

# GROUND CONTAMINATION INVESTIGATION AND ASSESSMENT

## PHASE 1 - DESK STUDY

for the proposed  
**Residential and Commercial Developments**  
at  
**Exchange Street,  
Driffield  
YO25 6UH**



*frontispiece – aerial view*

Planning Authority:  
Planning Application No.:

East Riding of Yorkshire Council  
20/10162/PREP

L-S&Co Project Number:  
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**L-S&Co Project Number:** **66 026**

**Report on:** Tier 1 Preliminary Risk Assessment -  
Desk Study

**Report at:** land to the north of Exhachange Road,  
Driffield YO25 6UH

**Report for:** Mr. M. Bengtsson, 36 Dene Road,  
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# 1. INTRODUCTION

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## 1.1 Background

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It is proposed to develop the land along the north side of Exchange Street (ERYC permission 20/10162/PREP) for residential and commercial use.

The overall site is, broadly, and east-west orientated rectangle that straddles The Beck, which is a water course that flows from north to south through the site.

The site is to be developed in two separate stages:

- commercial use on the east half; and
- residential use on the west half.

It is proposed to seek planning permission for the 'Land North of 32A, Exchange Street, Driffield' for commercial use, for the purpose of legally consolidating the current land use of *car sales*.

The land was formerly occupied by the Driffield Gasworks and that has since been remediated.

This report contains a review of the Remedial Works undertaken and gives an assessment of the ground conditions from those works with respect to the proposed site use.

## 1.2 Limitations

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Langdale-Smith and Co has prepared this report solely for the use of the client and/or his agent on the basis of exchange of proposals and instructions, and the company accepts no responsibility or liability for use of this report by any party other than the person for whom it was commissioned, or for the consequences of the report being used for any other purpose other than that for which it was commissioned. Should any third party wish to use or rely on the contents of the report, written approval should be sought. It is strongly recommended that independent advice is sought by that third party with respect to its specific proposals or requirements.

The conclusions and recommendations in this report represent our professional opinion, derived from currently accepted industry practices, exercising all reasonable skill and care to be expected of a professional engineering and environmental consultancy of similar size and experience.

The assessments and judgements given in this report are directed by both the finite quantity of data on which they are based and the proposed works to which they are addressed, taking account of the resources devoted to it by agreement with the client or agent, whether in writing or subsequent verbal instructions.

Environmental Desk Studies comprise a study of readily available information obtained from various identified sources, authorities and parties. The information reviewed is not exhaustive and is accepted in good faith as providing representative and true data pertaining to site conditions.

Any identified risks in Desk Study reports are 'perceived risks' based on the information available at that time. Actual risks can only be assessed after carrying out a physical intrusive investigation.

## 1.3 Information sources used

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The following sources of information were used to compile this report:

- in-house research procedures;
- interviews with current and former owners;
- Worley Parsons (2014): Shallow Soil Assessment, Exchange St., Driffield;
- VHE (2015): Verification report at Exchange St., Driffield; and
- local and archive knowledge.

## 2. SITE PERSPECTIVE

### 2.1 Location

Driffield is a market town located on the dip slope of the Yorkshire Wolds, 15 km west of the scarp edge and some 25 km north of Hull and the Humber Estuary.

The town has grown around the headwaters of the southward draining River Hull and the north-south alignment of a tributary to the River Hull, locally known as The Beck, has been followed by the main streets on the town.

The site of the former Gasworks is in the centre of the town and straddles the Beck, with a bridge over the stream

Access to the west half of the site is from Cranwell Road, from along the north side.

Access to the west of the site is from Exchange Street, from along the south side.



Fig 1 – location of site

The site is centred on OS coordinates:  $^{\circ}02400$   $^{\circ}457855$  and is at approximately 17 m AOD on locally flat land with the Beck running through the centre.

### 2.2 Description

The site comprises of two distinct areas set on either side of the Beck:

- southwest side, a 35 m square of open unused ground; and
- northeast side, a 70 m square with the north and south corners forming adjacent sites.

The two areas are connected by a concrete bridge over the Beck.



Fig 2 – aerial view

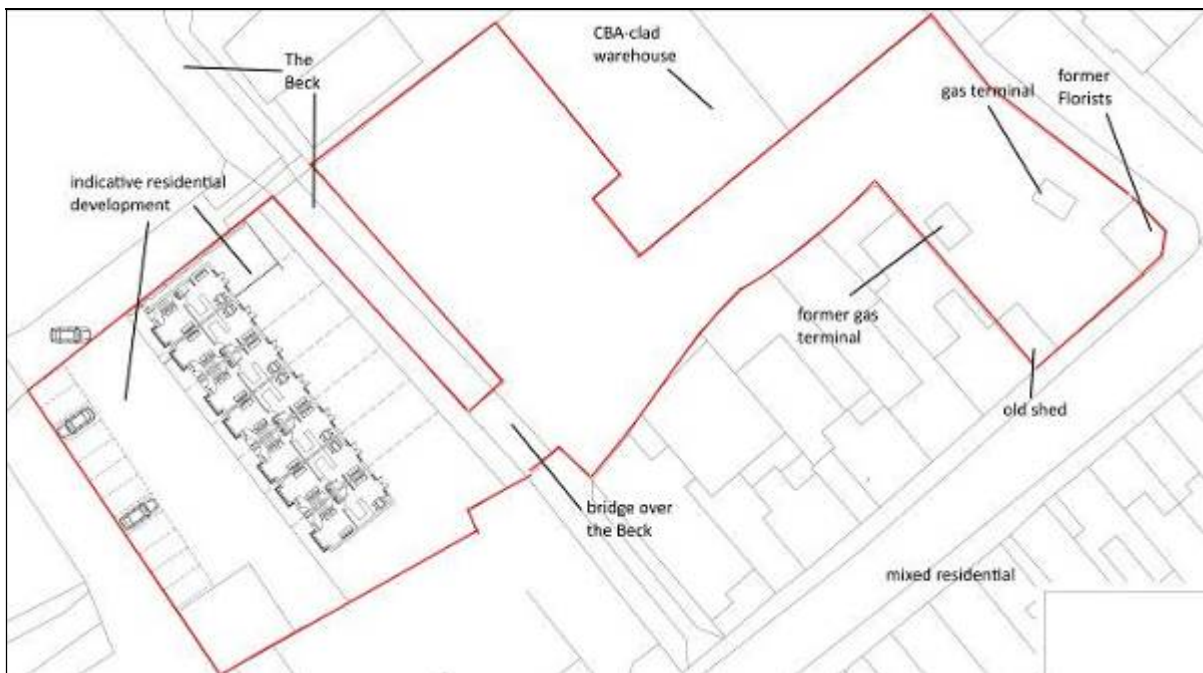


Fig 3 – local plan of site

### 2.2.1 Southwest side

The southwest half of the site is a 35 m square plot that is supported on three sides with a 1.7 m high red brick retaining wall.

The other side faces onto the Beck on the east side, with a lower wall and sloping ground rising to the site level that supports tree cover.

The plot itself is covered with clean coarse gravel.

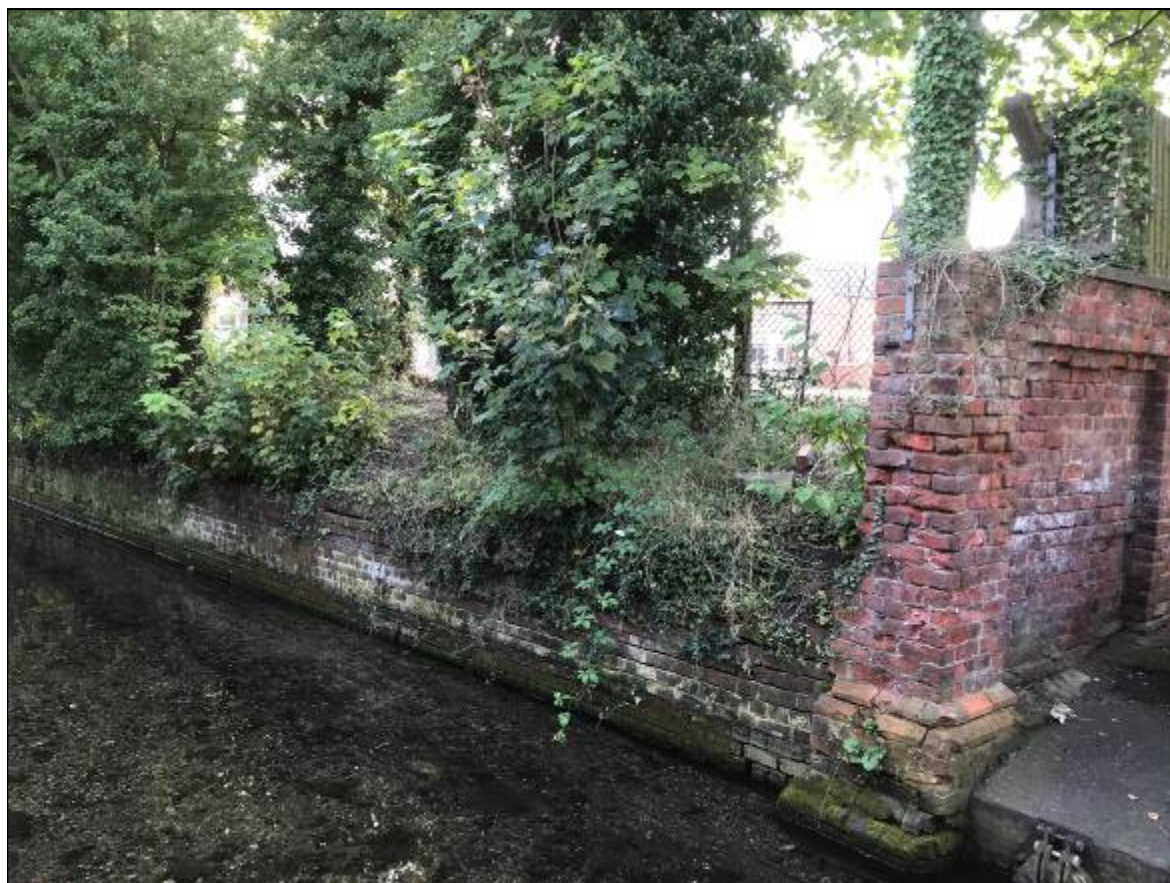
There is an unused telecoms tower set on a concrete plinth in the north corner of the plot.



**Fig 4 – view to east from Cranwell Road showing raised level and retaining wall**



**Fig 5 – view to west across southwest side showing gravel surface**



**Fig 6 – view to south of retaining wall and trees alongside the Beck**

### **2.2.2 Northeast side**

The ground on the northeast side is raised up above the level of the Beck and is supported by a red-brick retaining wall reinforced with ground anchors.

The wall is in good condition, with no seeps or discolouration.

Access to the northeast side is from Exchange Street, that runs east-west along the south of the site.

The ground is finished with the same gravel as the southwest side.

At the north side the ground level has been raised to almost 2 m above the neighbouring car park.

The level of the site slopes down towards entrance on the south side.

There are two small buildings near the entrance of the site on the south side:

- the modern one housing the gas governor for the natural gas supply that is still routed via the site; and
- the older one housing the former gas governor that is slowly being dismantled for spares.

The site is currently being used for the temporary parking of cars and the buildings along Exchange Road are being refurbished for commercial use.





**Fig 7 – view south along Beck showing retaining wall of the northeast side**



**Fig 8 – view to northeast from the bridge over the Beck**



Fig 9 – view to north of central part showing rise in site level



Fig 10 – view to northwest showing drop in level to neighbouring site



Fig 11 – new gas governor building



Fig 12 – interior of old gas governor building



Fig 14 – view to west from the east entrance showing rise in site level from road

## 2.3 History

Driffield has an ancient history of human habitation due to its amenable geographical location. There is evidence of settlement from the Neolithic period and in medieval times Driffield was the capital of the kingdom of Deira which a large portion of northern England.

The town is in the centre of a prosperous cereal growing region and business boomed when the canal reached Driffield in the 1770s.

The Driffield Gas Works was established in 1850, with the works set on the north part of the site.

By 1894 the works had expanded into the eastern part of the site and by 1901 the works had extended west of the Cranwell Beck.

By 1910 the site buildings included two Gasometers, two tar UST, tar pump, scrubber, washer, purifiers and former Governor Houses, in a layout that remained until the 1960s.

With the introduction of natural gas, from the North Sea, gas production ceased between 1961 and 1963 although the two gasometers remained in use.

Gasometer 1, on the west side, was dismantled and in-filled around 1968 – 1970 and Gasometer 2 and the site Governor House were demolished between 1994 and 1998.

The site was remediated by 2015 and remained unused until 2019.

Since then the southwest area has remained inaccessible and unoccupied.

The roadside buildings on the southeast side are now being restored for commercial use

## 2.4 Timeline of remedial works

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By the time of the remedial work the whole site had been stripped of all superstructures,

### 2.4.1 1998 – Komex remediation work

Remediation began for the area formerly occupied by Gasometer 2,

Previously backfilled materials were excavated, with the remaining structure cleaned by specialist a contractor and backfilled with site-won brick at the base and then a cap of 1,623 tonnes of imported material.

### 2.4.2 2001 - Komex – Environmental Assessment Site Investigation Report

This report has not been provided for review but is briefly mentioned in the Worley Parsons Shallow Soil Assessment report dated March 31, 2014.

An intrusive investigation was undertaken in 2001 which identified Gasometer 1 in the West of the Site and two Tar UST in the centre of the site.

### 2.4.3 2007 - Komex remediation work

Remediation works were undertaken to render the site suitable for a proposed residential end use.

These works were in part conducted to alleviate the risks highlighted by the Environment Agency regarding contamination of controlled waters (*i.e.* the Beck and associated groundwater).

The scope of these works included the remediation of:

- Gasometer 1
- 3 No. tar UST.

The process of remediation is detailed in the May 2008 post-remediation report by Worley Parsons Komex:

- the below ground former tar tanks were excavated and the steel base removed from Gasometer 1;
- the excavated material (782m<sup>3</sup>) was re-distributed on-site;
- 64m<sup>3</sup> of coarse material and tarmac was disposed off through a recycling facility;
- 1070m<sup>3</sup> of contaminated material was sent off-site to a licenced disposal/ soil washing facility; and
- an undocumented quantity of suitable for use 6F2 limestone was imported for fill.

Upon completion of the remediation works, the Environment Agency stated that they were “satisfied that the remedial works undertaken to date are adequate to ensure that the risk to controlled waters are acceptable”.

Additionally, a memorandum from the East Riding of Yorkshire Council (ERYC) stated that the Environmental Control Officer was “satisfied that the main sources of contamination identified or encountered on site have been remediated, and that any residual contamination which exceeded the target concentrations is located at depths unlikely to pose a significant risk to future occupiers.

### 2.4.4 2013 - Worley Parsons – Shallow Soil Assessment

Worley Parsons (WP) were instructed by National Grid Property Holdings Ltd. (NGPH) on June 12, 2013, to undertake an assessment of the Site.

A site walkover was conducted on July 4, 2013, which indicated that the site is currently vacant with two unused and derelict buildings in the east of the site and two northern gas network operational buildings in the east.

Worley Parsons then conducted a shallow soil assessment, comprising of the excavation of 17 No. hand-dug pits across the site and 10 No. samples taken for analysis.

Quantification of these samples reported Asbestos fibre concentrations as <0.001%.

The detailed results of this investigation can be found in the Worley Parsons assessment report of March 31, 2014.

#### **2.4.5 2014 – RSK – Outline Remedial Strategy, Driffield**

This report was issued on November 19, 2014 for client VHE (Principal Contractor).

The purpose of the report was to review information and to support automotive open storage end use.

The aim was to find cost-effective remedial options and ultimately identify the remedial strategy to be used on site.

The remedial options considered were:

- Cover the site with 'clean' imported material;
- Excavate the soil and cover the site with 'clean imported material'; and
- On-site material exchange.

On-site material exchange was the most cost-effective solution because RSK had determined that the necessary volume of Fill could be won from an area on-site which contained material that was suitable for reuse.

RSK recommended that the following steps should be taken to aid the Validation report:

- Capping layer thickness is documented through photographic evidence;
- 6 No. positions should be sampled across the site for asbestos;
- A Materials Management Plan (MMP) should be created to document the movements of clean and contaminated soils on-site; and
- Chemical analysis of material to be used as a cover material.

#### **2.4.6 2015 – VHE – Verification Letter Report for the Remediation Works at Exchange Street, Driffield**

The following information is from the VHE Verification Letter, dated October 6, 2015.

The aim of the remediation works was to create an appropriate space to be used for commercial purposes.

The report stated that no physical changes will be made to the site, and as such there are no changes that would involve planning permission, and this is corroborated by the correspondence with the local planning authority.

The report continues by detailing the remedial works that had taken place between February 16 and March 9, 2015, which are generally in accordance with the Outline Remedial Strategy produced by RSK, with any deviations listed.

Airborne asbestos monitoring was undertaken by Clearwater Environmental, and the subsequent data was found to be consistent with the non-detect background readings taken on February 17, 2015.

#### **2.4.7 Final site condition**

The remedial works were undertaken in accordance with the RSK Outline Remedial Strategy.

The work involved the excavation of potential Asbestos Containing Material (ACM) to 0.2 m bgl across the site, except at Gasometer 1 where excavation to 0.1 m bgl was sufficient.

A cover layer was installed comprising a geotextile marker layer overlain by 0.1 m of suitable for use (S4U) material within Gasometer 1 and 0.2 m across the rest of the site.

The S4U materials were obtained from:

- site-won 6F2 aggregate that were contained within the UST, and
- imported S4U aggregate.

#### **2.4.8 On-going Monitoring and Maintenance**

There were no further requirement for on-going monitoring of conditions beneath the site following removal of ACM.

### 2.4.9 Planning Permission Application(s)

2007 - (07/03531/STPLF) – ‘Remediation work of site in preparation for residential use’ – Approved

2008 - (08/01814/STOUT) – ‘Outline - Residential Development, pedestrian bridge over Beck and relocation of telecommunications tower (means of access and layout to be considered)’ - Refused.

2008 - (08/01815/PCC) – ‘Demolition (in part) of boundary wall to facilitate access to site proposed for residential development’ - Refused.

2008 - (08/31189/CONDET) – ‘Submission of details as required by condition 8 (remediation report) of planning permission 07/03531/STPLF’ - Approved.

20/10162/PREP - A pre-application planning enquiry was issued by Mr Martin Bengtsson on February 21, 2020

The response letter from the council indicates that if a formal application were to be submitted for the erection of No.7 dwellings on the western section on the site it would most likely be approved.

The approval would be require the following issues to be formally addressed:

- Flood Risk
- Land Contamination
- Design of dwelling

## 2.5 Assessment of site conditions

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The site had the potential to be contaminated by the former use as a Gasworks, with the contamination to be retained in the clay ground or flushed through the gravel into the Beck.

The site has since been remediated to a standard that will be safe for future residential users.

There is no potential for contamination at this site because:

- Any ground that had the potential to be contaminated has been removed from site; and
- A cover comprising of a membrane and 0.2 m of clean stone Fill has been emplaced.

## 3. ENVIRONMENTAL CONDITIONS

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### 3.1 Geology

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The geological map shows the geology at the site to comprise of the Cretaceous Chalk, overlain by Quaternary Glacial Till clay and Sand and Gravel, all with a fall to the southeast towards the River Hull.

Local boreholes suggest that the Boulder Clay is at least 8 m thick, overlying the bedrock Chalk.

The Boulder Clay forms the slightly higher ground around Driffield and the edges are draped with Sand and Gravel deposits left after the ice sheets had retreated eastwards.

#### 3.1.1 Cretaceous Chalk (100 – 65 Mya)

Chalk is a white very pure carbonate debris of microfossil skeletal material laid down in still warm seas where there was no ferruginous sediment to discolour the chalk.

In Yorkshire the Chalk belongs to the ill-defined lithofacial and faunal Northern Province which extends from Flamborough Head to northern Norfolk and continues eastwards under the North Sea and has more in common with its correlatives in Germany and further east than the area in the southern England which constitutes the 'Southern' or 'Anglo-Paris Basin' Province.

#### 3.1.2 Quaternary Glacial Till (1.8 Mya - recent)

Glacial Till mostly comprises of clay deposited by the Ice Sheets as they melted, containing abundant granular material because of mixing with harder bedrock. It is often characterised by a varying content of that debris, giving the name Boulder Clay.

Overall Glacial Till is generally *stiff* with apparent high degrees of over-consolidation although it may contain, or overlie, other glacial materials that can be much softer. The clay is typically *low to intermediate plasticity* with low to medium shrinkage potential. In chalky Boulder Clay the pH is alkaline and sulphate concentrations are low.

## 3.2 Hydrogeology and hydrology

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### 3.2.1 Hydrogeology

The Chalk is a principal aquifer and is controlled by the Environment Agency.

Beneath Driffield the aquifer is water-bearing and is confined by the overlying Boulder Clay.

### 3.2.2 Hydrology

The Beck is a controlled water. It flows southwards along the boundary between the impermeable Boulder Clay and the permeable Sand and Gravel which means that the west side of the site is on Clay ground and the east side is on Sand and Gravel.

## 3.3 Assessment of environmental conditions

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There are no natural sources of contamination at this site.

The Beck is a sensitive receptor for any contamination from the former Gasworks.





Fig 15 – regional geology

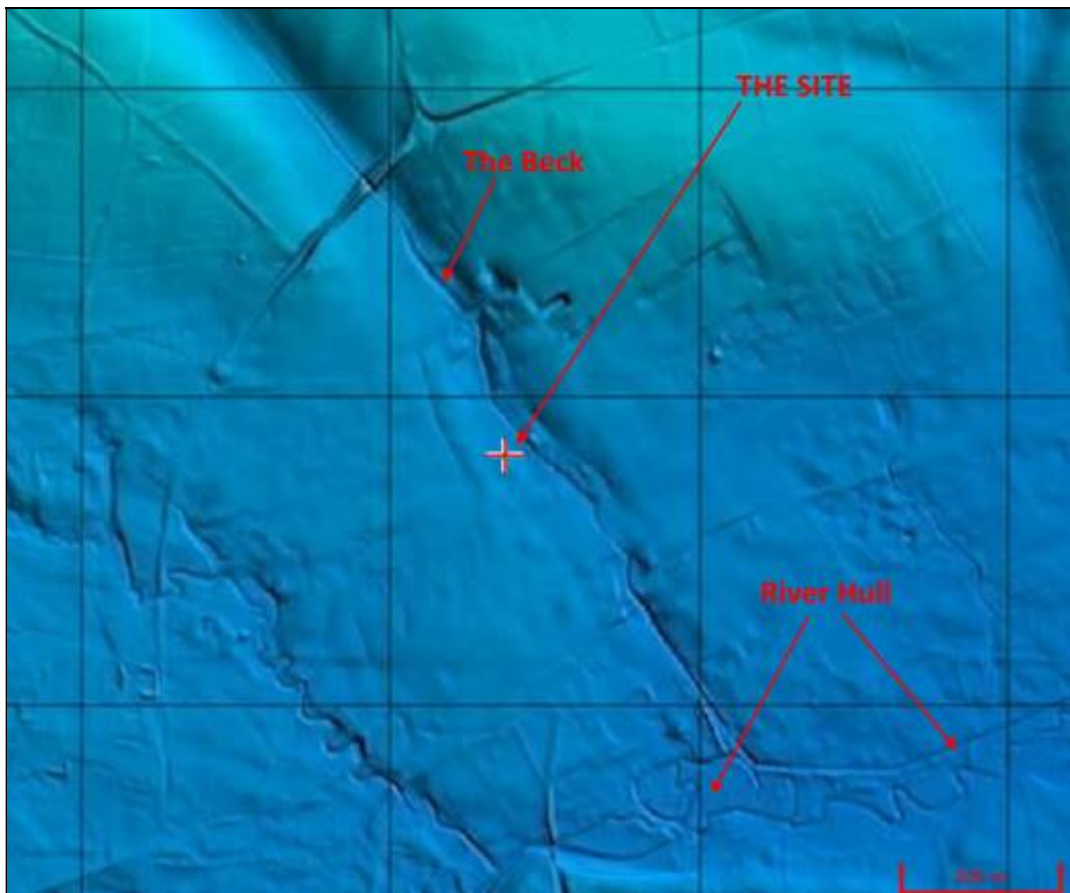


Fig 16 – regional terrain

## 4. CONCEPTUAL EXPOSURE MODEL

### 4.1 Sources

The site had the potential to be contaminated by the former use as a Gasworks, with the contamination to be retained in the clay ground or flushed through the gravel into the Beck.

The site has since been remediated to a standard that will be safe for future residential users.

There is no potential for contamination at this site from the former Gasworks because:

- Any ground that had the potential to be contaminated has been removed from site; and
- A cover comprising of a membrane and 0.2 m of clean stone Fill has been emplaced.

### 4.2 Receptors

The site is privately owned and is inaccessible to the general public.

Currently the site is used by site workers and for parking cars.

### 4.3 Pathways

#### 4.3.1 Direct exposure

DIRECT EXPOSURE	
P1	Outdoor ingestion of dust
P2	Indoor Ingestion of dust
P3	Consumption of home-grown vegetables
P4	Ingestion of soil attached to vegetables
P5	Outdoor exposure through dermal contact
P6	Indoor exposure through dermal contact
P7	Outdoor inhalation of fugitive dust
P8	Indoor inhalation of fugitive dust
P9	Outdoor inhalation of soil vapour
P10	Indoor inhalation of soil vapour
P11	Ingestion of surface water

Table 1 – Generic pathways of Direct Exposure

#### 4.3.2 Sub-surface migration

SUB-SURFACE MIGRATION	
P12	Surface infiltration (e.g. from AST)
P13	Sub-surface infiltration (e.g. from UST)
P14	Anthropogenic (e.g. pipes, conduits)
P15	Permeable ground
P16	Groundwater (perched)
P17	Groundwater (unrestrained)

Table 2 – Generic pathways of Sub-surface migration

## **5. ASSESSMENT AND RECOMMENDATIONS**

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### **5.1 Proposed development**

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It is proposed to develop the land along the north side of Exchange Street (ERYC permission 20/10162/PREP) for

- commercial use on the east half; and
- residential use on the west half.

Additionally, it is proposed to seek planning permission for the 'Land North of 32A, Exchange Street, Driffield' for commercial use, for the purpose of legally consolidating the current land use of *car sales*.

### **5.2 Qualitative risk assessment for the proposed development**

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There are no sources of contamination at this site.

### **5.3 Recommendations for remediation and validation**

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No remedial works are required.

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