane Colliery, off Bury Road, 169m to the northeast (Envirocheck Reference No. 505).

The upper portion of this pit record is shown below:

Exploratory Hole	Thickness (m)	Depth (m)	Description of Strata
Withins Bury Road BGS Reference SD70NE25 NGR: 378966mE, 407887mN	2.44	2.44	Soil and Gravel
	16.38	18.82	Marl
	2.44	21.26	Blue Rock
	0.36	21.62	Floor
	1.75	23.37	Blue Rock
	0.30	23.67	Floor
	0.93	24.60	Soft Rock
	2.44	27.04	Metal
	0.13	27.17	COAL
	0.86	28.03	Warrant
	2.74	30.77	Soft Rock
	0.33	31.1	COAL
	0.74	31.84	Warrant
	0.41	32.25	Rocky Warrant
	2.90	35.15	Rock
	1.22	36.37	Strong Metal
	0.36	36.73	Slate Floor
	0.61	37.34	COAL
	0.81	38.15	Warrant
	1.07	39.22	Strong Rocky Warrant
	4.27	43.49	Strong Grey Metal (WHITE MINE)

The nearest recorded groundwater level refers to a dynamic sample borehole located along Bury Road adjacent to the Texaco petrol filling station, about 66m to the northeast of the site. Here, groundwater was struck at 2.40m below ground level and rose to 1.78m below ground level.

Details of the site geology are presented in Appendix 2.

Geological Features

The presence of recorded geological features such as BGS Mineral Sites, Man Made Mining Cavities or natural cavities within 250m of site are summarised below. If entries are present in a wider radius than 250m, further details are presented in Appendix 2.

Data type	Entries (On site)	Entries (0-250m)
BGS Recorded Mineral Sites	None recorded	One entry, Radcliffe Gravel Pit, former Quaternary River Terrace Sand and Gravel pit, 120 to the southeast.
Man Made Mining Cavities	None recorded	None recorded
Natural Cavities	None recorded	None recorded
Artificial Ground / Made Ground	None recorded	None recorded The nearest area of Made Ground (spoil tips and landfill sites) shown on the BGS map lies 700m to the southeast of the site on the Alluvium of the flood plain of the River Irwell.

Mining Instability	In an area that may be affected by coal mining activity. A coal mining report has been obtained from the Coal Authority. Refer to Coal Section below.	
Coal Authority Interactive Map – Mine Entries	None	Three mine entries are shown, one near Pine Street to the east of the site, one at the former Withins Lane Colliery off Bury Road to the northeast and one at the former Whittaker's Bridge Colliery to the northwest of the site.
Coal Authority Interactive Map – Coal Outcrops and Probable Shallow Coal Mine Workings	Two southwest to northeast trending coal outcrops are shown over the north-western half of the site, with adjoining areas of probable shallow coal workings shown to the southeast of these.	To the north of the site, beyond the canal, a further southwest to northeast trending coal outcrop is shown with an adjoining area of probable shallow coal workings shown to the southeast. Various other coal outcrops and areas of probable shallow coal workings are shown surrounding the site.

Coal

From the Coal Authority website <https://www.groundstability.com/> it is stated that the site is “located on the coalfield” and hence from the information currently available to the Coal Authority, a mining report is required for this property. A Consultant's Coal Mining Report has been obtained and a copy is presented in Appendix 3.

The Summary of Findings Plan appended to the coal mining report shows the outcrop of the Park Yard Coal (also known as the Ashclough Coal) running southwest to northeast across the central part of the site. Further north on the site, near to the Manchester, Bolton & Bury Canal, the outcrop of the older Ince New Coal (also known as the Major Coal or Stonedelf Coal) is shown following a similar strike.

Another (older) coal seam is shown with a similar strike beyond the Manchester, Bolton & Bury Canal to the north of the site. Based on the Coal Authority's Interactive Map and the Summary of Findings Plan appended to the Coal Authority Consultant's Coal Mining Report it is possible to use trigonometry to estimate the depth to the seams below rockhead.

The coal mining report states that there are probable unrecorded shallow workings below the site.

The Summary of Findings Plan also shows the locations of two shafts in the vicinity of the site, namely,

Consultant's Coal Mining Report – Mine Entries		
Shaft Reference No.	Location	Treatment Details
378407-005	At the former Whittaker's Bridge Colliery, 60m to the west of the site.	Prior to 1973 this shaft was unfilled and covered with a concrete slab at ground level. Radcliffe Paper Mills used the shaft for effluent disposal. Dennis Brandwood (Homes) Limited filled and capped the shaft as part of the residential development (Great Hall Close).
378407-007	Near Pine Street, 45m to the east of the site.	No treatment details are available.

NB: Shafts associated with Withins Lane Colliery, 180m to the east of the site, are not shown on this Summary of Findings Plan as it lies beyond 100m from the site boundary.

Past underground mining is recorded in four (4 No.) seams below the site, namely the Roger Coal, Rams Coal, Doe Coal and Wigan Five Feet Coal at depths ranging between 65m and 146m below ground level. These seams were last worked between 1880 and 1887. The seams are largely recorded as dipping at 9.5 degrees to the southeast.

Depth to Coal Seams below Rockhead

As previously stated, the outcrop of the Park Yard Coal is recorded running southwest to northeast across the central part of the site. The Ince New Coal and another older coal seam are shown on the Coal Authority's Interactive Map outcropping 100m and 250m, respectively, to the northwest from the Park Yard Coal outcrop. Hence, taking 9.5 degrees as a typical angle of dip for the strata, and using trigonometry, the Ince New Coal and the older coal seam would be expected to lie about 17m and 42m, respectively, below the Park Yard Coal outcrop.

The coal mining report also provides the following information:

Consultant's Coal Mining Report	
Feature	Details
Geological faults, fissures and breaklines	None recorded
Opencast mines	None recorded within 500m of the site
Coal Authority managed tips	None recorded within 500m of the site
Site investigations	None recorded within 50m of the site
Remediated sites	None recorded within 50m of the site
Coal mining subsidence damage notices or claims, stop notices or preventative works	None recorded within 50m of the site
Mine gas	None recorded within 500m of the site
Mine water treatment schemes	None recorded within 500m of the site
Licensing and future mining activity	None recorded

Historical mine plans have also been obtained from the Coal Authority and these are also presented in Appendix 3.

Historical Coal Authority Mine Plans				
Coal Authority Reference No.	Mining Company	Colliery	Workings surveyed	Date on Mine Plan
3428A (1 of 2)	Andrew Knowles & Sons Ltd	Whittaker Bridge Colliery	Nine Feet Mine	Drafted 2 nd April 1896
3428A (2 of 2)	Andrew Knowles & Sons Ltd	Whittaker Bridge Colliery	Six Feet Mine	Drafted 2 nd April 1896
2055 (1 of 2)	Andrew Knowles & Sons Ltd	Withins Lane Colliery	Dow Mine	Inspected 5 th August 1887
2055 (2 of 2)	Andrew Knowles & Sons Ltd	Withins Lane Colliery	Five Quarters Mine	Inspected 5 th August 1887
3001A (3 of 3)	Andrew Knowles & Sons Ltd	Withins Lane Colliery	Hynes or Cannel Mine	Inspected 16 th November 1893

The workings shown on the historical mine plans listed above relate to deep coal seams (in excess of 30m below the surface).

Brine

The site is not within the Cheshire Brine Compensation District and is not affected by brine subsidence.

Radon

The property is in a Lower Probability Radon Area (less than 1% of homes are estimated to be at or above the Action Level). No radon protective measures are necessary in the construction of new dwellings, extensions or other property.

5.0 HYDROLOGY AND HYDROGEOLOGY

Hydrology

The presence of any hydrological licences and incidents within 250m of the proposed site is summarised below. If entries are present in a wider radius than 250m, further details are presented in Appendix 2.

Data type	Entries (On site)	Entries (0-250m)
Discharge Consents	None	There is one entry located 208m to the southeast of the site. This relates to a "Discharge of Other Matter - Surface Water" to Crow Trees Farm Brook. This Discharge Consent was operated by Irwell Valley Housing Association Ltd and was effective between 30 th September 1985 and 15 th February 1991
Pollution Incidents to Controlled Waters	None	There are two entries within 250m both classed as Category 3 – Minor Incidents affecting tributaries of the River Irwell. The nearest entry, 87m to the northwest involved an unknown pollutant, whereas the other entry, 177m to the east involved natural iron ochre.
Water Abstractions	None	There are two entries within 250m both relating to the same location, a pond/reservoir located 13m to the northeast (immediately north of the former Radcliffe West Fork embankment). Water has been abstracted from a reservoir fed by surface water drainage for use as process water in the paper and printing industry initially by the East Lancashire Paper Mill Co. and then by St. Regis Paper Company U.K. Ltd.
Nearest Surface Water Feature	None	The nearest entry refers to the Manchester, Bolton & Bury Canal, 4m to the north.
Flooding	No potential for flooding from rivers [or sea] on site. Small parts of the south-eastern half of the site are susceptible to a high (1 in 30 year) risk of flooding from surface water. A small strip in the north of the site, near to the canal is susceptible to a low (1 in 1000 year) risk of flooding from surface water. The site lies in an area with potential for groundwater flooding to occur at the surface.	Within 250m of the site there is some potential for flooding from rivers [or sea]. Within 250m of the site the surrounding roads and the canal are shown as areas are susceptible to a low to high risk of flooding from surface water. The site is surrounded by areas with potential for groundwater flooding of property situated below ground level to occur.

Hydrogeology

The Groundwater Vulnerability map is summarised in the table below:

Geology	Formation	Aquifer Type	Permeability
Drift	Glacial Till	Secondary Undifferentiated	Unknown
	Glaciofluvial Sheet Deposits	Secondary A	Unknown
Solid	Pennine Middle Coal Measures Formation	Secondary A	Unknown

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

6.0 ENVIRONMENTAL DATA

The following section details environmental data available for the site and the surrounding area. Full details can be found in the Envirocheck Report by Landmark located in Appendix 2.

The tables below summarise the presence/absence of any waste, hazardous substance sites and/or industrial land uses within 250m of the site with details provided. For entries present in a radius wider than 250m, further details are provided in Appendix 2.

	Data Source	Data Summary
Environmental Database Information	Industrial Processes	There are no registered Integrated Pollution Control (IPC) Sites, Registered Radioactive Substances sites, Control of Major Accident sites (COMAH), Explosive Sites or Notification of Installations Handling Hazardous Substances (NIHHS) within 250m of the site.
Landfill & Waste Sites Search	Landfills: Ordnance Survey Historical Mapping	There is one entry for a historical landfill within 250m of the site – located 144m southwest of the site. This historical landfill area lies immediately to the northwest of Darbyshire Street, extending from Spring Lane in the northeast to Pilkington Way in the southwest. It relates to the infilled railway cutting of the former Clifton, Accrington & Colne Line.
	Other Waste Sites	There are no entries for Potentially Infilled Land recorded on the site. There are four entries for Potentially Infilled Land (Non-Water) within 250m of the site. The nearest entry refers to unknown filled ground (pit, quarry, etc) 105m to the west. There are five entries for Potentially Infilled Land (Water) within 250m of the site. The nearest entry refers to unknown filled ground (pond, marsh, stream, etc) 42m to the north.
Trade Directories	Trade Directory Entries recorded in 250m radius	There are sixty-one (61 No.) Trade Directory entries within 250m of the site. The nearest to the site refers to an active Sheet Metal Works at 49 Bury Road, 46m to the east of the site. The nearest inactive entry refers to a Car Dealers at 51 Bury Road, 46m to the northeast of the site.
Fuel Stations	Fuel Stations recorded in 250m radius	There is one (1 No.) recorded fuel station within 250m of the site. This refers to the open Texaco petrol station at 55 Bury Road, 66m to the northeast of the site.

Radon Potential	Building Research Establishment, 2015, 'Radon: Guidance on protective measures for new buildings'	The site is situated in an area where radon protective measures are not necessary in the construction of new buildings.
Other Radiation		No reasonable grounds for believing land to be radioactively contaminated (in accordance with 2005 extension of Part IIA of The Environment Protection Act 1990).
Unexploded Ordnance	Alpha Associates Preliminary Unexploded Ordnance (UXO) Threat Assessment 1 st December 2021 (Presented in Appendix 2)	Risk of encountering UXO is assessed as being 'unlikely'. World War II high explosive bomb density assessed as less than one High Explosive bomb strike per 100 hectares (a "very low" level of bombing). The Report states that there is no evidence to suggest that further investigation into UXO is warranted.
Military Sites	Historical Maps and UXO Report	There is no evidence for any military use at the site. In addition the, UXO Report states that the Luftwaffe aerial reconnaissance photography does not identify any primary bombing targets within 1000m of the site.
Ecology	Sites of Ecological Importance	The site is not located in an area of Green Belt. The land to the north of the former Radcliffe West Fork embankment and land to the north of the Manchester, Bolton & Bury Canal is shown to be an area of Adopted Green Belt There are no Sites of Special Scientific Interest (SSSI), National Nature Reserves, National Parks, Local Nature Reserves, Areas of Outstanding Natural Beauty or RAMSAR (wetlands) within 1000m of the site.

Buried and overhead Services	Site Walkover and Groundwise Desktop Utility Search	Electricity Numerous service covers, areas of surface reinstatement and services were observed across the site. Both Spring Lane School and Radcliffe Leisure Centre are heated by gas boilers. The Spring Lane School Electricity Sub Station is housed with the east end of the boiler house block at the front of the leisure centre. An adjacent, disused Radcliffe Sub Station lies along the site's eastern boundary near to the Spring Lane School Sub Station. The 1988 OS map shows the boiler house chimney and the electricity sub stations at the site. Electricity North West's plan shows underground cables from both sub stations linking up at running south across the leisure centre car park towards Spring Lane. Gas Cadent's plans show underground 100mm ductile iron low pressure gas pipe exiting the leisure centre boiler house on its northern side. This pipe then heads south across the leisure centre car park to join another pipe running below the northern kerb of Spring Lane. Cadent's plans also show an intermediate pressure gas pipe running near to Banana Path on the sites western side. Telecommunications A BT Openreach plan shows two boxes sited in front of the MUGA with cables heading south towards Spring Lane. A Virgin Media plan shows a cable running from the south-eastern corner of the leisure centre, behind the Metrolink security fencing, towards Spring Lane. Water Mains The United Utilities Water Mains Record plan shows a water main running along the northern kerb of Spring Lane. No water mains are shown running across the site. Sewers The United Utilities Sewer Records plan shows a surface water sever running from Shirebrook Drive to the west of the site and terminating at a manhole in the front car park of the leisure centre. The United Utilities Sewer Records plan shows no foul water sewers on the site. Details of available plans and records relating to utility services at, and in the immediate vicinity of, the site are presented in a separate Groundwise Desktop Utility Search Report.
Archaeological & Building Heritage	MAGIC website 01/02/2022 Historic England website 01/02/2022 https://www.historicengland.org.uk	There are no sites of archaeological interest on site. The nearest historic building to the site are the remains of Radcliffe Tower situated 800m east off the south-eastern corner of the site, near to St. Mary's Parish Church. It is shown on the historical maps in Appendix 2. Radcliffe Tower is the only surviving part of a manor house in Radcliffe. It is a Grade I listed building and a Scheduled Monument. The manor house was demolished in the 19th Century leaving only the tower. Further details relating to the tower are presented on the following website: http://www.castlesfortsbattles.co.uk/north_west/radcliffe_tower.html

7.0 PREVIOUS REPORTS / INVESTIGATIONS

No previous ground investigation reports are available for this site.

8.0 POTENTIAL CONTAMINANT LINKAGES AND PRELIMINARY CONCEPTUAL SITE MODEL

Hazards Identified with the Proposed Development

The hazard identification is based on the assumptions presented below:

- The Radcliffe Leisure Centre (including the swimming pool building) will be demolished.
- Spring Lane School and its adjoining sports hall will be demolished.
- The Metrolink Radcliffe temporary car park will be removed.
- A new school (Superblock building and Sports Hall) is to be constructed on the higher, former sports field site towards the former Radcliffe West Fork embankment.
- Two new car parks are to be constructed to the west and south of the new Superblock.
- A new MUGA is to be constructed to the northeast of the new Superblock, adjacent to the former Radcliffe West Fork embankment.
- East of the new Superblock and Sports Hall, on the lower site (currently used as the Metrolink Radcliffe temporary car park), a grass pitch is to be laid down
- To the south of the new grass pitch (Over the footprints of Spring Lane School and much of the Radcliffe Leisure Centre), an artificial grass pitch is to be constructed.
- Pedestrian and vehicular access to the new school site will be via a new roadway along the south-western part of the site, linking it to Spring Lane to the south.
- Drinking water will be from a mains supply.

Potential Sources of Contamination

For the purpose of this assessment the potential contaminants of concern have been considered according to whether they are likely to have originated from on-site or off-site sources.

Potential On-site Sources of Contamination

- Potential sources of contamination relating to the demolition of the existing Radcliffe Leisure Centre and Spring Lane School possibly including metals, pH, sulphate, TPH, PAH and other wastes. In terms of Asbestos, it is understood that Asbestos-containing materials (ACMs) were removed from Spring Lane School prior to re-opening as a pupil-referral unit. However, ACMs are understood to remain in the building fabric of the leisure centre, such as in the ceiling tiles and floor-tile adhesive.
- The size of the boiler house chimney suggests that a fuel other than mains gas may have been used in the past (e.g. heating oil). Hence, any spillage/leakage of hydrocarbons in this area could present a potential source of contamination.
- Potential spillages / leaks of Polychlorinated Biphenyls (PCBs)-containing dielectric oils and petroleum hydrocarbons from the Electricity Sub Stations;
- Potential spillages /leaks of chemicals and chemically treated water associated with both the previous and current swimming pools, plant and filtration systems.
- Potential hydrocarbon and other chemical spillages / leaks associated with maintenance equipment in the area of the shipping container on the northern side of Spring Lane School near to its Plant Room (boiler house).
- Potential hydrocarbon spillages / leaks from vehicles parked around the site.
- Potential sources of contamination relating to the removal of the asphalt, sub base and capping layers (construction rubble) associated with existing access roads and car parks (including the Metrolink Radcliffe temporary car park to the north of Spring Lane School) – e.g. hydrocarbons (bitumen, tars, etc), pH,

- sulphate, etc
- Potential hydrocarbon spillages / leaks from vehicles parked around the site
- Potential historical sources from former Allotment Gardens possibly including greenhouses – ash (metals, pH, sulphate, TPH, PAH), pesticides, herbicides, petroleum hydrocarbons from heaters.
- Potential historical sources from former sports field (cricket ground) – herbicides
- Potential historical sources including ACM's, in Made Ground associated with former railways on the site, namely the southwest to northeast running former Clifton, Accrington & Colne Line and the former goods station with associated sidings to the southeast of this railway.

Potential Off-site Sources of Contamination

- Fill materials within the surrounding railway embankments to the former Prestwich Line to the west, to the former Radcliffe West Fork to the north and the Radcliffe East Fork (present-day Metrolink line) to the east.
- A coal shaft at the former Whittaker's Bridge Colliery (See Section 4) was used for effluent disposal by Radcliffe Paper Mills. This shaft lies 60m to the west of the site and on the opposite side of the Manchester, Bolton & Bury Canal. Furthermore, the shaft area has now been developed for residential housing. Given its setting, the potential for this shaft to form a pathway that could affect the development of the site is deemed unlikely.
- The nearest landfill, the Darbyshire Street infilled railway cutting (See Section 6), lies 144m to the southwest of the site. No other landfills lie within 250m of the site. Given the distance from the site and topography, the potential for the migration of shallow contaminated groundwater from off-site landfills is deemed unlikely.

Past Railways and Sidings

Colliery spoil derived from local collieries is likely to have provided a ready source of fill materials for the surrounding railway embankments along with arisings won from local railway cuttings. Such fill materials are likely to comprise (at least in part) Coal Measures rocks. Metals such as Arsenic, Nickel and Lead, are generally associated with the Coal Measures rocks. In addition, 19th Century colliery spoil also contains high proportions of boiler ash, which can have high concentration of organic contaminants, such as polyaromatic hydrocarbons (PAHs), etc.

Other sources associated with past railway land include spillage of coal, ash, greases and oils, and Asbestos from brake linings and lagging from the former locomotives and wagons in addition to creosote used as a wood preservative on timber railway sleepers.

With regards to the past railway and sidings on the site, the Department of the Environment Industry Profile for Railway Land lists the following chemical compounds as potential contaminants relating to the railway industry:

Department of the Environment Industry Profile for Railway Land	
Type	Potential Contaminants
Organic	hydrocarbons, diesel, lubricating oils, paraffin, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), solvents, ethylene glycol, creosote (contains PAHs), herbicides: atrazine, simazine, 2,4-5 – trichlorophenoxyacetic acid, sodium chlorate, dalapon, diuron, borax, paraquat, picloram, 2,4 - dichlorophenoxyacetic acid
Metals	ferrous residues metal fines
Other	asbestos ash and fill (possibly containing metals, phenols, sulphates and PAHs) sulphates

NB: The above list is not exhaustive nor does it imply that these chemicals are present or have caused contamination.

Potential Receptors of Contamination

Based on the data previously discussed, the following potential receptors to contamination have been identified:

- Humans – Pre-development completion, i.e. working on site during demolition and construction.
- Humans – Pupils, staff and visitors attending the school following development.
- Off-site Human Health receptors
- Surface Waters – none of concern - nearest water features to the proposed development area (shown in Appendix 6) are the Manchester, Bolton & Bury Canal 4m to the northwest and the ponds/reservoirs, 30m to the north beyond the former Radcliffe West Fork embankment.
- Groundwater – Groundwater within the on-site and off-site Secondary Undifferentiated and Secondary A Aquifers.
- Building structure and services following development.

The possible contaminant linkages are discussed below. It should be noted not all may be formed between all sources and receptors.

Identification of Pathways

Pathways to Human Health

A potential contaminant may reach a receptor by various routes. For example, in areas where contaminated material is exposed, dermal contact with the material, inhalation or ingestion of dust may occur.

Inhalation or ingestion of dust and water could occur during the construction and development phase at the site. Pathways from dermal contact with soil and groundwater may also arise. It is considered that the risk of short-term exposure for ground workers and other construction workers is low unless there are asbestos fibres in any Made Ground.

Post construction, the surface of the development area will predominantly comprise areas of new buildings, hardstanding and landscaped grassed areas. This is significant in that a number of potential pathways are possible. However, long-term direct contact and dust inhalation/ingestion should be mitigated considerably by any areas of contamination either being removed or buried below barriers such as new floor slabs, hardstanding or cover systems.

Ground Gas and Vapour related Pathways

Ground gas and vapour entry into buildings is considered to be a potential pathway for the proposed development due to the possibility of advection and diffusion into buildings, which may occur regardless of the presence of any hard standing across the site. Of particular importance for this site are pathways allowing for the migration of mine gases derived from the coal outcrops (and potentially coal workings) below the site, such as fissures or permeable granular bands within the Glacial Till capping, and these should be considered in terms of items referenced in the Conceptual Site Model as outlined within CL:AIRE; Good Practice for Risk Assessment for Coal Mine Gas Emissions (2021).

Pathways to Controlled Waters

The Manchester, Bolton & Bury Canal runs along the higher, north-western site boundary and the ponds/reservoirs to the north of the site lie beyond the former Radcliffe West Fork disused railway embankment. Hence, due to the local topography, these receptors are unlikely to be impacted by any on-site contaminants due to drainage pathways either not running towards them (in the case of the canal), or being obstructed (in the case of the ponds/reservoirs).

Groundwater levels at the site are currently unknown. The nearest recorded groundwater level refers to a dynamic sample borehole located along Bury Road adjacent to the Texaco petrol filling station, about 66m to the northeast of the site. Here, groundwater was struck at 2.40m below ground level and rose to 1.78m below ground level.

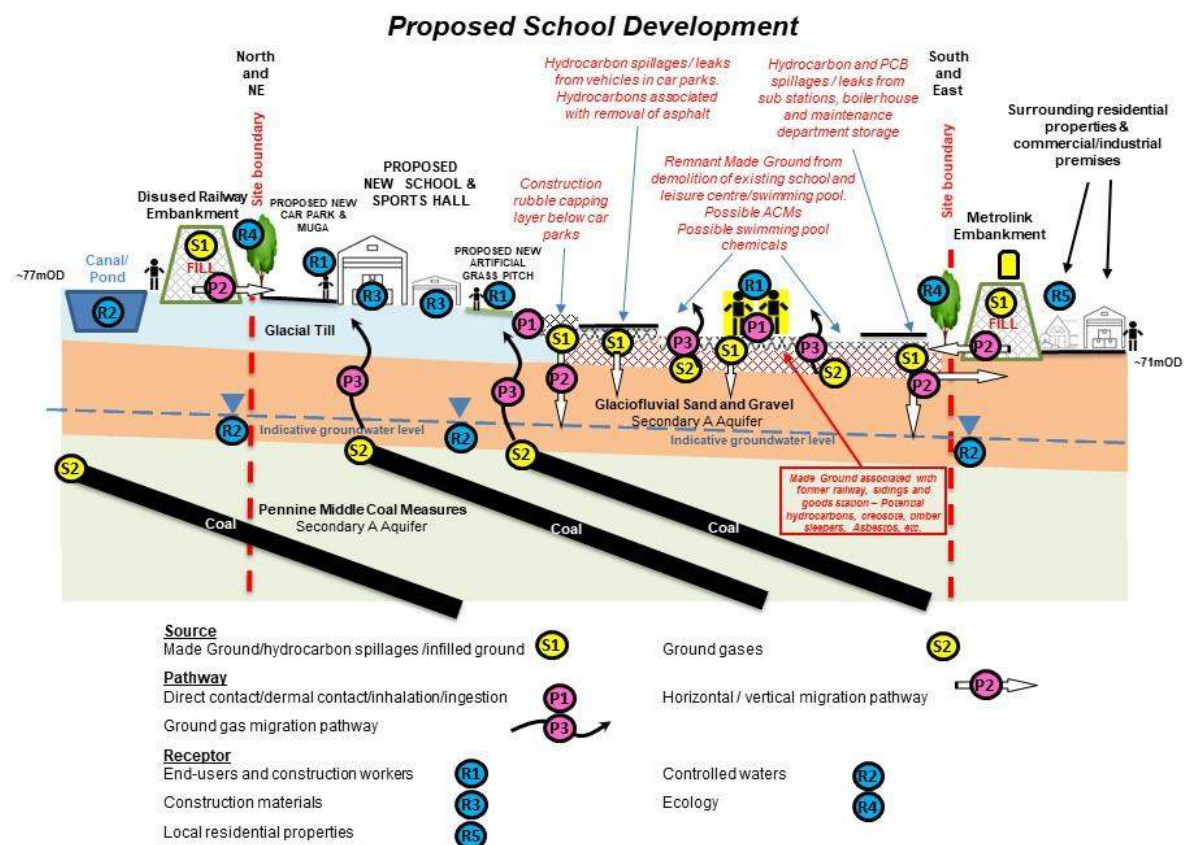
The vertical downward leaching of contaminants from any Made Ground into the groundwater is a potential pathway for contaminants to impact Controlled Waters. The presence of relatively impermeable Glacial Till, or cohesive layers in the Glaciofluvial Sand and Gravel Deposits, may reduce the downward migration of contaminants to the bedrock (i.e. the Pennine Middle Coal Measures Formation – Secondary A Aquifer).

Other Pathways

Other potential pathways that are possibly less significant to the site but still require consideration are; potential phytotoxic effects on sensitive landscaping plants; chemical attack on foundations and services, potential for surface run-off to transport soils off-site during construction works and permeation of contaminants through domestic water pipes.

Initial Conceptual Site Model

In accordance with BS 10175 and LCRM, a schematic Initial Conceptual Site Model has been developed based on the source-pathway-receptor data presented above. Further details of the risk assessment methodology are presented in Appendix 4.



The model shows the predicted geology and topography, the major on site potential contamination sources and vulnerable receptors. Levels shown are relative to Ordnance Datum and are based on published data previously presented in the report, although the drawing may not be considered to scale. The information presented above represents the preliminary conceptual ground model that may need to be revised based on information obtained as part of any future intrusive investigation. A number of sensitive receptors and potential pathways and sources (in association with a list of likely contaminants) have been identified.

The ground model and proposed end use described above have been broadly considered in relation to Nathaniel et al. 2015, The LQM/CIEH S4ULs for Human Health Risk Assessment. The proposed development generally does not

conform to the conceptual models defined in Nathaniel et al. 2015. However, for the purpose of this geoenvironmental assessment, the site is closest to public open space (parkland) and residential without home grown produce.

Potential Contaminant Linkages Assessment

For each contamination source there are potential contaminant linkages with all receptors. However, in the context of this site, not all of the contaminant linkages are plausible. The likelihood of the various pathways linking the contaminants to the receptors is presented in the table below:

The preliminary contaminant linkage assessment is based on current available guidance published by a number of sources and is summarised in Appendix 4.

The preliminary hazard assessment is a qualitative assessment of the risks posed by each viable pollution link identified. The hazard assessment leads to a recommended subsequent activity that could be:

- Action Required (AR) in the short term to break existing contaminant-pathway-receptor (CPR) link;
- Site Investigation Required (SIR) with objectives for risk estimation; or
- No Action Required (NAR) at this stage.

Hazard Identification				Hazard Assessment			
Link	Contaminant	Pathway	Receptor	Probability	Consequence	Risk	Contaminant Linkage Assessment
1	Contaminated Soil / Groundwater	Ingestion (via soil dust) and inhalation (via soil dust and vapours), ingestion through dirty hands, dermal contact with soil/water.	A- Humans using the site during construction.	Medium/ Reasonably foreseeable	Medium	Medium Risk	SIR: Proposed new school buildings, car parks and MUGA are shown largely to lie over undeveloped former sports field. However, southeast corner of new Sports Hall lies over former railway line. New grass pitch shown to lie partly over former railway sidings (latterly asphalt car park areas). New artificial grass pitch shown to lie over former railway sidings and goods station (latterly a school and leisure centre including asphalt car parks and access roads). Potential for contaminants to be present in Made Ground, demolition wastes (including Asbestos) and from spillages / leaks of hydrocarbons. Confirmation of contaminant status around existing school, leisure centre and car parks is required.
		Ingestion (via soil dust) and inhalation (via soil dust and vapours), ingestion through dirty hands, dermal contact with soil/water.	B- Humans using the site after development completion.	Negligible	Medium	Low Risk	NAR – With mitigation measures in place to break pathway.

Hazard Identification				Hazard Assessment			
Link	Contaminant	Pathway	Receptor	Probability	Consequence	Risk	Contaminant Linkage Assessment
3		Downward / Lateral Migration	C – Secondary A Aquifers (Glaciofluvial Sand and Gravel, Pennine Middle Coal Measures Formation) D – Surface water	Medium/ Reasonably foreseeable	Medium	Medium Risk	SIR: Concentrations of contaminants in groundwater (soil leaching samples if groundwater not encountered) required to quantify risks to sensitive receptors
		Direct contact.	E- Building Structures	Medium/ Reasonably foreseeable	Medium	Medium Risk	SIR: BRE SDI Test Suites to be carried out to determine appropriate ACEC Class for new buried concrete.
4							
5	Gas – Methane & Carbon Dioxide	Ingestion, inhalation, dermal / direct contact	A- Humans using the site during construction.	Low/ Unlikely	Severe	High/ Medium Risk	NAR: Atmospheric monitoring within excavations should be carried out in accordance with health and safety requirements.
6		Ingestion, inhalation, dermal / direct contact	B - Humans using the site after development completion.	Low/ Unlikely	Severe	High/ Medium Risk	SIR: Evidence for some Made Ground on the site. Potential for gas generation from historic landfills (e.g. Darbyshire Street infilled railway cutting to the southwest). However, given the age and distance of the landfill sites there is likely to be only a low potential for gas migration onto the site. Potential for mine gases from coal outcrops and probable shallow workings below the site. Monitoring required.
7		Gas migration from coal outcrops and shallow workings via fissures in Glacial Till and permeable Glaciofluvial Sand and Gravel Deposits	E- Building Structures	High	Severe	Very High Risk	SIR: Potential for mine gases from coal outcrops and probable shallow workings below the site. Monitoring is required in accordance with CL:AIRE; Good Practice for Risk Assessment for Coal Mine Gas Emissions (2021) and the Ground Gas Handbook (2009).
8		Ingestion, inhalation, dermal / direct contact	F- Ecology (Flora/Fauna)	Low/ Unlikely	Negligible	Low Risk	NAR
9	Contaminated Soil / Waste / Groundwater	Secondary Aquifer	F- Ecology (Flora/Fauna)	Low/ Unlikely	Mild	Low Risk	NAR

9.0 GEOTECHNICAL HAZARDS ASSOCIATED WITH DEVELOPMENT

In addition to the environmental hazards, there are also geotechnical hazards associated with the stability of the ground (including load bearing capacity and slope stability). Local Authorities follow the NPPF (2019) which requires that “site is suitable for its new use taking account of ground conditions and land instability....includes risks arising from natural hazards or former activities such as mining...” A summary of the geotechnical hazards and considerations is provided below:

Geohazards	
Compressible Ground	Negligible. No hazard recorded. (Some soft, wet, rutted ground noted in north-eastern corner of the site).
Collapsible Ground	Very low hazard potential recorded.
Swelling Clay	Very low hazard potential recorded. (Glacial Till likely to be of low swelling potential)
Running Sand	Very low hazard potential recorded. (Possible in excavations below the water table in Glaciofluvial Sand and Gravel Deposits)
Ground Dissolution	Negligible.
Landslip	Very low hazard potential. (Gradual slope of the ground means that only minor, low retaining walls are currently present. Localised steeper slopes are present in places on the western perimeter and along the scarp of the former Clifton, Accrington & Colne Line that run southwest to northeast across the centre of the site).
Mining & Quarrying	There is no evidence of any non-coal mining, mineral extraction or quarrying at the site. The site is crossed by two southwest to northeast trending coal seam outcrops. The Coal Authority considers that there are probable unrecorded shallow workings below the site (Refer to Section 4). Past mine entries and former workings associated with shallow coal mining have the potential for instability and subsidence.
Geotechnical Design Considerations	
Site Clearance	The current redevelopment proposals will include the clearance of all of the existing buildings present on site. The floor slabs of the existing buildings and car parks will require breaking out as part of the site clearance works.
Trees	To the south and west of the existing school/leisure centre are landscaped areas including several tall mature deciduous trees. The steep embankment slopes of the Radcliffe East and West Forks, which lie immediately off-site are also lined with various mature deciduous trees along with various smaller bushes. The far western corner of the site is densely vegetated including several very tall deciduous trees. Foundation design to take into account the effect of local trees and hedgerows in accordance with NHBC Standards 2021.
Existing Buildings / Obstructions	All permanent buildings and structures of the Spring lane School and Radcliffe Leisure Centre are currently present on site with associated foundations and floor slabs. The foundation types and depth is unknown. The temporary demountable swimming pool building is likely to be on shallow pad foundations.
Foundations	The redevelopment option involves new construction of a new Superblock over the undeveloped former sports field and a new Sports Hall, partly over the former sports field but with its southeast corner over a former railway line (latterly part of an asphalt car park area). Spread foundations are likely to be suitable at this site but must take into account the presence of the trees and hedges and be founded in competent ground below the depth of any Made Ground. There is a need to confirm the volume change potential where clay forms the foundation bearing stratum. The potential variation in the surface profile of the Bedrock, the variation in the strength / relative density of the weathered, partially cemented Bedrock that could affect foundation design needs to be confirmed. Should extensive Made Ground, or deeper zones of soft / loose / weaker natural strata be present then deep foundations, such as piles may be necessary. Vibro (stone) columns should not be used where shallow coal mining is present as they would form a preferential pathway for mine gas migration. For any proposed larger, multi-storey buildings, piled foundations may be required in order to support the anticipated high column loads. Ground investigation will be required in order to fully inform the design of such foundations.

Floor Slabs	The redevelopment option involves new construction of a new Superblock (over the undeveloped former sports field) and a new Sports Hall (partly over the former sports field but with its southeast corner over a former railway line latterly part of an asphalt car park area). Ground-bearing floor slabs may be suitable for competent natural soils or suitably engineered fill. However, suspended floor slabs may be required where soft/loose compressible soils exist near to formation level, possibly to allow for the effects of local trees on shrinkable clay soils, or possibly to preclude/reduce differential settlement where part of the building footprint is over engineered fill.
Groundwater	Shallow groundwater may be encountered in the Made Ground (where present) and shallow natural strata. Ground investigation will be required to determine whether any groundwater control measures will be required during construction. Given the current lack of on-site groundwater level data, the potential for a high water table (particularly over the lower, south-eastern part of the site) should not be discounted. A high water table could potentially hinder proposed earthworks operations.
Earthworks	Significant bulk earthworks are likely to be required to produce the development platform for the new school (particularly the south-eastern corner of the proposed new Sports Hall). Proposed platforms for the new sports pitches to have slopes around their perimeter. The cut/fill balance will need to be assessed along with determining the volume of excavated material deemed suitable for re-use as fill and the volume of additional new imported fill the is required. The volume of unsuitable excavated materials requiring off-site disposal will also need to be assessed. (Refer to the earthworks legend shown off the south-eastern corner of the proposed new Sports Hall on the Proposed Development Option Drawing presented in Appendix 6).
Slopes	Slope instability is likely to be low risk with only new slopes created surrounding the development platforms of the proposed new Sports Hall and Sports Pitches. All proposed slopes should be properly designed to ensure their long-term stability.
Retaining Walls	Currently a low stone retaining wall (at the base of a slope) runs alongside the existing access road to the car parks to the rear (north) of Spring Lane School. Other than a retaining structure for the southwest corner of the proposed new MUGA, no significant retaining structures are anticipated as part of the proposed development option.
Pavements / Hard Standing	The formation levels for the proposed new car parks and the MUGA are likely to be within the upper Glacial Till. Similarly, the formation level for the north-western half of the proposed new access road is also likely to be within the upper Glacial Till. The formation level for the proposed new artificial grass pitch is likely to be within Made Ground (given that it will lie over the footprint of the existing school and leisure centre which themselves were previously built over an area of railway sidings and a goods station). Similarly, the formation level for the south-eastern half of the proposed new access road is likely to be in Made Ground (given that it will lie over an area of former railway sidings and a former goods station. The likely variability of the Made Ground means that following testing, it may be prudent to adopt a lower-bound CBR value to reduce the need for pavement thickness design changes. Where unsuitable material is met at formation level, localised removal and replacement with suitably compacted granular fill will be required. This needs to be confirmed by the investigation.
Chemically aggressive ground conditions	Given that the new school buildings are to be constructed over the undeveloped former sports field (or upon engineered fill in the case of the south-eastern corner of the proposed new Sports Hall.) adverse pH and sulphate levels are unlikely. This needs to be confirmed as part of the investigation, particularly where any Made Ground is encountered within the building footprints.

The Geotechnical Risk Register is included in Appendix 5. This should be reviewed and refined following the preliminary investigation proposed in Section 10 below and further developed as the geotechnical design and assessment progresses.

A detailed ground investigation is imperative in the redevelopment of the site; the proposed investigations are for preliminary use only. Contractors for the scheme should obtain any additional investigation work that may be required to prepare their own detailed Ground Investigation Report and Geotechnical Design Report to Eurocode 7 and to prepare their own contaminated land risk assessment in line with Land Contamination Risk Management (LCRM, 2020) guidance including further ground investigation and risk assessment, remediation options appraisal and remediation strategy and verification (if required), which are to be used as the basis of the contractors detailed design.

10.0 CONCLUSIONS AND RECOMMENDATIONS

Environmental Risk Assessment

The results of the risk assessments indicate that there are potentially significant source of contaminants present over the south-eastern half of the site, primarily related to it previously including a railway, sidings and a good station and more-recently (currently) including car parking areas, a school, leisure centre and swimming pool including boiler houses, plant rooms and electricity sub stations.

There is the potential for spillages of fuel and other chemicals, as well as the presence of historic demolition waste, from the demolition of previous structures and used below landscaped areas, and the presence of new demolition waste in the foreseeable future when the existing school, leisure centre and swimming pool buildings are demolished. The boiler house and plant room may present a source of waste and contaminants. There is a medium risk to receptors, including human receptors during construction and to site users following development.

There was no evidence of localised areas of burning across the site.

A coal shaft at the former Whittaker's Bridge Colliery was used for effluent disposal by Radcliffe Paper Mills. This shaft lies 60m to the west of the site and on the opposite side of the Manchester, Bolton & Bury Canal. Furthermore, the shaft area has now been developed for residential housing. Given its setting, the potential for this shaft to form a pathway that could affect the development of the site is deemed unlikely.

The nearest landfill, the Darbyshire Street infilled railway cutting, lies 144m to the southwest of the site. No other landfills lie within 250m of the site. Given the distance from the site and topography, the potential for the migration of shallow contaminated groundwater from off-site landfills is deemed unlikely.

Given that there is little evidence for significant thicknesses Made Ground, the potential for ground gas generation on the site from this source is deemed to be low. The potential for ground gas migration onto the site from the recorded off-site historic landfills is deemed to be of little concern given their age and distance from the site. However, there is a high potential for mine gases from coal outcrops and probable shallow workings below the site to affect the development.

No specific precautions are required with respect to radon for the development options.

There is the potential for contaminants in Made Ground to migrate vertically into the underlying Secondary Undifferentiated Aquifer (Glacial Till) and the Secondary A Aquifers (Glaciofluvial Sand and Gravel Deposits and the Pennine Middle Coal Measures Formation). There is also the potential for lateral migration of contaminants onto the site from off-site sources, such as from the surrounding historic railway embankments surrounding the site.

If any soils are to be removed from site and disposed of at a Permitted facility, these should be chemically analysed to ensure appropriate waste classification and characterisation.

Geotechnical Risk Assessment

The risk assessment has concluded that as site is crossed by two southwest to northeast trending coal seam outcrops and hence the Coal Authority considers that there are probable unrecorded shallow workings below the site, this poses a significant geotechnical risk to the proposed new school development. Information is required in order to design appropriate foundations and floor slabs for the proposed development, as well as assess the potential for aggressive ground conditions for concrete design purposes. Where earthworks (cut and fill) are proposed to provide development platforms, geotechnical information will be required to assess the soils compaction characteristics, etc. and to examine the stability of any new slopes and the design of any proposed retaining structures.

Identified Geotechnical and Geo-environmental Abnormal Conditions.

The following Geotechnical Abnormal Conditions have been identified:

- Potential for shallow mining instability and subsidence relating to unrecorded past mine entries and former workings.
- Potential for remnant foundations, floor slabs and asphalt layers to remain at shallow depth if not fully broken out and removed during the proposed demolition of the existing school, leisure centre, swimming pool and temporary Metrolink Radcliffe car parking facility.
- The presence of numerous buried services, especially on the south-eastern corner of the site where buried electricity cables, gas mains, sewers and telecommunications cables serve the existing school, leisure centre, swimming pool and temporary Metrolink Radcliffe car parking facility.
- Given the current lack of on-site groundwater level data, the potential for a high water table (particularly over the lower, south-eastern part of the site) should not be discounted. A high water table could potentially hinder proposed earthworks operations.

The following Geo-environmental Abnormal Conditions have been identified:

- Elevated concentrations of contaminants may be present associated with the existing and historic land use of the site. This may include remnant demolition materials following the removal and clearance of the existing school, leisure centre, swimming pool and temporary Metrolink Radcliffe car parking facility, and buried Made Ground associated with the site's former historical use as a railway, sidings and goods station.
- Potential for contaminants to be present in shallow soils in the vicinity of the electricity sub stations, boiler house, plant room and car parking areas including the possibility of Polychlorinated Biphenyls (PCBs) and petroleum hydrocarbons from past leakages or spillages.
- Potential for contaminants to vertically and laterally migrate to the sensitive controlled waters receptor, of the Secondary A Aquifers (Glaciofluvial Sand and Gravel Deposits and Pennine Middle Coal Measures Formation) beneath the site. Off-site sources of contaminants may also be associated with the historic railway embankments surrounded the site.
- The potential for ground gas generation from Made Ground below the site and also migration of mine gases from coal outcrops and probable shallow workings via fissures in the Glacial Till and any permeable granular layers.

Recommendations for Further Works and Proposed Investigation Strategy

Re-use of Soils

It is recommended that a UI exemption is applied for in order to re-use up to 1,000 tons of soil at the site. If any cut/fill operations will exceed the limit of a UI exemption, then soils should be assessed and re-used in accordance with the requirements of the CL:AIRE Definition of Waste: Code of Practice (DoWCoP). The works requires are as follows:

- A baseline contaminant assessment should be undertaken in order to allow screening of clean naturally occurring soils for importation to assess for potential increased contaminant loading, if there is the potential for a shortfall of materials, with the materials imported via the CL:AIRE DoWCoP Direct Transfer or Hub and Cluster scenarios;
- As most developments require a portion of excess soil to be sent to a landfill sites, an assessment of the Made Ground and natural strata should be made to classify them in accordance with Landfill Waste Acceptance Criteria;
- If soils are re-used in accordance with the CL:AIRE DoWCoP these soils may potentially still be classified as waste until a Verification Report has been submitted; and
- If contamination is found during excavation or construction, stop work and make excavations safe and contact an experienced geo-environmental engineer to re-assess potential risks.

Proposed Intrusive Investigation Strategy

In order to make a quantitative assessment of the potential risks and so any required remedial measures can be designed, it is recommended that a Phase 2 Investigation is carried out in accordance with BS 10175: 2011+A2:2017. This should be combined with a geotechnical investigation carried out in accordance with BS 5930:2015+A1:2020 to assist with the proposed development design. It is recommended that the aims of future investigations are:

- Determine the presence of shallow coal seams below the site and also the presence of any unrecorded mine entries or workings in the vicinity of the proposed new school buildings.
- Determine whether any contaminative substances are present at site associated with any Made Ground and historical spillages / leaks.
- To confirm the depth and extent of any Made Ground that may be present across the site.
- Determine the geotechnical properties of the natural strata at the site, and any Made Ground that may be present, to allow for the design of the proposed development foundations, the aggressiveness of the soils to buried concrete and provide information for pavement / hard-standing design and any earthworks including slopes and retaining structures.
- Determine the presence of any groundwater and also determine if it has been impacted by contamination.
- Confirmatory ground gas monitoring and risk assessment, if required, in accordance with CL:AIRE; Good Practice for Risk Assessment for Coal Mine Gas Emissions (2021) and the Ground Gas Handbook (2009).

In order to fulfil the aims detailed above, it is recommended that this investigation comprises:

- Exploratory holes comprising four (4 No.) cable percussion with rotary-cored follow-on (CP/RC) boreholes to a depth of up to 40m below ground level (ideally at least 30m below rockhead) for the proposed new Superblock and Sports Hall. These boreholes are to be sunk both to determine the presence of any shallow mine workings and to provide geotechnical data for foundation design.
- Seven (7 No.) dynamic sample/ window sample (WS) boreholes to a depth of up to 5m below ground level sunk to provide both geotechnical data to supplement foundation design and also for the MUGA retaining structure, and to provide geo-environmental data across the site and in specific accessible areas (e.g. near canal and electricity sub station/boiler house).
- Six (6 No.) machine-dug trial pits located along the route of proposed new access road (where accessible) and in area of proposed sports pitch, partly to facilitate soakaway testing.
- Five (5 No.) hand-dug pits to target specific less accessible areas (e.g. near plant room and swimming pool filtration unit) and also along the route of proposed new access road.
- Three (3 No.) in situ soakaway tests to determine the soil infiltration rate of the soils (Glaciofluvial Sand and Gravel Deposits indicated) below the lower, eastern part of the site.
- Fourteen (14 No.) DCP tests (adjacent to service inspection pits and trial pits where possible) to provide geotechnical data for the design of the proposed new car parking areas and access road.
- Recovery of samples from service inspection pits and boreholes to undertake chemical testing including Asbestos, heavy metals, Total Petroleum Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs);
- Soil leaching tests of Made Ground materials to assess any potential impact to the underlying Secondary Undifferentiated and Secondary A Aquifers, if shallow groundwater is not encountered;
- Recovery of samples of the appropriate Sample Class for classification, strength, compressibility, earthworks classification and buried concrete classification;
- Sampling of 'natural' soils to allow the establishment of baseline soil chemical concentrations to allow assessment of any proposed soil importation via the CL:AIRE DoWCoP, if soil importation is likely to be required;
- For each contaminant identified, a quantified application of risk assessment models in accordance with LCRM;
- Installation of combined gas/groundwater monitoring wells and their subsequent monitoring and sampling. Monitoring wells to be carefully designed to ensure monitoring of discrete strata (i.e. Made Ground/natural Drift Deposits and Coal Measures);
- Commissioning of a GIR and Phase 2 report following the completion of the intrusive investigations; and
- Review and update the Geotechnical Risk Assessment.

The figure in Appendix 7 shows the proposed development option (Sketch Option 02) along with the location of proposed exploratory holes.

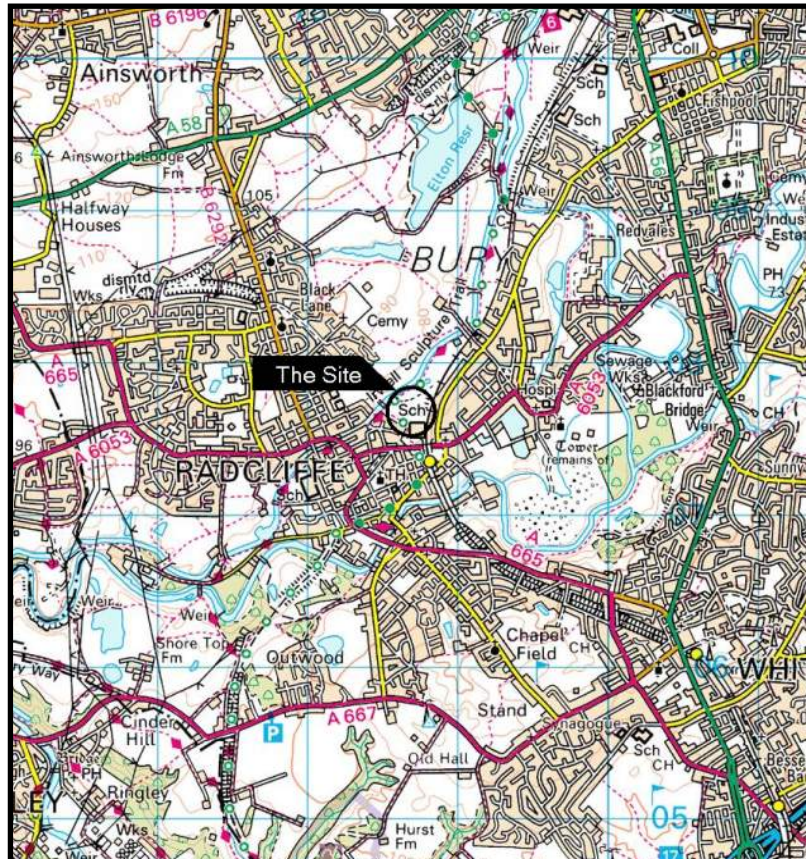
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- 14) The Ground Gas Handbook; Steve Wilson, Geoff Card & Sarah Haines (2009).

APPENDIX I

Site Location Plans and Site Walkover Photographs (taken 24th January 2022)

SITE LOCATION PLAN



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Desk Study Report
at
Star Radcliffe
for
Department for Education

GEOTECHNICS
geotechnical and geoenvironmental specialists



Banana Path Radcliffe

Manchester, Bolton & Bury Canal

Grest Hall Cl

Sheaf Field Walk

Canalside Gardens

Gordon Cl

DB Solutions Group

Bury Council

Whittaker House

Whittaker St

Kingmoor Ave

Shirebrook Dr

Lundore Cl

Banana Path

Spring Lane School

Banana Path

Coney Green Leisure Centre (Temporary...)

Radcliffe Leisure Centre

Radcliffe Car Auctions

Van Dealers
Motor vehicle dealer

Metrolink Radcliffe
Park and Ride

Bury Road Garage

Radcliffe Furnishings
Home Furniture Shop

Bed
Home Furniture Shop

Texaco

Newbridge Cl

Bury Rd

Northern
Broaching Services

Hair Extension
Technician

Polar Heating
& Hot Water

St Marys Catholic
Social Club

Zahid Bros Newsagents
Newsstand

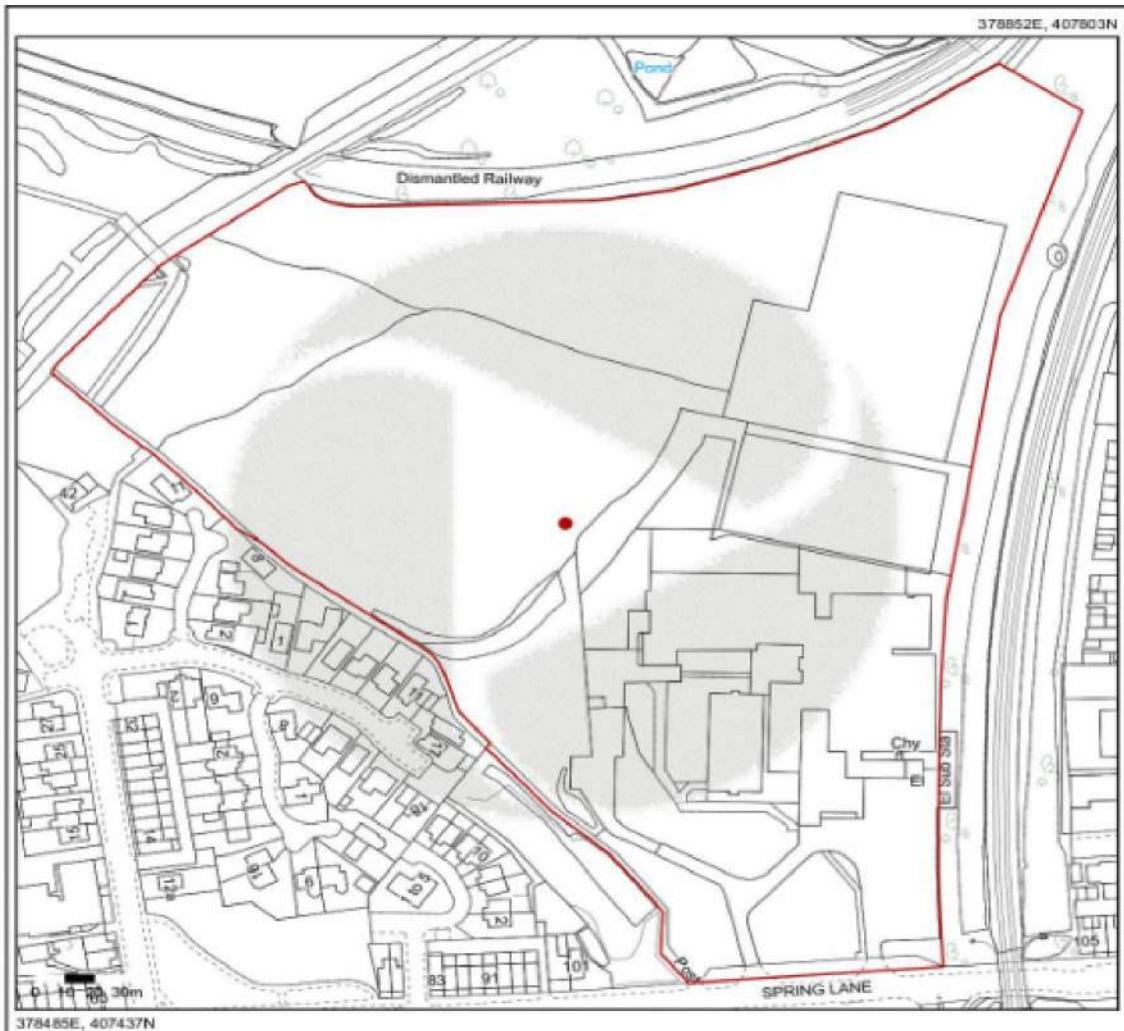
The New Swan

Spring Ln

Scott Davies Design

A6053

A6053

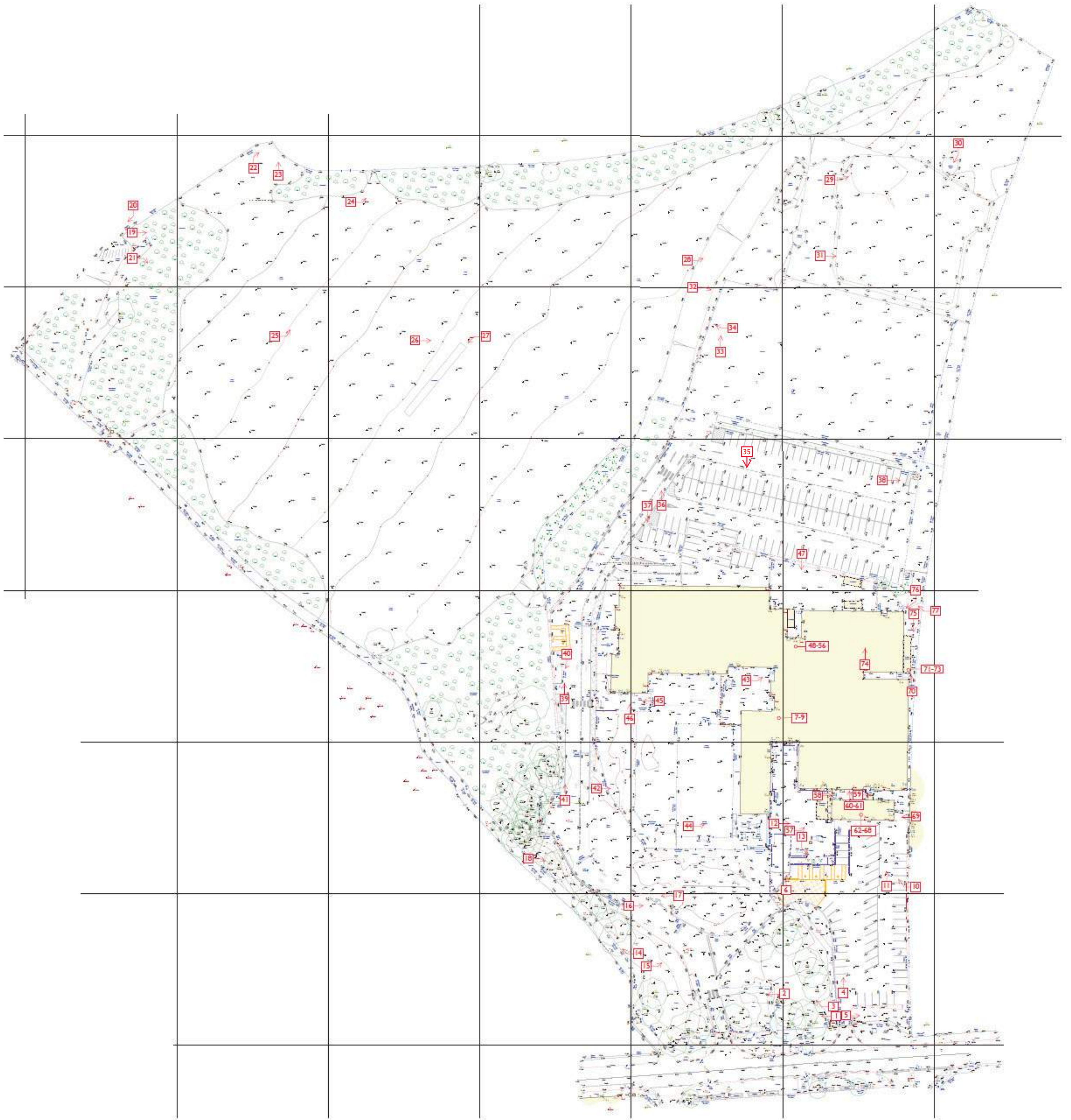


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Land on the north side of
Spring Lane
Radcliffe
Manchester
M26 2SZ



Case Reference: EAD.054507.00000.RPA



Client: DEPARTMENT FOR EDUCATION	
Project: STAR, RADCLIFFE	
Drawing Title: SITE WALKOVER PHOTOGRAPH LOCATION PLAN	
Scale: NTS	Date: APRIL 2022
	Project No: PC228400

PHOTOGRAPHS

Project Number : PC228400

Project : STAR, RADCLIFFE



1) Looking west onto Banana Path from site entrance off Spring Lane



2) Southwest corner of the site

PHOTOGRAPHS

Project Number : PC228400

Project : STAR, RADCLIFFE



3) Looking northwest onto Banana Path from site entrance off Spring Lane



4) Looking north towards Radcliffe Leisure Centre

PHOTOGRAPHS

Project Number : PC228400

Project : STAR, RADCLIFFE



5) South-eastern corner of the site with Metrolink embankment beyond



6) Looking north towards entrance to Radcliffe Leisure Centre with recycling bin by gate

PHOTOGRAPHS

Project Number : PC228400

Project : STAR, RADCLIFFE



7) Asbestos cement ceiling tiles



8) Asbestos cement ceiling tiles of Leisure Centre building with overhead hatch in background

PHOTOGRAPHS

Project Number : PC228400

Project : STAR, RADCLIFFE



9) Plywood boards blocking overhead hatch in Leisure Centre building



10) Radcliffe Leisure Centre with boiler house and chimney to the east (right) side

PHOTOGRAPHS

Project Number : PC228400

Project : STAR, RADCLIFFE



11) Boiler house, chimney and grey disused Radcliffe Sub Station on east (right) side



12) Looking east towards grey disused Radcliffe Sub Station

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13) Outdoor seating area and recycling bins



14) Banana Path along western site boundary

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15) Looking northeast across MUGA towards Spring Lane School



16) Rough ground to the west of Leisure Centre

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17) Rough ground, access road and stone retaining wall with Banana Path beyond



18) Looking southeast from Banana Path

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19) Looking east from Bridge 17e of the Manchester, Bolton & Bury Canal



20) Bridge 17e of the Manchester. Bolton & Bury Canal

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21) Western corner of the site from the Manchester, Bolton & Bury Canal towpath



22) Wing wall of former bridge carrying L. & Y. R. Radcliffe West Fork over canal

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23) Northwestern corner of the site



24) Embankment to the former L. & Y. R. Radcliffe West Fork

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25) Looking NNE across former rugby pitch towards disused railway embankment



26) Looking east from former rugby pitch

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27) Artificial turf of former cricket square



28) Former running track and athletics ground in northeast corner of the site

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29) Soft rutted ground west of former running track



30) 5m diameter concrete base to former hammer and discus throwing area

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31) Construction rubble placed over former running track and athletics ground



32) New gravel-surfaced car parking area north of car park adjacent to Spring Lane School

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33) Looking north over new gravel-surfaced car parking area



34) Electricity cables to lighting columns along west side of new gravel-surfaced car parking area

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35) Tarmacadam car park on former tennis courts north of Spring Lane School



36) Car park north of Spring Lane School

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37) Electrical service box in car park on north side of Spring Lane School



38) Electrical service box in northeast corner of car park north of Spring Lane School

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39) Recycling bin store near entrance to Spring Lane School (looking north)



40)) Recycling bin store off car park access road near entrance to Spring Lane School (looking south)

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41) Temporary fencing and cables along west side of car park access road



42) Looking east towards Spring Lane School from car park access road. MUGA on south (right) side

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43) Incoming services to Spring Lane School



44) Multi-Use Games Area (MUGA) with rubber surface

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45) Entrance to Spring Lane School from car park access road 46) Entrance to Spring Lane School building

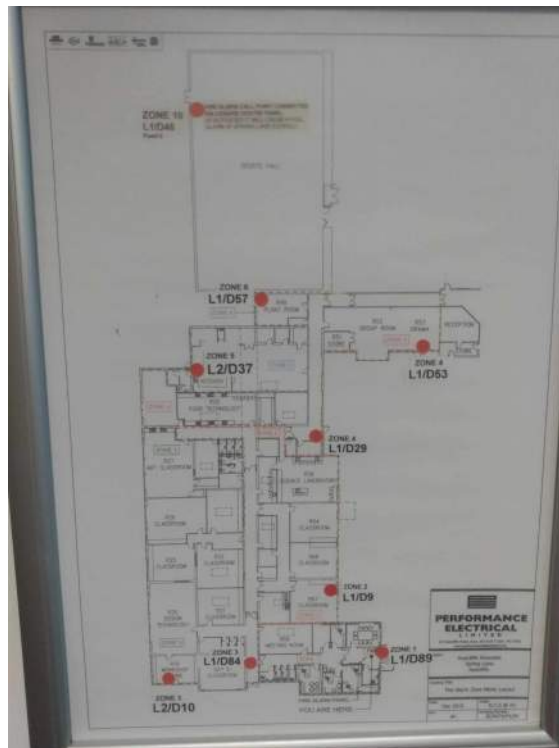
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47) Looking south towards Plant Room between Sports Hall and blue shipping container



48) Fire Alarm Zone Mimic Layout Plan for Spring Lane School

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49) Plant Room (Boiler Room)



50) Possible oil stains on Plant Room floor

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51) Plant Room (Boiler Room) of Spring Lane School



52) Plant Room (Boiler Room) of Spring Lane School

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53) Plant Room (Boiler Room) of Spring Lane School



54) Plant Room (Boiler Room) of Spring Lane School

PHOTOGRAPHS

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55) Plant Room (Boiler Room) of Spring Lane School



56) Plant Room (Boiler Room) of Spring Lane School

PHOTOGRAPHS

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57) West end of boiler house of Leisure Centre



58) Looking east along passage to boiler house chimney

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59) Boiler house to south (right) of chimney



60) Fire exit from blue swimming pool building

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61) Corrosion to steel reinforcing bars and concrete of boiler house chimney



62) Boiler house interior

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63) Boiler house interior



64) Boiler house interior

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65) Boiler house interior



66) Boiler house interior

PHOTOGRAPHS

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67) Boiler house interior



68) Electrical cables in pit in boiler house

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69) Spring Lane School Electricity Sub Station



70) Looking north past blue swimming pool filtration unit

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71) Pipework from blue swimming pool building passing under stairs to the filtration unit



72) Filtration unit interior

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73) Filtration unit interior



74) Looking north up access ramp to walkway around swimming pool building (Old tarmacadam surface visible on right below pool)

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75) Looking south towards filtration unit on old cobbled roadway at rear of Sports Hall



76) Northeast corner of Sports Hall

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77) Land off northeast corner of Sports Hall