

**HUDDERSFIELD TOWN AFC
CANALSIDE CAMPUS**

**INITIAL SITE INVESTIGATION
REVIEW SUMMARY**

REVISION S1

Prepared for

FWP

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PROJECT 6981

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Duty of Care

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Introduction

The existing Canalside Sports Complex which is located at 509 Leeds Road, Huddersfield HD2 1YJ comprises two plots of land, one located immediately north of the Huddersfield Broad Canal (Canal) and one located between the south side of the Canal and Leeds Road. An initial site appraisal covering the two plots was undertaken by Ever Group Ltd on behalf of Huddersfield Town AFC and the Phase I report was issued in May 2018.

The proposed works comprise the phased redevelopment of the existing Canalside Sports Complex land located to the south of the Huddersfield Broad Canal to provide a reconfigured access from Leeds Road, 128 space visitor parking, first team training facility (including hydrotherapy rooms, changing rooms, gymnasium and medical treatment area, office space and media and commercial zones), viewing stand, a range of pitches and remodelling of the former groundsman's storage building. The Ever Group Ltd report also considered any concerns associated with the development of on-site Water Abstraction boreholes to draw water from the underlying aquifer to feed sprinkler systems at the site.

TRP Consulting has been appointed to undertake a brief review of Ever Group Ltd's Phase I Report by FWP on behalf of the client, Huddersfield Town AFC. The land located to the north of the Canal has not been reviewed within the TRP Consulting report.

This appraisal is based solely on desk study research of information generally accessible in the public domain. No consultation or site visit has been undertaken at this stage.

Sources of Information

The general review has been undertaken by TRP Consulting based on the following sources:

- Phase I Desk Study ref. HTAFC 3339 and appendices A, B and C, prepared by Ever Group Ltd, dated May 2018
- Groundsure OS mapping included in Appendix A of the Phase I Desk Study ref. HTAFC 3339, prepared by Ever Group Ltd, dated May 2018
- Canalside Training Complex Redevelopment Proposals prepared by FWP, dated July 2018

The findings of this report are based on finite information obtained from research and consultations. TRP Consulting cannot guarantee the reliability of all such information and the searches should not be considered exhaustive. The findings of the report may need to be

reviewed as any future exploratory investigations progress and if any additional archive information becomes available.

The Site

The site is located between Leeds Road and the southern side of the Huddersfield Broad Canal in Huddersfield. There are two locks on the Canal in the section along the northern site boundary. The development site is centred around national grid reference (NGR) 415664, 418362 and ground level is around 57m AOD. Site area is around 64,156 m².

The site is currently occupied by football training facility/former social club, pitches, bowling green, car parking and outbuildings.



Figure 1: Existing site plan

Historic OS Mapping Summary

A review of historical mapping covering the site and surrounding area was undertaken by Ever Group Ltd together with a review of the Groundsure Data Reports to confirm the historic and current site settings.

The Site - Historic mapping between 1889 and 1918 indicates that the site was undeveloped. By 1930-31, mapping indicates the site is a recreational ground with a pavilion, bowling greens and tennis courts near the eastern boundary. Additional bowling greens and tennis courts had been constructed by 1958. The site remained largely unchanged until a football ground was first shown on mapping of 1990-93. Mapping of 2014 shows the land as a cricket ground and football grounds. No significant changes are shown on later mapping.

Land in the vicinity of the site – nearby industrial uses identified over time have included a woollen mill, tramway along Leeds Road, a number of ‘works’ immediately beyond the southern boundary and collieries, engineering, old shafts, fire clay works and quarries. Unidentified tanks are also noted. Residential buildings have been developed in the vicinity of the site. Earthworks/landfill have been located on land adjacent to the eastern boundary, along the northern boundary with the canal and adjacent to the canal on land immediately to the west of the site. There are a number of current potentially contaminative industrial uses listed in the vicinity of the site, e.g. former and active fuel stations, motor repairs, scrap yard, recycling facility, railway and landfill (e.g. licensed for liquid sludge).

Anticipated Geology

Geological mapping identified in the report indicates the general succession of strata on the site to be as follows:

Geological Mapping Summary	
Strata	Description
Superficial Strata	Alluvium comprising clay, silt, sand and gravel of around 5m thickness.
Bedrock	Lower Coal Measures comprising fine grained Sandstone interbedded with Mudstone and Siltstone and interbedded Coal and Fireclay seams of the Upper Carboniferous Period.
Faults	None

The Ever Group Ltd report contains records of local BGS borehole logs for boreholes located within the vicinity of the site together with the relevant water Quantity/Strike/Depth records.

Mining

The site lies within the area mined by the Fieldhouse, Peace Pit and New Peace Pit Collieries and the Leeds Fireclay Company. There is no evidence of quarrying within 500m of the site.

Table 4 within the Ever Group Ltd report records the sequence (depth and thickness) of Coal Measures strata beneath the site and indicates that the Coal Measures generally comprise Mudstone underlain by the Hard Bed Band Coal and Fireclay, Hard Bed Ironstone, Coal and Fireclay, Middle Bed Coal and Sandstone and Soft Bed Coal and Fireclay, interbedded with Mudstones and thin Sandstones. These are underlain by the Soft Bed Flag Sandstone, Pot Clay Coal and Rough Rock Sandstone. These are in turn underlain by Millstone Grit.

Coal Mining report

The information provided by the Coal Authority uses records dating back to 1872 and is summarised below:

- The site is located within an area that could be affected by past underground mining from one seam of coal at shallow depth which was last worked in 1886. Any associated ground movement should have stopped.
- The site is not in the likely zone of influence of any present underground workings, within an area for which the Coal Authority is determining the granting of a licence for mining or otherwise working coal by underground methods or in an area that is likely to be affected at the surface from planned future workings, although coal reserves still exist in the area.
- The Coal Authority is not aware of any damage arising due to geological faults or other lines of weakness that may have been affected by coal mining.
- The site is not within 200m of the boundary of any opencast mining site or within 800m of the boundary of any opencast site for which the Coal Authority is determining whether to grant a license.
- No damage notices have been received for any property within 50m of the site since October 1994. The Coal Authority is not aware of any stop notices or requests to carry out preventative works.
- There is no record of any gas emissions requiring action by the Coal Authority.
- There may be also unrecorded mines or underground voids at shallow depth (<30m).

Mining Risk Assessment

Geological mapping indicates that the 36 Yards Coal seam outcrops east of the site. Evidence from the Ramsden Estate Archives indicates that at least 2 coal seams and 2 fireclays were mined beneath the larger site covered by the Ever Group Ltd report (i.e. includes land north of the Canal). It is conjectured (from the depth of the colliery mine shafts and other evidence) that the underlying Soft Bed Coal and Fireclay may also have been mined. There are no records of abandonment plans for ironstone mining, however, there is evidence that ironstone mining occurred in the vicinity of the site. Voids may migrate upwards over time resulting in associated subsidence.

Strata Beneath Site Estimated From Geological Plans

Strata	Thickness in m	Depth in m bgl	Workings recorded by Coal Authority/Archives
Alluvial Deposits		0 – 10	
Stanningley Rock Sandstone			
Hard Bed Band Coal	0-0.61	20	Yes
Hard Bed Band Fireclay	1.83		Yes-Seggar Clay
Hard Bed Ironstone			Possible
Hard Bed Coal	0.71	40	Yes
Hard Bed Fireclay	2.03		Yes-White City
Middle Band Coal	Thin – 0.20	60	Unlikely
Middle Band Rock Sandstone			
Soft Bed Coal	0.8	75	Unknown
Soft Bed Fireclay	0.25	80	Unknown
Soft Bed Flag Sandstone		80+	
Pot Clay Coal	Thin	90	No
Rough Rock Sandstone		90+	

Mudstone sequences have been omitted.

Coal Authority Guidance has recently changed regarding the thickness of competent cover overlying worked coal seams that is required to avoid subsidence. Calculations within the Coal Mining Risk Assessment section of the report suggest that there is likely to be inadequate bedrock cover over previously worked coal seams to prevent collapse into voids and associated subsidence at the site.

No special radon protection measures are required in the construction of new buildings.

Hydrogeology and Hydrology

Environment Agency Groundwater Vulnerability maps have been consulted and the information is presented in the table below.

Environment Agency Vulnerability Summary	
Strata	Description
Superficial	The superficial strata are designated as a Secondary A Aquifer.
Bedrock	The bedrock is designated as a Secondary A Aquifer.
Source Protection Zone (SPZ)	The site is outside any source protection zones.

Groundwater deposits within the Alluvial deposits are generally perched. The underlying Soft Bed Flag Sandstone and Rough Rock Sandstone are likely to produce the groundwater for

any abstraction wells and wells may need to be drilled to just over 100m depth to encounter the groundwater. Several wells drilled into the aquifer in the local area experienced artesian conditions and achieved a resting water level of <50m bgl.

The closest surface water feature is the Huddersfield Broad Canal adjacent to the northern site boundary which flows north east to south west. The River Colne is located around 737m east of the site.

There are 15 surface water abstraction points licensed between 469m east and 1,000m south west of the site for uses such as general cooling, general use related to secondary category and process waters taken from the Canal, River Colne and tributaries. There are 9 recorded groundwater abstraction points within 1,000m of the site for general cooling, process water and general use relating to secondary category uses. There are currently no water abstractions for a potable water supply recorded within 1,100m of the site. There may be unrecorded or unlicensed wells in the vicinity of the site.

There are 6 discharge consents to the River Colne or Canker Dyke recorded in the report within 61m north east of the larger site covered by the report (i.e. including land to the north of the Canal) to 479m east of the current proposed development site.

Flooding

EA Mapping indicates that the site is located in fluvial Flood Zones 2 (north west corner) and 3 (rest of the site). Land assessed as being within Flood Zone 2 has between 0.1% – 1% chance of flooding from rivers in any year (between 1:1000 and 1:100 chance) or between 0.1% – 0.5% chance of flooding from the sea in any year (between 1:1000 and 1:200 chance). Land assessed as being within Flood Zone 3 are at a 1% or greater probability of flooding from rivers or 0.5% or greater probability of flooding from the sea. There are currently no areas within 250m of the site benefitting from flood storage or flood defences. There is a low potential for groundwater flooding at the site.

Landfill and Waste

A landfill site is recorded as being located adjacent to the subject site. There are 9 historic or current landfill sites located within 250m of the site.

Potentially Contaminative Uses on Site and Surrounding Area

The report identifies a number of potentially contaminative uses both on and in the vicinity of the site. These include:

- Organic substances from waste fuel/unspecified works (e.g. PAHs, TPHs)
- Asbestos from building materials
- Heavy metals from mine waste
- Waste from brick/coke manufacture
- Mine waste present in Made Ground

In addition, there is potential for contamination and the generation of landfill gases associated with Made Ground under the existing buildings, any hardstanding and in the adjacent landfill.

A copy of the Ever Group Ltd Summary of Environmental Risk is included in Appendix A.

Conclusions and Recommendations

Environmental

1. Site use as open land/recreational facility has a generally low risk of contamination.
2. There is potential for contamination to be present on the site from organic substances from waste fuel/unspecified works (e.g. PAHs, TPHs), Asbestos from building materials, heavy metals from mine waste present in Made Ground and waste from brick/coke manufacture.
3. Adjacent land use has included industrial, coal and fireclay mining, brickfields, coke ovens and landfill.
4. PPE will be required for site workers.
5. Future site use for sports pitches should result in a low risk for future site users.
6. There are 9 landfill sites located within 250m of the site. Gas monitoring will be required to assess the risk to the site from methane and landfill gases. Gas mitigation measures may be required.
7. Radon Protection is not required for new buildings.
8. Contamination is unlikely to detrimentally impact upon groundwater abstraction provided boreholes are permanently steel encased.

Mining

1. There is a low risk of deep mining affecting the development.
2. There are no recorded mine shafts on the site although there is potential for unrecorded shafts to exist in the area.
3. Evidence from abandonment plans suggests that the entire site was undermined. There is a high risk of ground subsidence occurring on the site due to historic mining beneath the site at shallow (<30m) depth as there is insufficient bedrock cover above worked seams. A mining investigation will be required in areas of proposed buildings. Stabilisation by grout injection into voids may be required.
4. Boreholes will require permanent steel casing through the underlying strata and mine works. This will seal off any voids and prevent mine water and methane gases from entering the boreholes.

Geotechnical

1. Made Ground and Alluvial deposits will be unsuitable founding strata for buildings.
Ground investigation and geo-technical testing will be required for the design of suitable foundations for buildings and hardstanding.
2. Trench excavations in Made Ground may require temporary support.

Abstraction Boreholes

1. Boreholes will need to be cased with steel casing through mined ground to seal them from voids, mine water and ground gases.
2. Boreholes sunk to a depth of 100m bgl should encounter sufficient groundwater for the required purposes. It is anticipated that groundwater levels will rise to a resting level of <50m bgl. In-borehole submersible pumps will raise groundwater to ground level to be distributed via pumps to increase the water pressure for use on the fields. The report recommends that one borehole is drilled on each side of the Canal (i.e. the land north of the canal is not included within this review, therefore one abstraction borehole to be drilled on the development site).
3. Electricity will be required with the headworks being contained in a chamber with a flush manhole cover.
4. A Coal Authority drilling permit and an EA abstraction license will be required.

An intrusive ground investigation is recommended to assess suitable foundation strata and the potential for mining subsidence prior to any new construction being undertaken on the site.

Intrusive Site Investigation

It is proposed to undertake an initial intrusive investigation on the site targeted to the specific development proposals. The site investigation will be designed to provide independent and comprehensive information, address the geo-technical and environmental issues and allow appropriate remedial action to be defined based on the findings of the investigation.

The investigation and testing will allow the risk assessment to be refined to determine whether any remedial measures are necessary to protect site users.

The investigation is intended to confirm the following:

- i. The succession of superficial strata and in particular the depth of topsoil and fills and the consistency of the underlying strata.

- ii. The presence of voids in mined coal seams or fireclay seams which could affect the stability of the site.
- iii. Geotechnical parameters for design of underground concrete, foundations and hardstanding.
- iv. Contamination levels in superficial strata and groundwater in order to assess hazards to the development and to classify materials for disposal.
- v. Gas and groundwater monitoring to monitor groundwater levels and toxic gases and to assess suitable mitigation or remedial procedures and measures.
- vi. Provision of an abstraction borehole will require the excavation of a borehole to around 110m bgl with sampling of soils and groundwater to assess the potential water quality and the requirement for any water treatment. A pump test over 24 hours will enable assessment of levels of drawdown and time for water level to recover. This element will not form part of the initial site investigation.

Particular details of initial investigation

The site investigation will comprise sampling and testing to determine the nature, thickness and geotechnical parameters for superficial strata:

- Liaison with the Coal Authority will be required to obtain technical advice and permits before site works commence.
- 1no. rotary coring borehole taken to 30m bgl to investigate the potential strata, voids and stability of the site.
- 8 no. Cable percussive boreholes initially taken to a depth of 10m (although this depth could be reassessed based on the information obtained from the rotary coring borehole) to assess the general founding strata.
- 10 no. trial pits excavated to between 2.0 - 4.0m bgl to investigate the general strata.
- 2no. hand excavated trial pits adjacent to the existing building taken to 1.0 - 2.0m bgl, with suitable support for the sides and in line with current H&S guidance, to investigate the foundations of the existing building.
- Representative samples of the superficial soils and underlying natural strata and groundwater will be taken and selected samples forwarded for chemical analysis of soils and groundwater.
- 3 no. Soakaways for the design of SUDs.

Summary Environmental Risk Assessment

A risk assessment was undertaken using a site end use of Playing Field Site Use with grass uptake to derive the following conceptual model.

Pathways	Receptors	Perceived Risk	Probability of Risk	Consequence of Risk	RISK
Environmental					
Inhalation of vapours such as methane from landfill and hydrocarbons from ground contamination	Existing/future occupants of the buildings and workmen.	Methane & Carbon Dioxide from possible infilled land, last site use. Hydrocarbons.	Low Likelihood	Severe-Methane can be explosive in air. Carbon dioxide can be fatal. Hydrocarbon can have long term health effects.	Low to Moderate historic landfill within 250m. Hydrocarbon odours possible. Methane from shallow mine workings possible. Monitoring required as new buildings may need protection.
Ingestion of and/or skin contact from contaminated soil	Existing/future occupants of the building and workmen	Metals, hydrocarbons	Low Likelihood	Mild	Low to Moderate – Players are having contact with grass.
Ingestion of Contaminated drinking water	Local abstraction wells	Contamination of potable water	Low likelihood to Unlikely	Medium - prosecution can occur if site is affecting controlled waters	Low - No potable boreholes within 1,100m.
Transportation by surface and/or groundwater	Groundwater Groundwater Surface Water	Contamination of shallow groundwater in the Superficial Deposits Contamination of groundwater in Coal Measures Sandstone where abstraction is proposed Contamination of surface water	Low Likelihood Unlikely Low Likelihood	Medium - prosecution can occur if site is affecting controlled waters.	Low – Recorded superficial deposits on site. Risk only if made ground is present on site. It is unlikely that the site is contaminating groundwater in the Coal Measures Sandstone due to cover of relatively impermeable mudstone. It is possible that the site is contaminating surface water of the Canal if made ground is present on the site.
Ingestion and uptake of contamination in grass/plants/animals/vegetables.	Future occupants	Ingestion of contamination grass	Low likelihood	Medium	Low –grass is grown on site. Plants and vegetables and animals in the food chain and pets are unlikely to be on site.

Inhalation of airborne dust	Workmen, occupants of building, neighbouring users	Dust during any future demolition or construction.	Low likelihood	Medium	Low – provided good construction practice on site and to limit dust levels during demolition.
Irradiation	Humans	Radon gas	Unlikely	Mild	Low-Radon protection not required in buildings
Geotechnical					
Fire and Explosion	Buildings and humans	Methane gas from made ground	Low likelihood	Severe	Low – Infilled land adjacent and possibly on site monitoring required for new build.
Settlement or Heave	Buildings and car park	Damage to hard surface and buildings	Unlikely	Medium	Low – can be assessed by ground investigation
Landslip	Buildings	Level land	Unlikely	Severe	Low risk – Level site
Chemical attack	Buildings	Sulphate can, under certain ground and groundwater conditions, attack concrete.	Low likelihood	Medium	Low -soil tests can reduce risk to low by appropriate underground concrete design.
Groundwater	Buildings	Rising groundwater	Low likely	Medium	Low
Mining					
Voids in Mined Coal/Ironstone	Buildings possibly humans	Voids migrating from shallow mined coal and ironstone to ground surface by successive roof collapse	Low likelihood to Likely	Severe	High– coal, fireclay and ironstone at shallow depth which have been mined beneath the site. Ground subsidence may occur in the future.
Voids in Mined Stone	Buildings possibly humans	Voids migrating from mined stone to ground surface by successive roof collapse	Unlikely	Severe	Low – No stone mining in this area.
Mine Gas from coal workings	Humans	Methane and other gases reaching ground surface and causing harm	Unlikely	Severe	Low to Moderate– Possible as shallow mining has occurred beneath the site.
Mine Shafts	Building possibly humans	Collapse of mine shafts on and local to site	Unlikely	Severe	Low - no recorded mine shafts or adits on or within 20m.