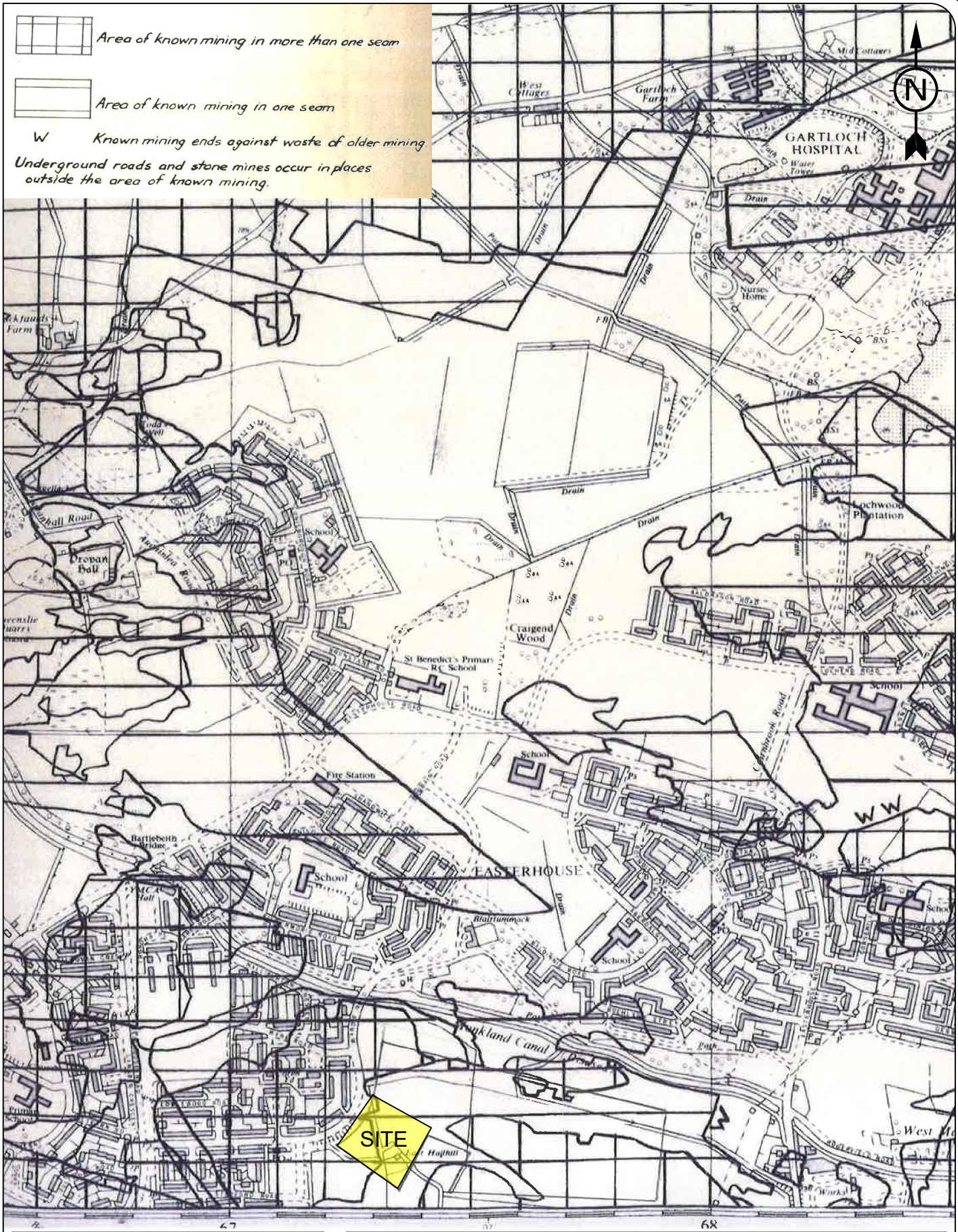

MASON EVANS

Geo-Environmental Consultants

t: 0141 420 2025 e: mail@masonevans.co.uk

The Piazza, 95 Morrison Street, Glasgow, G5 8BE

client details: HERMISTON SECURITIES
MUIR HOUSE, BELLEKNOWES INDUSTRIAL ESTATE
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project title: SITE A, GLASGOW BUSINESS PARK
GLASGOW

drawing title: EXTRACT FROM PUBLISHED GEOLOGICAL SURVEY MAP (MINING INFORMATION)

project no:	drawing no:	revision:	date:	drawn by:	approved by:	scale:
P17/478	P17/478/CMRA/R/F/06		16.04.21	RC	PB	1:10,560

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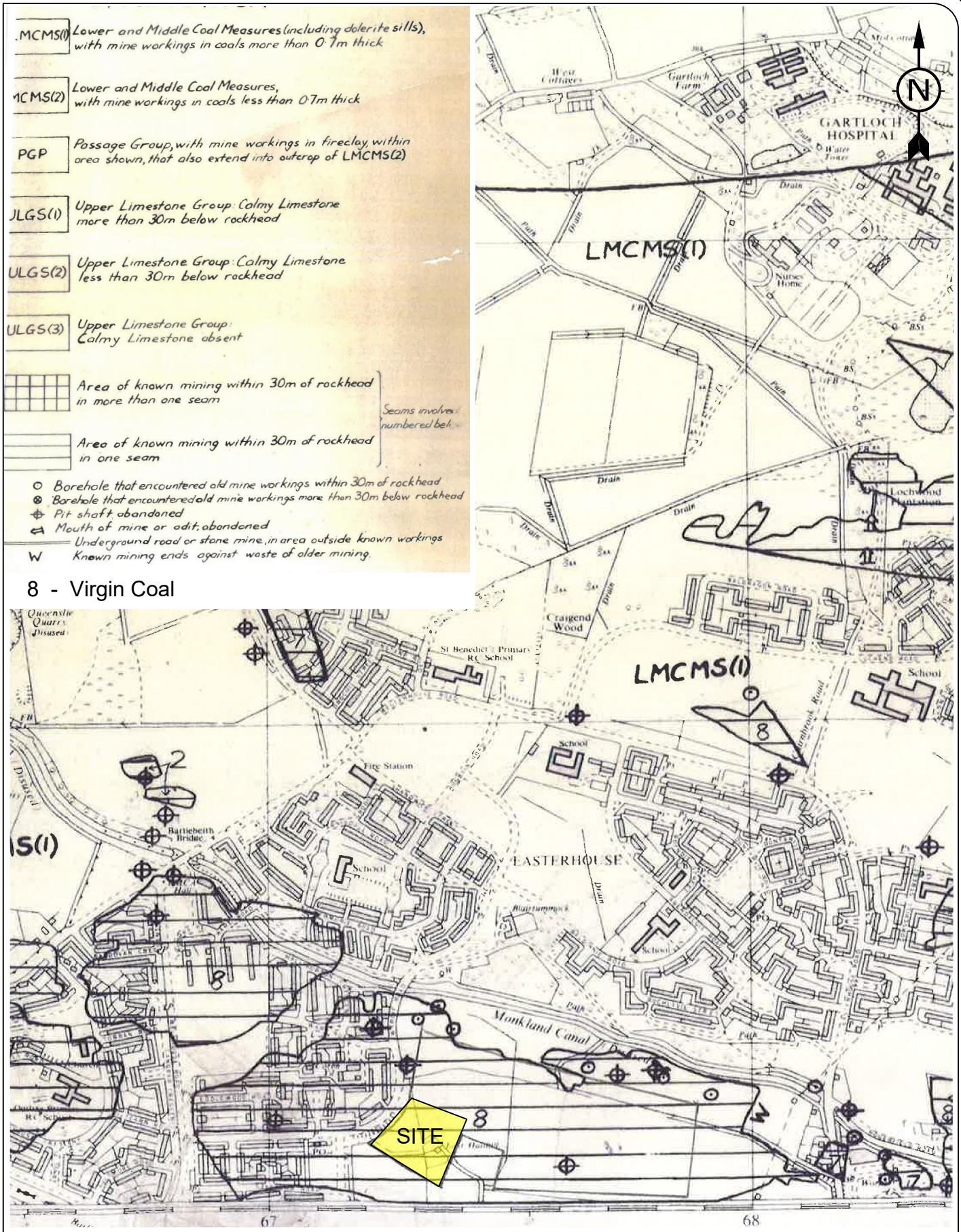

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project title:	SITE B, GLASGOW BUSINESS PARK GLASGOW
drawing title:	EXTRACT FROM PUBLISHED GEOLOGICAL SURVEY MAP (SHALLOW MINING)

project no:	drawing no:	revision:	date:	drawn by:	approved by:	scale:
P17/478	P17/478/CMRA/R/F/07		16.04.21	RC	PB	1:10,560

A4 border: 277 x 190

4.4 Mineral Investigations (2018)

4.4.1 In April 2018, we supervised mineral investigations to confirm, or otherwise, the presence of historical shallow underground coal mining activities.

4.4.2 2 No. mineral boreholes (PH06 and PH08) were sunk within the site to depths of up to 35.00 m bgl. The bores were sunk to confirm the geological conditions below the site and to provide information on any shallow mine workings.

4.4.3 The findings from mineral investigations is summarised on Table 02 below.

Table 02 – Summary of Mineral Investigations

Borehole	Depth Encountered (m bgl)	Thickness (m)	Comments
PH06	0.00	14.00	Superficial Deposits
	14.00	7.00	Hard Band (Ironstone)*
	25.00	1.00	Coal (**Intact**) – Splint Coal (conjectured by Mason Evans, 2021)
	The intervening rock strata was indicated to be SANDSTONE, proven to 35 m bgl.		
PH08	0.00	15.00	Superficial Deposits
	15.00	7.00	Hard Band (Ironstone)*
	27.00	0.50	Coal (**Intact**)
	31.00	0.50	Coal (**Intact**) – Splint Coal (conjectured by Mason Evans, 2021)
	The intervening rock strata was indicated to be SANDSTONE, proven to 35 m bgl.		

*We conjecture the hard band described as 'ironstone' in the drillers logs to be the igneous intrusion (dolerite) as encountered in the historical borehole logs (included in Appendix B).

4.4.4 No mine workings were recorded below the site, to a proven depth of 35.0 m bgl. Coal seams were recorded between 25.00 m and 31.0 m depth, although they were all noted to be intact (i.e. unworked).

4.4.5 Based on information from the mineral bores and mine abandonment plans, the Virgin Coal (0.64 m thick) has been worked below the site at shallowest depths of 28 m bgl. As rockhead was encountered at 14.0 m below the northern (shallowest) area, we consider that there is sufficient rock cover (i.e. >10 x seam thickness) to ensure no future ground stability issues at this level.

4.4.6 The younger Glasgow Splint Coal (0.60 m thick) was conjectured to have been recorded within two of the bores (between 25.0 m and 31.0 m bgl) and was noted to be intact. There was no indication that this coal seam had been worked below the site, however, if unrecorded workings were to exist within this seam, we consider that there is sufficient rock cover to ensure no future ground stability issues. It is also considered that the adjacent shallow igneous intrusion may have burnt this coal seam to remove any economic value. As such, we consider the risk of mineral instability at the level of the Glasgow Splint Coal below the site to be low.

4.4.7 No mine entries were recorded within site boundary. However as in all areas of historical mining, unrecorded mine entries could exist. During future development works, vigilance for such features will be important.

4.5 Conclusions

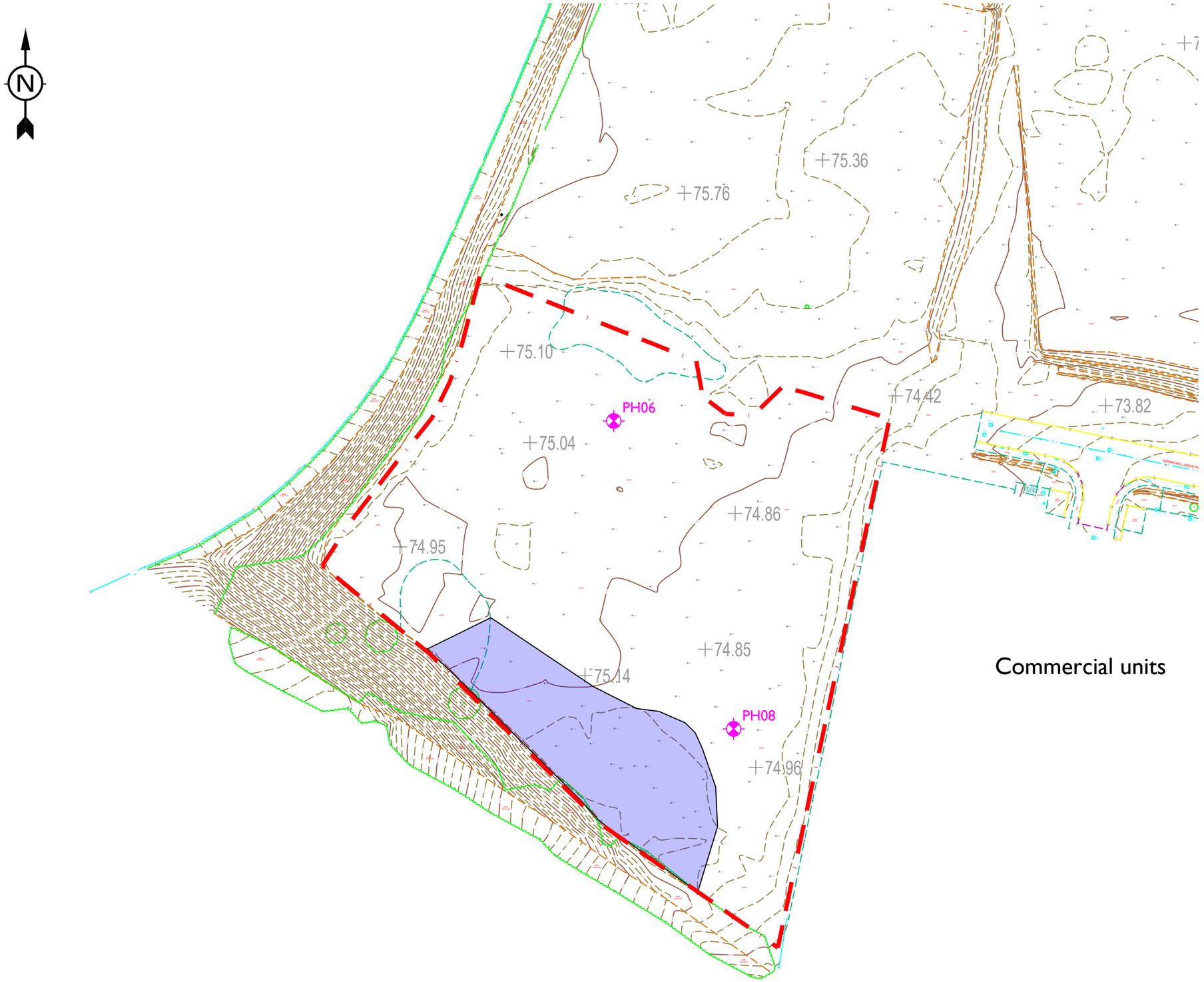
4.5.1 Based on our desktop researches (utilising historical OS maps, geological maps and information from The Coal Authority) we were aware of the Virgin Coal having been worked below the site from shallowest depths of 28 m bgl. The younger Glasgow Splint Coal was also indicated to underlie the site at shallow depths, though there were no records of this having been worked below the site.

4.5.2 Mineral bores were sunk below the site to a maximum depth of 35.0 m bgl. Additional mineral bores were also sunk within the land to the immediate north and east of the site. No mine workings were recorded within any of the bores.

4.5.3 The Virgin Coal (0.64 m thick) has been worked below the site at minimum depths of approximately 28 m bgl (shallower to the north). However, as rockhead was encountered at 14.0 m below the northern (shallowest) area, we consider that there is sufficient rock cover to ensure no future ground stability issues.

4.5.4 The younger Glasgow Splint Coal (0.60 m thick) underlies the site at shallowest depths of 23 m bgl. There was no indication that this coal seam had been worked below the site, however, if unrecorded workings were to exist within this seam, we consider that there is sufficient rock cover to ensure no future ground stability issues. It is also considered that the adjacent shallow igneous intrusion may have burnt this coal seam to remove any economic value. As such, we consider the risk of mineral instability at the level of the Glasgow Splint Coal below the site to be low.

4.5.5 There were no records of mine entries within the site, however as in all areas of historical mining, unrecorded mine entries could exist. During future development works vigilance for such features will be important.



NOTES

Site boundary

PH06 & PH08 — Mineral borehole sunk by GBLE Limited (April 2018)

No access due to waterlogged conditions

Note:
Topographic survey supplied by Struer Consulting Engineers Ltd, August 2019.

REV	DATE	DETAILS

HERMISTON SECURITIES
MUIR HOUSE
BELLEKNOWES INDUSTRIAL ESTATE
FIFE, KY11 1HY

PROJECT TITLE

SITE A, GLASGOW BUSINESS PARK
GLASGOW

DRAWING TITLE

MINERAL BORE
LOCATION PLAN

DRAWN BY	CHK'D BY	APP'D BY	DATE	SCALES
RC	SA	PB	16.04.21	1:1000 @ A3

PROJECT No.	DRAWING No.	REVISION
P17/478	P17/478/CMRA/R/F/08	

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A3 border: 400 X 273

5.0 MINING

5.1 Past Mining

5.1.1 Information from mine abandonment plans indicate the Virgin Coal (0.64 m thick) has been previously worked below the site at minimum depths of approximately 28 m bgl.

5.1.2 The Coal Authority Report did not record any mine entries within the site boundary or immediate surrounding area. There is the potential for unrecorded mine entries to exist as with all areas of previous underground mining.

5.2 Present Mining

5.2.1 The Coal Authority have advised that the site is not within a surface area that could be affected by present underground mining. That apart, we are not aware of any present mining operations taking place within or below the site.

5.3 Mining Methods

5.3.1 The methods of mining historically adopted in the area were the 'stoop and room' and 'longwall' systems of extraction. We envisage that variations of both systems of mining could have been undertaken beneath the site. The stoop and room mining operations involved partial excavation of the mineral, with the seam recovered from 'rooms' and the roof supported by retained 'stoops' or 'pillars' of mineral. The pillar or stoops widths varied depending on the depth and the condition of the roof. For seams of the thicknesses involved here, the stoops would typically be rectangular or square with a typical minimum dimension of 4 metres by 4 metres. Where more slender stoops were left, often by 'robbing' of the edges of the stoop, additional support to the roof was often provided by artificial props, which would usually be timber.

5.3.2 In the 'longwall' method of mining, extraction was virtually total with the seam face accessed via supported roadways. It is unlikely that this system was employed in the seam here. In the areas from which the seam had already been removed, the roof was generally allowed to collapse behind the face, or was partially supported by spoil or 'waste' deposited within the works. While the workings would be generally closed on abandonment with the withdrawal of roof support, roadways would be expected to remain open and artificially supported long after the operations had ceased. A variation of the longwall method is the technique commonly used in deep mining today but was generally only applied to the recovery of ironstones or coals of restricted thickness in the nineteenth century.

5.3.3 Opencast mining is a more recent method generally when improved plant allowed large scale excavations to be opened up with seams recovered and the mines subsequently backfilled with rock and soil arisings. Such operations rarely exceeded 50m in depth and, in this instance, appeared to be generally considerably shallower with the typical depth range shown to be between 6m to 30m. The depth of the excavations and backfill would normally increase in the direction of the strata dip.

5.4 General Principles of Surface Instability for Underground Mine Workings

5.4.1 It is generally accepted that old abandoned mine workings are susceptible to collapse. This is generally the consequence of on-going deterioration within the mines and failure can occur a considerable time after abandonment. The mechanisms of collapse are varied and complex, but generally involve either a yield in the roof of the mine between supports, or collapse as a direct result of failure of the supports. Except in instances where the mine workings are very shallow for example, less than 10 m deep, the stability is comparatively unaffected by enhanced loadings from buildings or by vibrations from heavy traffic. Progressive deterioration within the workings can, however, advance to a stage where instability is reached and collapses occur. In most cases, however, it is impossible to predict with any degree of accuracy if, and when, such movements will take place.

5.4.2 The subsidence assessments consider various elements of the geological and mining configuration. These include the nature and thickness of the rock and soil overburden, the extracted height of the workings and the typical mine configuration. **Assessments typically seek to achieve a rock/overburden cover thickness of 10 times the seam extraction height**. This is consistent with a number of recent studies in the field of mining stability assessment.

5.5 Surface Instability Due to Underground Mining

5.5.1 We have concluded that the Virgin Coal (0.64 m thick) has been previously worked (at minimum depths of 28 m bgl). In addition, the younger Glasgow Splint Coal (0.60 m thick) underlies the site at shallower depths, though there is no indication that this seam has been previously worked below the site. Given the thickness of the coal seams and depth to rockhead recorded, we consider that there is sufficient rock cover (i.e. >10 x seam thickness) to ensure no future ground stability issues as a result of historical shallow mine workings. As such, we consider the risk of ground instability as a result of shallow mining workings to be low.

5.6 Mine Entries

5.6.1 The Coal Authority Report did not record any mine entries within site boundary. As such there would be no requirement for consolidation works.

5.7 Opencast Mining

5.7.1 The Coal Authority has confirmed that the site is not impacted by past, present or future open cast mining.

5.8 Potential for Future Mineral Extraction

5.8.1 The Coal Authority have advised that there are no existing plans to carry our mining by opencast or underground methods below/within the site.

5.9 Mine Gas

5.9.1 The Coal Authority have advised that there is no record of mine gas emissions within the site boundary, requiring action by them.

6.0 IDENTIFICATION AND ASSESSMENT OF SITE-SPECIFIC COAL MINING RISKS

6.1 Mason Evans Risk Assessment Process

6.1.1 We have developed a qualitative approach in risk assessment to determine the potential impact on the proposed development. It is based on three categories of 'High', 'Moderate' and 'Low' risk. These are defined as follows

a) High Risk – where records exist which indicate a significant impact requiring mitigation for development to proceed. In the case of mining subsidence, it will be determined by an expectation of seams which are known, or strongly suspected to have been mined within depths of potential influence on the surface. Where mine entries are indicated, they will be considered high risk unless information exists to suggest that these have been adequately secured. In every case where mine workings are known or suspected, gas emissions are considered to be of 'high risk'. In each instance, investigations are advised and mitigation likely.

b) Moderate Risk – where mine workings are suspected to lie at shallow depth but may not be worked. In the case of gas emissions, a moderate risk is considered where there is uncertainty on the existence of former mine workings. In each instance, investigations are necessary, but mitigation may not be necessary.

c) Low Risk – where coal seams are not indicated at shallow depths or are known to be unworked. For mine entries, a low risk would be interpreted where stabilisation is known to have taken place to an adequate specification. For gas emissions, this category relates to areas known to be clear of mine workings.

6.1.2 The desk-top assessment indicates that the risk of potential surface instability due to historical shallow mining or recorded mine entries is considered to be low. Table 03 has been derived from the researches, highlighting the risk relating to impact of coal mining within the site.

Table 03 – Coal Mining Issues Risk Assessment

Coal Mining Issue	Yes	No	Risk Assessment
Underground shallow coal mining * ***(Refs 1, 2 and 3)***			**Low**
Mine entries (shafts and adits) ***(Refs 1 and 2)***			**Low**
Coal mining geology (fissures) ***(Ref 2)***			**Low**
Record of past mine gas emissions ***(Ref 2)***			**Low**
Recorded coal mining surface hazard ***(Refs 1 and 2)***			**Low**
Surface mining (opencast workings) ***(Refs 1 and 2)***			**Low**

Ref 1: BGS Geological Maps – NS66NE

Ref 2: Coal Authority Report – Ref 51002455396001 dated 14th April 2021

Ref 3: Mine Abandonment Plans – Catalogue No. S2045 (Sheet 2 of 3)

**** Shallowest mine workings below the site are at the level of the Virgin Coal (at a minimum depth of 28 m bgl) with seam thicknesses of 0.64 m (based on information from The Coal Authority). However, we consider that there is sufficient rock cover (i.e. >10 x seam thickness) to ensure no future ground stability issues.***

6.2 Conclusions

6.2.1 Based on our desktop researches (utilising historical OS maps, geological maps and information from The Coal Authority) we are aware of the Virgin Coal having been worked below the site.

6.2.2 Mine abandonment plans indicate the Virgin Coal (0.64 m thick) has been worked below the site at minimum depths of approximately 28 m bgl. However, as rockhead was encountered at 14.0 m bgl below the northern site area (where the seam is at its shallowest), we consider that there is sufficient rock cover (minimum of 14 m) to ensure no future ground stability issues. As such, we consider the risk of mineral instability at the level of the Virgin Coal below the site to be low.

6.2.3 There is no evidence to suggest that the younger Glasgow Splint Coal has been worked below the site, and as such, we consider the risk of mineral instability at the level of the Glasgow Splint Coal below the site to be low.

6.2.4 Mineral bores were sunk to a maximum depth of 35.0 m bgl within the site and within the immediate surrounding area. No mine workings were recorded within any of the bores.

6.2.5 To conclude, we consider that the site is at low risk of ground instability, as a result of historical shallow coal mine workings.

6.2.6 There are no records of mine entries within the site, however, as in all areas of historical mining, unrecorded mine entries could exist. During future development works vigilance for such features will be important.

We trust that this will meet your current requirements. However, should you require any further information, please do not hesitate to contact us.

Scott Armstrong	Patrick Barry
Geo-Environmental Scientist	Director

Appendix A

Historical Ordnance Survey Maps
(Envirocheck)

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

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

Ordnance Survey Plan 1:10,000

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

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

1:10,000 Raster Mapping

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

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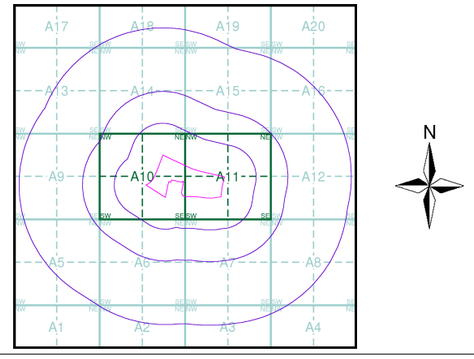
Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Lanarkshire	1:10,560	1864	2
Lanarkshire	1:10,560	1899	3
Lanarkshire	1:10,560	1914	4
Lanarkshire	1:10,560	1935 - 1936	5
Lanarkshire	1:10,560	1938	6
Ordnance Survey Plan	1:10,000	1957 - 1958	7
Ordnance Survey Plan	1:10,000	1967	8
Ordnance Survey Plan	1:10,000	1980 - 1982	9
Ordnance Survey Plan	1:10,000	1989	10
Ordnance Survey Plan	1:10,000	1994 - 1996	11
10K Raster Mapping	1:10,000	1999	12
Street View	Variable		13

Historical Map - Slice A



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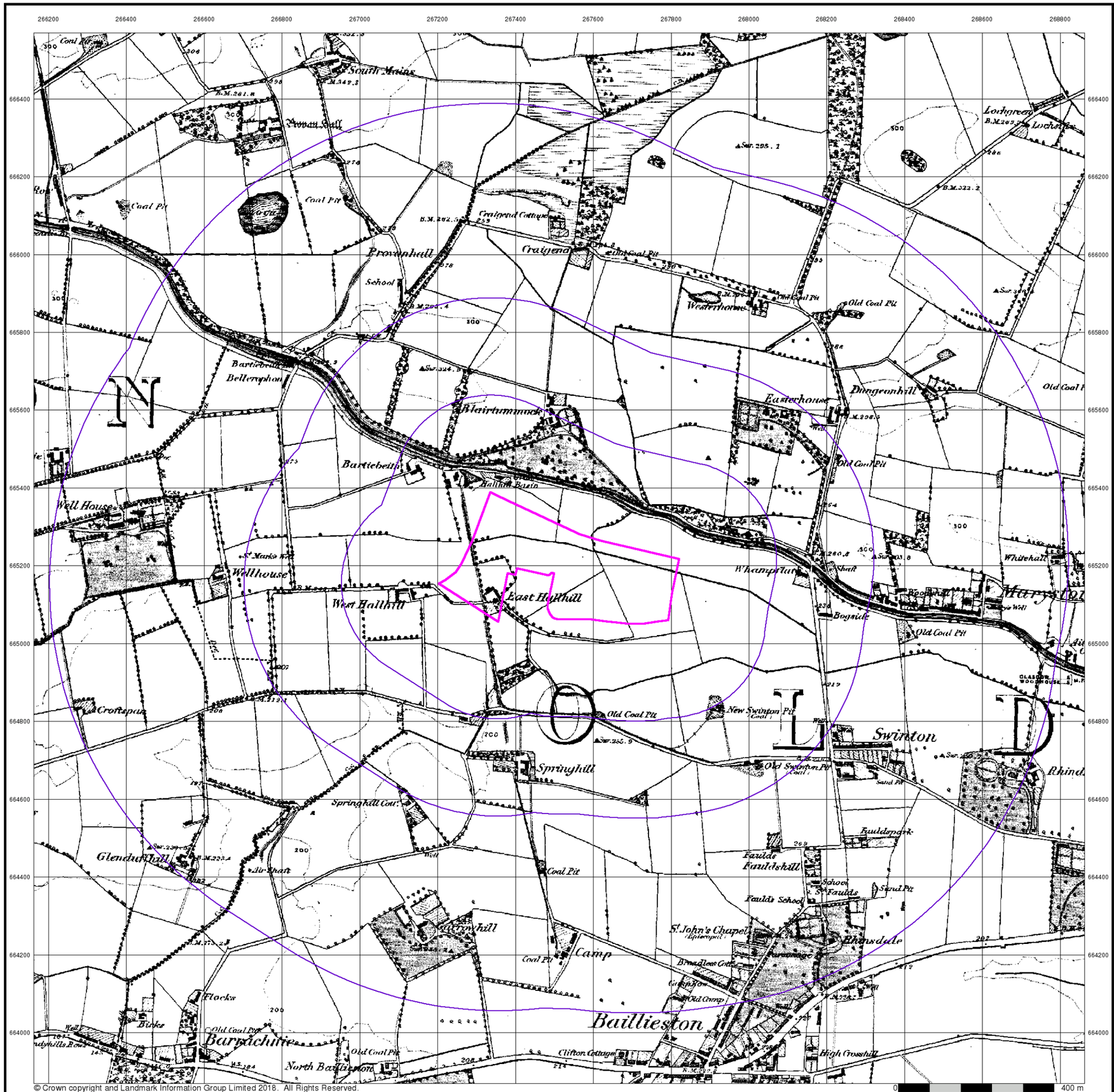
Site Area (Ha): 11.14
Search Buffer (m): 1000

Site Details

Kerr & Smith (Glasgow) Ltd, 10, Springhill Parkway, Glasgow Business Park, GLASGOW, G69 6GA

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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Geo-Environmental Consultants

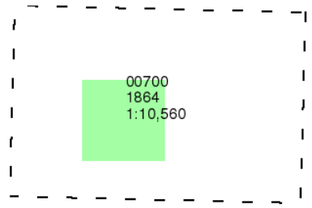
Lanarkshire

Published 1864

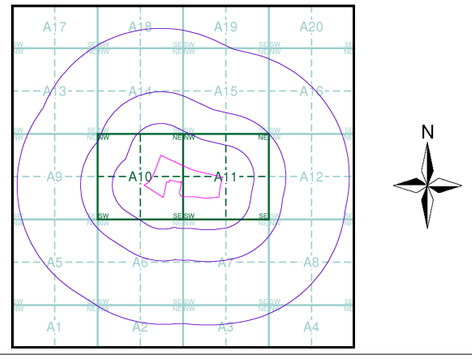
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



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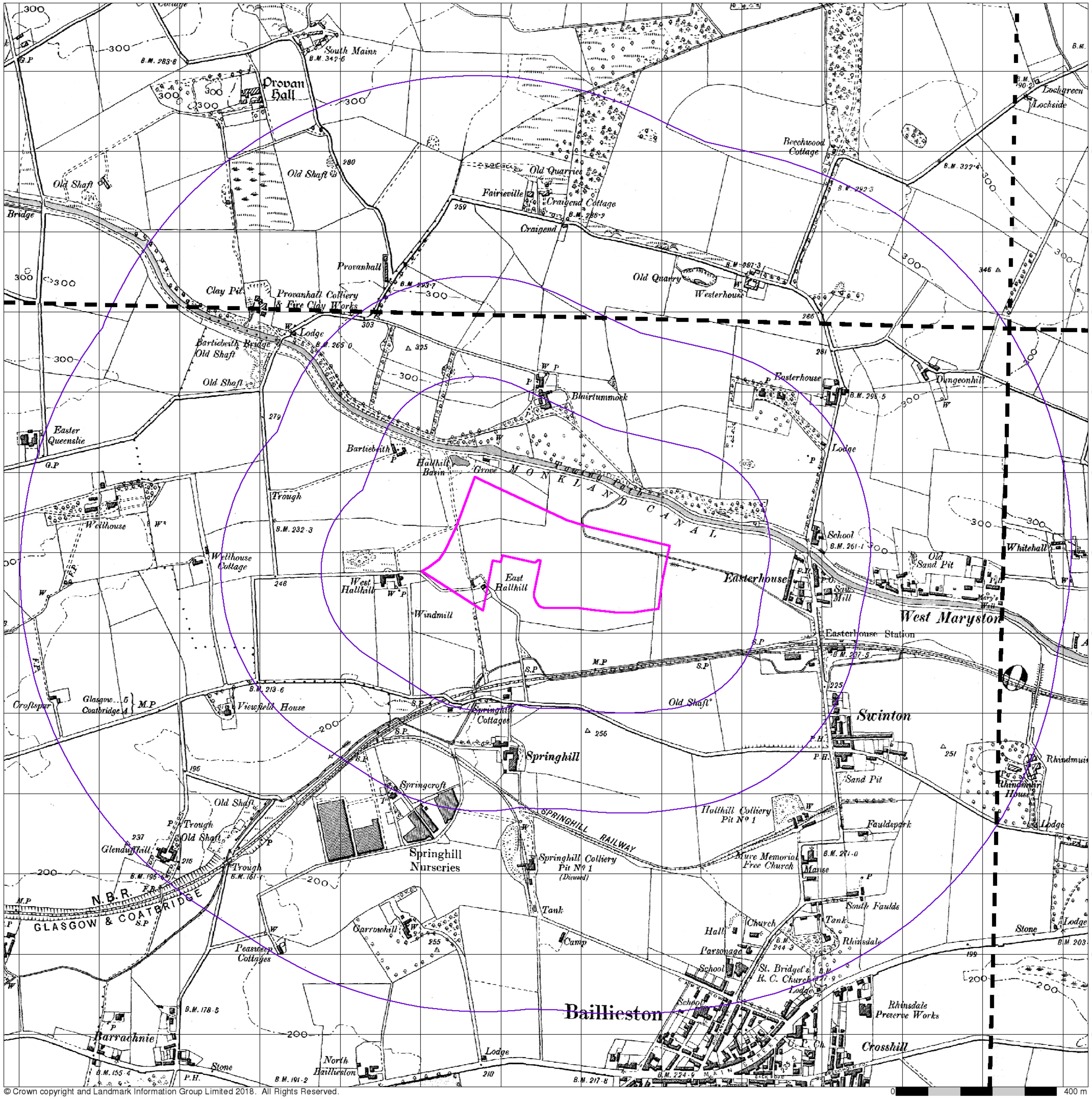

Lanarkshire

Published 1899

Source map scale - 1:10,560

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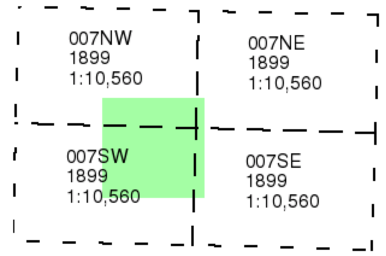

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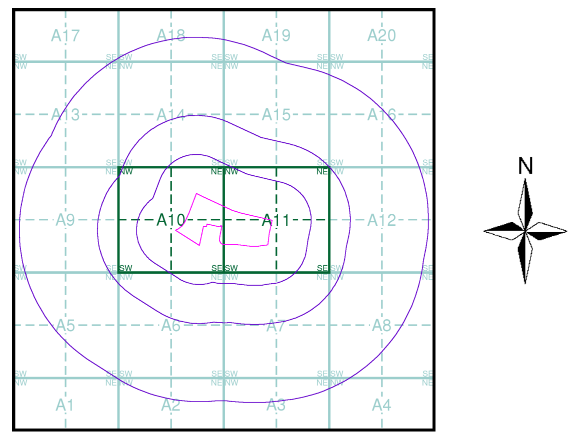

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