



e3p

Desk Based Ground Gas Risk Assessment

Reference:16-691-R1-1

Date: March 2023



# **DESK BASED GROUND GAS RISK ASSESSMENT**

Newthorpe Quarry  
North Yorkshire  
LS25 6JW

Prepared for:  
**The Mineral Planning Group Ltd**

**Report Ref: 16-691-R1-1**  
**Date Issued: March 2023**

## E3P

Taylor Road  
Trafford Park  
Urmston  
Manchester  
M41 7JQ

+ 44 (0) 161 707 9612  
<https://e3p.co.uk>

Registered in England  
CRN: 08725262

## QUALITY ASSURANCE

<b>PROJECT NUMBER</b>	16-691		
<b>VERSION</b>	Version 1		
<b>REMARKS</b>	Issue 1		
<b>DATE</b>	February 2023		
<b>PREPARED BY</b>	N Sellars		
<b>QUALIFICATIONS</b>	MSci (Hons), FGS, MIEnvSc		
<b>CHECKED BY</b>	R Walker		
<b>QUALIFICATIONS</b>	BSc(Hons), FGS, AIEMA, AMICE, MIEnvSc, CEnv		
<b>AUTHORISED BY</b>	R Walker		
<b>QUALIFICATIONS</b>	BSc(Hons), FGS, AIEMA, AMICE, MIEnvSc, CEnv		

## EXECUTIVE SUMMARY

<b>Site Address</b>	Newthorpe Quarry, North Yorkshire, LS25 6JW	
<b>Grid Reference</b>	E 445897 N 432148	
<b>Site Area</b>	~8.8 Ha	
<b>Proposed Development</b>	E3P understands that the limestone quarry is to be infilled with inert material.	
<b>Current Site Use</b>	<p>The site predominantly comprises an active limestone quarry known as Newthorpe Quarry. Areas of the site to the east and southwest are undeveloped agricultural land.</p> <p>Highfield Lane is present through the southern sector of the site.</p>	
<b>Site History</b>	<p>The northern sector of the site is part of a quarry on the earliest historical mapping dated circa 1885 which is later shown as Newthorpe Lime Works.</p> <p>The site has remained in a similar configuration to the present day, with the quarry extended further to the south.</p>	
<b>Environmental Setting</b>	Drift Geology	No superficial deposits recorded on site.
	Bedrock Geology	Cadeby Formation – DOLOSTONE
	Faults	No faults are recorded on-site.
	Hydrogeology	Principal bedrock aquifer with no superficial deposits/aquifer recorded.
	Hydrology	Newthorpe Beck is located circa 285 m north.
	Flood Risk	Unaffected by flooding from rivers.
<b>Landfill Sites and Ground Gases</b>	<p>The subject site is a historic landfill site operated by Selby Rural District Council. Waste was input between 1973 and 1984, however no further information is available.</p> <p>No further historic or authorised landfill sites are located within 1km.</p>	
<b>Radon</b>	The UK Radon map shows that the site is located in area where the maximum radon potential is 1-3%.	
<b>Coal Mining/Land Stability</b>	<p>The site is located in a coal mining reporting area, but not within a development high risk area.</p> <p>There are no mine entries or recorded outcrops within close proximity and no underground workings or probable workings are recorded.</p>	



**Conclusion**

- ✦ The RB17 assessment indicates a cumulative risk as being low. This is considered to be very conservative and E3P would note that factual ground gas monitoring data would provide a more reliable assessment.
- ✦ The historic landfill material is a potential source of ground gas where this remains in-situ.
- ✦ The majority of the site area has been excavated as a limestone quarry.
- ✦ Material used to backfill the quarry should be inert with a low ground gas risk.



## Table of Contents

<b>EXECUTIVE SUMMARY .....</b>	<b>2</b>
<b>1. INTRODUCTION .....</b>	<b>2</b>
1.1. Background .....	2
1.2. Proposed Development.....	2
1.3. Objectives .....	2
1.4. Sources of Information .....	2
1.5. Limitations .....	2
1.6. Confidentiality.....	2
<b>2. SITE HISTORY.....</b>	<b>3</b>
2.1. On-Site Historical Development.....	3
<b>3. ENVIRONMENTAL SETTING.....</b>	<b>5</b>
3.1. Geology and Hydrogeology .....	5
3.2. Coal Mining .....	5
3.3. Radon Risk Potential .....	5
3.4. Hydrology .....	5
<b>4. REGULATORY DATA .....</b>	<b>6</b>
4.1. Landfill Sites and Waste Treatment Sites.....	6
<b>5. SOURCES AND PATHWAYS OF GROUND GAS .....</b>	<b>7</b>
<b>6. GROUND GAS RISK ASSESSMENT METHODOLOGY – RB17 .....</b>	<b>8</b>
<b>7. CONCLUSIONS .....</b>	<b>9</b>
<b>APPENDIX I LIMITATIONS.....</b>	<b>10</b>
<b>APPENDIX II GLOSSARY .....</b>	<b>12</b>
<b>APPENDIX III DRAWINGS .....</b>	<b>15</b>



## **1. INTRODUCTION**

### **1.1. BACKGROUND**

E3P Ltd has been commissioned by The Mineral Planning Group Ltd to undertake a desk based ground gas risk assessment for Newthorpe Quarry in North Yorkshire.

### **1.2. PROPOSED DEVELOPMENT**

E3P understands that the limestone quarry is to be infilled with inert material.

### **1.3. OBJECTIVES**

The objectives of the ground gas risk assessment are to provide a detailed assessment of ground gas risk based on all available desk based data.

### **1.4. SOURCES OF INFORMATION**

Background information was sought from the following sources:

- ✦ <https://maps.nls.uk>;
- ✦ <https://www.ukradon.org>;
- ✦ Magic Map Groundwater Vulnerability Map;
- ✦ <https://flood-map-for-planning.service.gov.uk>.
- ✦ Groundsure IO database;
- ✦ BGS GeolIndex;
- ✦ BGS Geological Survey Map.

### **1.5. LIMITATIONS**

The limitations of this report are presented in Appendix I.

### **1.6. CONFIDENTIALITY**

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


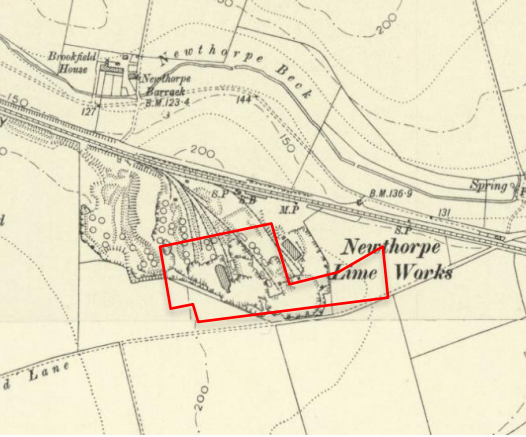
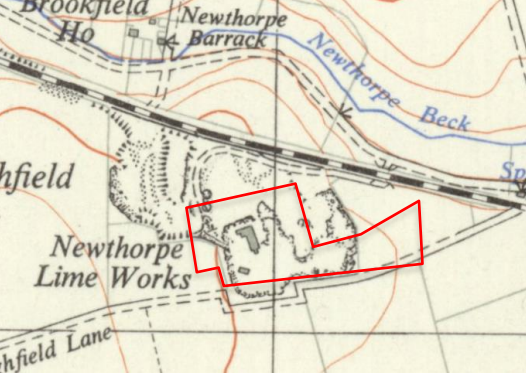


## 2. SITE HISTORY

### 2.1. ON-SITE HISTORICAL DEVELOPMENT

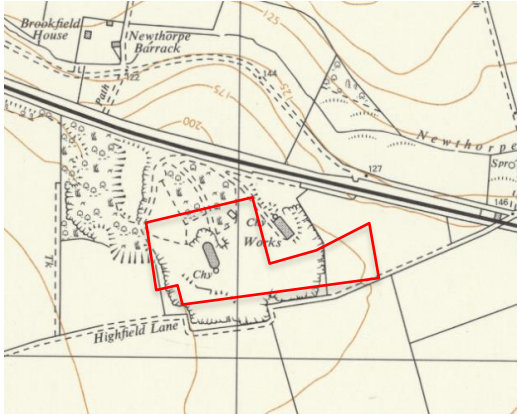


A review of historical mapping and historical aerial imagery pertinent to the site is summarised in Table 2.1.

TABLE 2.1 HISTORICAL DEVELOPMENT

MAP EDITION	HISTORICAL LAND USE	HISTORICAL MAP EXCERPT
<p><b>1885-1900</b> <b>One Inch</b></p>	<p>The northern sector of the site is part of a quarry.  A track is present through the south of the site.</p>	 <p>This historical map excerpt shows the 'Newthorpe Barrack' in the upper center. A red-outlined area indicates the site's location, which is situated south of the barrack and north of a track. The map includes contour lines and a scale of 1:25,000.</p>
<p><b>1888-1913</b> <b>Six Inch</b></p>	<p>The site is part of Newthorpe Lime Works.</p>	 <p>This historical map excerpt shows the 'Newthorpe Lime Works' in the center. A red-outlined area indicates the site's location. The map includes 'Newthorpe Beck' to the north and 'Brookfield House' to the west. The map includes contour lines and a scale of 1:25,000.</p>
<p><b>1937-1961</b> <b>1:25,000</b></p>	<p>The Lime Works has been extended further to the south.</p>	 <p>This historical map excerpt shows the 'Newthorpe Lime Works' in the center. A red-outlined area indicates the site's location, which has been extended further south compared to the previous editions. The map includes 'Newthorpe Beck' to the north and 'Brookfield House' to the west. The map includes contour lines and a scale of 1:25,000.</p>





MAP EDITION	HISTORICAL LAND USE	HISTORICAL MAP EXCERPT
<p><b>1949-1972</b> <b>1:10,560</b></p>	<p>There are no significant changes. A chimney is recorded on-site.</p>	 <p>A historical map excerpt showing the Newthorpe Quarry area. A red outline highlights the quarry site. A chimney is visible on the site. The map includes labels for 'Brookfield House', 'Newthorpe Barrack', 'Newthorpe Beck', and 'Highfield Lane'. Contour lines and other geographical features are also shown.</p>
<p><b>2002</b> <b>Google Earth Imagery</b></p>	<p>The quarry has been extended slightly further to the south.</p>	 <p>Aerial Google Earth imagery from 2002 showing the quarry area. A red outline highlights the quarry site, which has been extended slightly further to the south compared to the 1949-1972 map. The quarry is surrounded by green fields and a stream labeled 'Newthorpe Beck'. A grid reference 'TQ256JW' is visible at the top.</p>
<p><b>2023</b> <b>Google Earth Imagery</b></p>	<p>There are no significant changes.</p>	 <p>Aerial Google Earth imagery from 2023 showing the quarry area. A red outline highlights the quarry site. The quarry is surrounded by green fields and a stream labeled 'Newthorpe Beck'. The quarry area appears to be stable and consistent with the 2002 imagery.</p>



### 3. ENVIRONMENTAL SETTING

#### 3.1. GEOLOGY AND HYDROGEOLOGY

The British Geological Survey (BGS) map (Sheet 70) for the site, (1:50,000, Solid and Drift editions) and online records indicate the site is underlain by the geological sequence presented in Table 3.1.

TABLE 3.1 SUMMARY OF UNDERLYING GEOLOGY

GEOLOGICAL UNIT	CLASSIFICATION	DESCRIPTION	AQUIFER CLASSIFICATION
Drift	None Recorded	-	-
Solid	Cadeby Formation – DOLOSTONE	DOLOSTONE	Principal Aquifer

A summary of nearby BGS borehole records is included in Table 3.2.

TABLE 3.2 SUMMARY OF BGS BOREHOLE RECORDS

LOCATION	DEPTH	MADE GROUND	DRIFT	SOLID
550 m N SE43SE71	69.00 M	-	Topsoil, clay and stones 0.00 – 6.40 m	>6.40 m
550 m NW SE43SE3	78.79 m	-	Soil 0.00 – 0.79 m	>0.79 m

No faults are recorded on-site.

#### 3.2. COAL MINING

The site is located in a coal mining reporting area, but not within a development high risk area.

There are no mine entries or recorded outcrops within close proximity and no underground workings or probable workings are recorded.

#### 3.3. RADON RISK POTENTIAL

The UK Radon map shows that the site is located in area where the maximum radon potential is 1-3%.

#### 3.4. HYDROLOGY

Newthorpe Beck is located circa 285 m north.



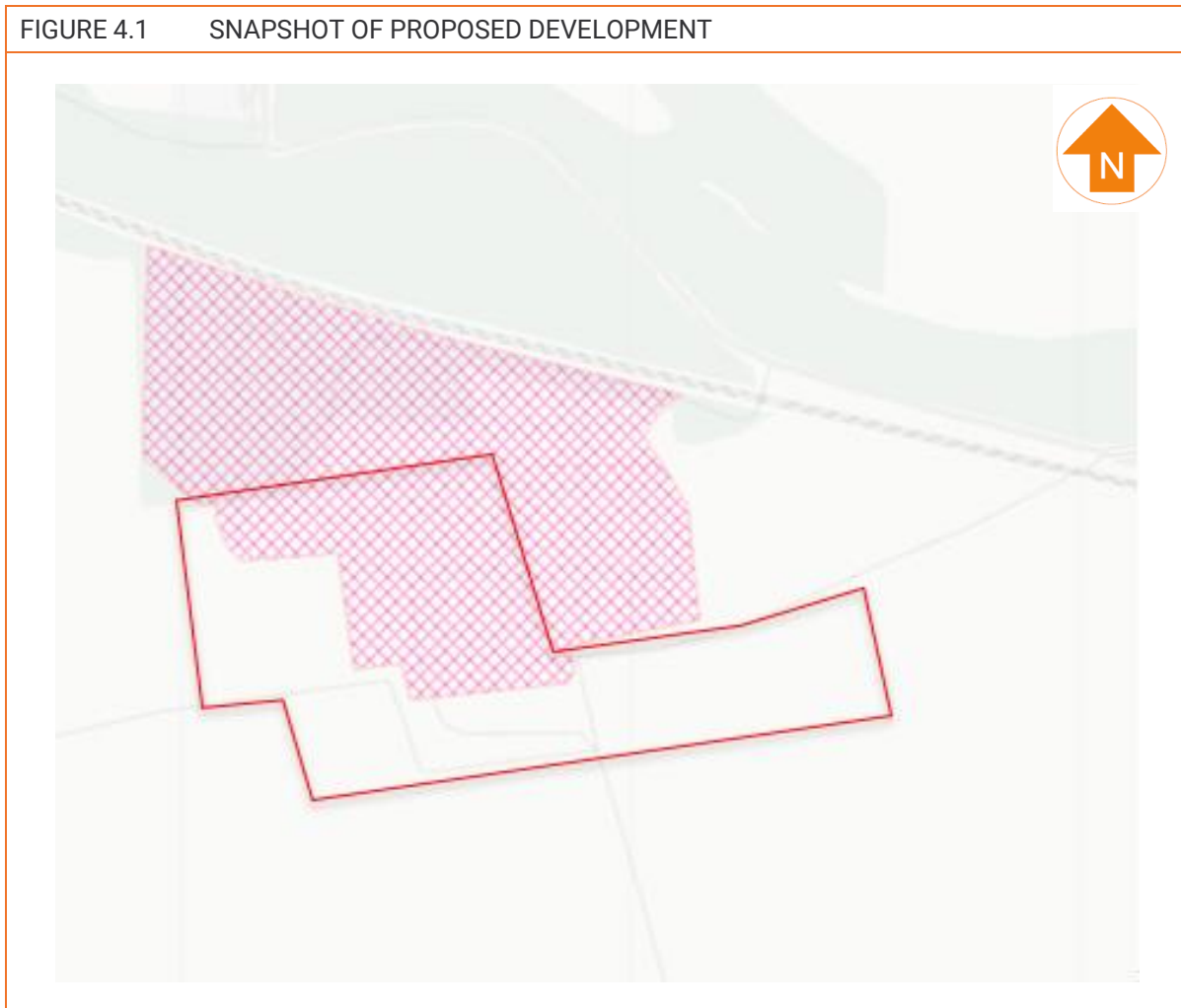
## 4. REGULATORY DATA

### 4.1. LANDFILL SITES AND WASTE TREATMENT SITES

The subject site is a historic landfill site operated by Selby Rural District Council. Waste was input between 1973 and 1984, however no further information is available. The location of the landfill is shown in Figure 4.1.

No further historic or authorised landfill sites are located within 1km.

FIGURE 4.1 SNAPSHOT OF PROPOSED DEVELOPMENT



## 5. SOURCES AND PATHWAYS OF GROUND GAS

Table 5.1 summarises the potential sources and pathways of ground gas within the context of the recorded site setting and proposed development.

TABLE 5.1 IDENTIFIED POTENTIAL SOURCES OF GROUND GAS

<b>SOURCE</b>
<b>Made Ground</b>  Localised areas of landfill material may be present on-site, however the majority of the site has been excavated for use as a limestone quarry.
<b>Drift Strata</b>  No superficial deposits recorded on site. The BGS borehole located circa 550 m north records topsoil, clay and stones to 6.40 m bgl.
<b>Solid Strata</b>  The closest BGS boreholes located circa 550 m northwest and 550 m north record limestone bedrock at 0.79 m bgl and 6.40 m bgl.
<b>Coal Mining</b>  The site is located in a coal mining reporting area, but not within a development high risk area.  There are no mine entries or recorded outcrops within close proximity and no underground workings or probable workings are recorded.
<b>Landfill Sites</b>  The subject site is a historic landfill site operated by Selby Rural District Council. Waste was input between 1973 and 1984, however no further information is available.  No further historic or authorised landfill sites are located within 1km.
<b>Other Gases</b>  The UK Radon map shows that the site is located in area where the maximum radon potential is 1-3%.  No significant source of VOCs has been identified.



## 6. GROUND GAS RISK ASSESSMENT METHODOLOGY – RB17

An initial assessment has been carried out in accordance with guidance published in CIEH Research Bulletin 17 A Pragmatic Approach to Ground Gas Risk Assessment (RB17).

CL:AIRE RB17 provides an alternative framework for the investigation and assessment of ground gas that takes into account other factors such as site history and the nature of the ground conditions beneath the site.

The full RB17 assessment is summarised in Table 6.1.

TABLE 6.1 RB17 GROUND GAS RISK ASSESSMENT

ITEM	OUTCOME	ACTION / COMMENT	RISK SCORE
<p><b>Have any credible OFF SITE ground gas sources been identified within the Desk Study &amp; ICSM that would include:</b></p> <p><i>Registered landfill within 250m; Historical landfill; Infilled pond within 50m; Infilled ground 100m.</i></p>	Yes	The site is recorded as a historic landfill, however the site has been excavated for limestone.	Medium
<p><b>Is the site located within close proximity to a variable groundwater regime (river or tidal) that could potentially influence the ground gas regime.</b></p>	Yes	Newthorpe Beck is located 280 m north, however unlikely to induce significant groundwater level changes.	Low
<p><b>Has a credible pathway for the migration of gas from historical mine workings been identified.</b></p>	No	None	Low
<p><b>Average depth of Made Ground &gt;5.0m</b></p>	No	Made Ground is likely to be shallow given the site is a limestone quarry.	Low
<p><b>Average depth Made Ground &gt;3.0m</b></p>	No	None	Low
<p><b>Average Depth Made Ground &gt;1.0m</b></p>	No	None	Low
<p><b>TOC &lt;1</b></p>	Yes	TOC testing required	Low
<p><b>TOC 1-3</b></p>	Yes	TOC testing required	Low
<p><b>TOC &gt;3</b></p>	No	TOC unlikely to be >3.0	Low
<p><b>Made Ground In-situ &gt;20 Years</b></p>	Yes	Landfill recorded between 1973-1984.	High
<p><b>Made Ground In-situ &lt;20 Years</b></p>	No	Landfill recorded between 1973-1984.	Low
<p><b>Only natural soils with no potential to generate CH<sub>4</sub></b></p>	No	None	Low
<p><b>Recorded coal gas emission</b></p>	No	None	Low
<p><b>Radon Protection Measures Required</b></p>	No	The site is located in an area where the maximum radon potential is 1-3%.	Low
<p><b>Risk Score</b></p>			<b>Low</b>



## 7. CONCLUSIONS

E3P have assessed the previous variables and come to the following conclusions:

- ✿ The RB17 assessment indicates a cumulative risk as being low. This is considered to be very conservative and E3P would note that factual ground gas monitoring data would provide a more reliable assessment.
- ✿ The historic landfill material is a potential source of ground gas where this remains in-situ.
- ✿ The majority of the site area has been excavated as a limestone quarry.
- ✿ Material used to backfill the quarry should be inert with a low ground gas risk.

**END OF REPORT**



# APPENDIX I LIMITATIONS



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





# **APPENDIX II**

# **GLOSSARY**

## TERMS

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



**Newthorpe Quarry**

Ground Gas Risk Assessment

March 2023

<b>MIBK</b>	Methyl isobutyl ketone	<b>WTE</b>	Water table elevation
<b>m</b>	Metres	<b>ppm</b>	Parts per million
<b>km</b>	Kilometres	<b>mg/m<sup>3</sup></b>	Milligram per metre cubed
<b>% v/v</b>	Percent volume in air	<b>m bgl</b>	Metres below ground level
<b>mb</b>	Millibars (atmospheric pressure)	<b>m bcl</b>	Metre below cover level
<b>l/hr</b>	Litres per hour	<b>mAOD</b>	Metres above ordnance datum (sea level)
<b>µg/l</b>	Micrograms per litre (parts per billion)	<b>kN/m<sup>2</sup></b>	Kilonewtons per metre squared
<b>ppb</b>	Parts per billion	<b>µm</b>	Micrometre
<b>mg/kg</b>	Milligrams per kilogram (parts per million)	<b>SSRT</b>	Site Specific Remediation Target
<b>PSD</b>	Particle Size Distribution	<b>DD</b>	Dry Density
<b>CL:AIRE</b>	Contaminated Land: Applications in Real Environments	<b>Mc</b>	Moisture Content
<b>ρ</b>	Bulk Density	<b>GPR</b>	Ground Penetrating Radar
<b>NDP</b>	Nuclear Density Probe	<b>FFL</b>	Finished Floor Level
<b>LEL</b>	Lower Explosive Limit	<b>UKWIR</b>	UK Water Industry Research
<b>CIRIA</b>	Construction Industry Research and Information Association	<b>LOD</b>	Limit of Detection



# APPENDIX III DRAWINGS



**DRAWING 16-691-001 – SITE LOCATION PLAN**

