Field New Deer Ltd

New Deer 2 BESS

Phase 1 Desk Study

340617-R01(01)

RSK GEOSCIENCES

April 2025

RSK GENERAL NOTES

Project No.: 340617

Title: Phase 1 Desk Study: New Deer 2 BESS, Land at Wagglehill North and South, Cuminestown Turriff, AB53 8JJ

Client: Field New Deer Ltd

Date: April 2025

Office: RSK Environment Limited, Battlegate Road, Boxworth, Cambridge, CB23 4NN. Tel 01954 268200

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Rev 00		Draft - First issue	n/a	see above
Rev 01		Updated following client comments		

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

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EXECUTIVE SUMMARY

Commissioning and purpose of assessment	RSK Environment Limited (RSK) was commissioned by Field New Deer Ltd to carry out a Phase 1 Desk Study of the land at New Deer BESS, Land at Wagglehill North and South, Cuminestown Turriff, AB53 8JJ, grid reference 380808, 848148. The overall aim of the study was to assess land contamination sources and geotechnical constraints to the proposed development.
DESK-BASED ASSESSMENT	
Site description and proposed development	The boundary for the whole site is circa 129ha. The boundary for the preliminary risk assessment (herein referred to as 'the Study Area') is circa 62.1 hectares; in this area is: (a) the western land parcel (c. 33 hectares), which is proposed for development and includes c. 9.4 hectares of proposed battery compound, (b) the central land parcel which is not proposed for development. At the time of writing, the Study Area comprises recently logged and recently planted forestry land in the Western Parcel (proposed for development). The central parcel (not proposed for development) comprises fields, a heritage farmstead (Northburnhill) and an inverted L-shaped field of forestry plantation. The proposed development, in the western parcel, is the construction of a 400 MW Battery Energy Storage System (BESS) with associated compound, electrical infrastructure, ancillary building and transformers, soft landscaping, and an attenuation basin in the northeast.
History of site and surrounding area	The Study Area has been fields and forestry plantation since the earliest available mapping of 1870, with coniferous forest plantations mapped from 1968 in the western parcel. The locations of access tracks throughout the western parcel (proposed for development) have changed between 1870 and 1999. A small gravel pit is mapped on the western boundary between 1968 and 1995. The heritage farmstead of Northburnhill in the central parcel (not proposed for development) has been present throughout available historical mapping. Potential sources of contamination identified in the Study Area (western and central parcels) comprise possible made ground associated with the former tracks or unrecorded lands uses, the historical gravel pit, and historical timber logging activities. No significant potentially contaminative land uses have been identified in the surrounds.
Previous site investigation (SI) reports	There are no previous SI reports available.

Geology and environmental setting	British Geological Survey records indicate that the preliminary risk assessment boundary is underlain by superficial geology of peat in part of the western parcel, and till (diamicton) across most of the central parcel. The bedrock geology underlying the whole site is mapped as the Macduff Formation (highly metamorphosed sedimentary rocks, c. 540 million years old, thickness up to 5.5 km). There is potential for made ground on site associated with historical track locations in the western parcel, or with unrecorded land uses. There is a historical gravel pit 490m north of the Study Area, and pumps (likely for private water supplies) in the central parcel (outside of the proposed development area) and within 200m, associated with existing structures. Environmental receptors identified comprise: • Groundwater within bedrock geology on site (Macduff Formation, part of the Southern Highland Group) classified as a low productivity aquifer with water expected in near surface weathered zone and in fractures. • Groundwater within bedrock geology off site and downgradient from the Study Area (Lower Old Red Sandstone Group), a moderately productive aquifer, locally important, with fracture/discontinuity flow. • Groundwater abstraction records are not available without a Scottish Environmental Protection Agency (SEPA) CAR enquiry; however one pump within the Study Area (but outside of the proposed development area) and two within 250m are considered likely to be for drinking water. • Any groundwater underlying the site, regardless of its status as an aquifer with resource value, is considered to be a receptor with respect to any ongoing entry of hazardous substances. • The Study Area's topography drains to the east and west: the watershed is in the western parcel, and the western boundary drains down towards the closest stream approximately 250m west, then on to the Teuchar Stanks stream (good ecological status) and into the Burn of Turriff catchment. • The remainder of the western parcel (proposed for development and the central parcel drain down towards the east: two ponds are located east of the Study Area in the eastern parcel (offsite) and a stream onsite running across the central parcel (outside of the proposed development area) flows southeast toward the Little Water / Black Burn drain (moderate ecological status), into the River Ythan catchment. • The Study Area lies within the Grampian site of importance for nature conservation, and within various forestry designations.
Site reconnaissance findings	The client has provided photographs from a January 2025 walkover, and RSK completed a walkover focused on the western parcel in March 2025. The western parcel (proposed for development) was formed of uneven ground with tree stumps, young to semi mature coniferous trees, frequent holes and uneven ground, with a single width access track leading north from the southern site boundary. Various areas of the western parcel were inaccessible with vehicles due to the density of stumps, holes and trees, and the track embankment. The central parcel was generally formed of fields with a track leading north to a building at Northburnhill.

Geotechnical constraints assessment	There is potential for highly compressible and low bearing capacity soils, unknown silt content of soil and lateral changes in geology due to: • Peat mapped across part of the western parcel; • An unknown thickness of Till across the western parcel (this is mapped nearby and could also underlie the proposed development) • An unknown depth to bedrock • Potential for localised made ground A low risk of landslides is identified at the eastern edge of the western parcel and the depth to groundwater is not known.
Initial conceptual site model (CSM) and preliminary risk assessment (PRA)	Potentially complete pollutant linkages with a potential risk of moderate to low or higher comprise: • Risks to current and future site users and adjacent land users, from accumulation of ground gas leading to asphyxiation or explosion. • Risk to future buildings and services from accumulation of ground gas leading to explosion. • Risk to surface waters including on site stream from direct discharge of surface run off. • The potential for ongoing entry of hazardous substances from point source areas to shallow groundwater will also require further consideration. Uncertainties and data gaps have been identified in the CSM at desk study stage and should be considered in the design of any future intrusive investigation.
The information given in this summary is necessarily incomplete and is provided for initial briefing purposes only. The summary must not be used as a substitute for the full text of the report.	

1 INTRODUCTION

1.1 Commissioning

RSK Environment Limited (RSK) were engaged by Virmati Energy Ltd (T/A Field New Deer Ltd), Fora Montacute Yards, Shoreditch High Street, London, E1 6HU, herein referred to as the 'Client' to carry out a Phase 1 Desk Study for the land at the proposed New Deer 2 Battery Energy Storage System (BESS), Land at Wagglehill North and South, Cuminestown Turriff, AB53 8JJ. The western parcel within the Study Area is where proposed above ground BESS infrastructure would be located.

The works were completed under fee proposal reference 340617 T02 (00), dated 4th February 2025, including RSK Standard Terms and Conditions, Issue No. 12, July 2023 which forms the appointment between ourselves and the Client.

References in this report to 'we', 'us', or 'our' shall mean RSK Geosciences as a trading name of RSK Environment Limited (company no.SC115530) at registered address 65 Sussex Street, Glasgow, G41 1DX.

The Site location is provided in **Figure 1** and the site layout boundary, to which this report refers, is presented in **Figure 2**.

The report should be read and used in accordance with the limitations and constraints identified in the report text, and at **Appendix A – Service Constraints**.

1.2 Objectives

The Site is being considered for development for industrial use.

The objective of the work is:

- to identify and contamination and/or geotechnical constraints to the proposed development and, where relevant, to support discharge of planning conditions and building control requirements; and
- to identify, based on risk assessment, whether additional investigation or remediation works may be required to support safe development to make the area within the Study Area suitable for use.

1.3 Scope of works

The scope of works has been developed in accordance with relevant British Standards and authoritative technical guidance as referenced through the report. The assessment of the contamination status of the area within the Study Area is in line with the technical approach presented in Land Contamination Risk Management (LCRM) (Environment Agency, 2023) and in general accordance with BS 10175: 2011 + A2 2017 (BSI, 2017).

RSK notes that whilst LCRM is not currently formally adopted for use within Scotland due to an ongoing review of certain divergences in regulatory policy and terminology, SEPA consider it to present good practice guidance on the approach to the assessment of potential land contamination constraints. This guidance can be used where it is demonstrated to be appropriate for site specifics

and the relevant regulatory regime(s).The scope of works for the assessment has included the following:

Desk study:

- review of the history of development on the Study Area (western parcel and central parcel) and surroundings;
- review of local geology, hydrogeology and hydrology;
- to consider potential risks from mining activities;
- review previous reports pertaining to the Study Area's condition where available;
- completion of a site reconnaissance survey to assess the visual condition of the western parcel (proposed for development);
- development of an initial conceptual site model (CSM) and preliminary risk assessment;
- preliminary consideration of geotechnical constraints and hazards; and
- provide recommendations for further works, should this be required.

1.3.1 Agreed variations

The client has provided a redline boundary for the wider site area of 129 hectares, which is presented in **Appendix B**.

The client has requested a preliminary risk assessment for the central and western land parcels, together referred to in this desk study as the Study Area, totalling an area of approximately 62.1 hectares. The preliminary risk assessment boundary is presented in **Figure 2**. The client has confirmed that the central parcel is not proposed for development; as such, the desk study has been focused with more detail on the western parcel.

1.3.2 Scope omissions

As agreed with the client, the reconnaissance survey has not been undertaken at the time of preliminary risk assessment reporting. Photographs have been provided by the client, and a walkover will be completed when the Phase II geoenvironmental investigation commences.

1.4 Existing reports

The following reports for the site were made available for review:

- Lichfields, Briefing Note, Site Appraisal: New Deer, 65288/01/NOW/kmit, 18 April 2024.

Pertinent information from these reports has been summarised in **Section 4.4**.

1.5 Limitations

This report is subject to the RSK service constraints given in **Appendix A** and limitations that may be described below and throughout this document.

This report was prepared in accordance with good practice guidance at the time of issue. Consideration should be considered in the light of changes in legislation, statutory requirements, or industry practices subsequent to the date of issue.

The opinions expressed in this report, and the comments and recommendations given, are based on the information obtained from the desk assessment and the site reconnaissance photographs provided by the client. No intrusive investigations have been undertaken to confirm the actual ground conditions and hence the environmental status of the site.

The study aims to principally identify and assess the potential risks and liabilities associated with contamination of the ground, on and in the vicinity of the site. While this includes consideration of current operations and housekeeping on the site, the report does not constitute a comprehensive environmental audit of the site, as covered under ISO 14001.

A detailed survey of invasive plant species is outside the scope of this investigation therefore detailed comments with regards to such species have been omitted from this report.

The comments given in this report and the opinions expressed are primarily based on third party data and investigations, while RSK have undertaken a review of the information provided RSK cannot be held liable for the quality of the data provided. There may be conditions pertaining to the site that have not been disclosed by the investigations and therefore could not be taken into account.

2 SITE DETAILS

2.1 Site location

Site location details are presented in Table 1 and a Site Location Plan is provided on **Figure 1**.

Table 1 Site location details

Site name	New Deer 2 BESS
Full site address and Post code	Land at Wagglehill North and South, Cuminestown Turriff, AB53 8JJ
National Grid coordinates (centre of site)	NJ 80808 48148 (Centre of Study Area) NJ 80816 48145 (Centre of western parcel – proposed for development)

2.2 Site description

The site is located approximately 7.5km west of New Deer and approximately 1.5 km south of Cuminestown.

The client has provided a redline boundary for the wider site area of approximately 129 hectares, which is presented in **Appendix B**. Of relevance to this report are the western parcel of approximately 33 hectares, which contains the proposed development area, and the central parcel, which is adjacent, but not proposed for development. Together, these form the Study Area preliminary risk assessment boundary of approximately 62.1 hectares. Outside of the preliminary risk assessment boundary to the east is the eastern parcel.

The land boundary for the preliminary risk assessment was provided by the client via email along with the Purchase Order on 6th February 2025. This is presented in **Figure 2**.

Land uses at the time of reporting were existing recently logged and recently planted forestry plantation in the western parcel, farmland, a farmstead (Northburnhill) and forestry land in the central parcel, and farmland in the eastern parcel. The Client has advised that Northburnhill is an uninhabited old heritage (non-designated) farmstead.

The western parcel (approximately 500 m width, approximately 33 hectares) is currently occupied by a field containing a young conifer plantation. There is a track oriented northeast-southwest running through the western parcel.

The central parcel (within the preliminary risk assessment boundary, but outside of the proposed development area and approximately 1 km in width) comprises five fields of total width approximately 500 m, which contain a structure known as Northburnhill and associated track leading north-south, and a current or former conifer plantation in an inverted L-shape with internal access track located further east.

2.3 Surrounding land uses

The site is located in Turriff, within a predominantly rural setting.

Immediate surrounding land uses are described in Table 2.

Table 2 Surrounding land uses

North	Fields and former / current coniferous forestry plantations. One structure 300 m north.
East	The eastern parcel (approximately 1km width) of the overall redline boundary is outside of the scope of this preliminary risk assessment. It is formed of four large, approximately rectangular or trapezium shaped fields, with one smaller approximately triangular shaped field in the centre. Two small ponds are present in the centre and southeast of the eastern parcel. Farm buildings are present approximately 1.0-1.4 km east of the central land parcel. The offsite land slopes down to the east.
South	A single width road is present on the southern boundary, leading southeast from the southeastern corner of the site towards Upper Greenstead (dwelling / farmstead located approximately 180 m south of the central parcel), and southwest from the western parcel towards Berryhill (dwelling approximately 100 m south of the western parcel).
West	Fields and former / current forestry plantations. The offsite land slopes down towards the west. Offsite access tracks are visible at the northwest corner of site, leading north and west, and along the southwestern boundary, leading northwest from the offsite road towards Boghead, a dwelling or farmstead approximately 125 m west of the western parcel.

2.4 Proposed development plans

The preliminary risk assessment boundary for the Study Area, circa. 62.1 ha, includes the central parcel, which is not proposed for development, and the western parcel, which is approximately 33 hectares and includes the proposed development area.

The client's development plans indicate a 9.4 ha fenced area in the approximate centre of the western parcel consisting of the BESS compound, energy infrastructure, ancillary building, and transformers. A planting/landscape area is proposed around the BESS compound, and an acoustic bund of approximately 4m height on the south and western edges of the BESS compound. An attenuation basin is proposed to the north, with access routes from the southern boundary and construction compound in the southeast.

A diagram of proposed levels for the BESS compound has been provided by the client, author Field, project reference BTGBNDE02, drawing number 005.2 rev 02 dated March 2025. The proposed levels within the BESS compound show a gentle fall from southeast (169.4 metres above Ordnance Datum, mAOD) to northeast (166.1 mAOD).

The topographic survey provided by the client, author Highland Surveyors Ltd, drawing reference 24074-01, sheets 1-14, Highland Surveyors Ltd, dated February 2025, indicates a gentle fall across the proposed BESS compound from southeast (approximately 172.0 mAOD) down to the north (approximately 164.5 mAOD).

Comparison of the proposed levels and existing topography indicates a cut of around 1 m in the northwest, around 2 m in the northeast, less than 1m in the southwest and less than 1m in the southeast.

A raise in ground levels (fill) of up to 2m is expected in the centre to north-centre of site, and the construction of an acoustic bund of up to 4m height is anticipated at the south and western boundaries of the proposed BESS compound.

Proposed levels have not been provided across the remainder of the western parcel, including construction compound, site access, attenuation basin and wider western parcel. Therefore, it has been assumed for the purpose of this report that no major changes in levels are anticipated outside of the BESS beyond the construction of the attenuation basin.

The proposed layout of the Site, at the time of preparing this report, is shown in **Appendix B**.

3 SUMMARY OF DESK-BASED ASSESSMENT

The desk-based assessment was designed to generally meet the objectives of a preliminary or Phase 1 investigation, as defined by BS 10175:2011+A2:2017 (BSI, 2017) and BS 5930:2015, and is set in context of a Tier 1 preliminary risk assessment as defined in CLR11.

The "vicinity" of the site for the purposes of this report is defined as locations situated within an approximate 250m radius of the Study Area, although certain sources and/ or sensitive targets further than 250m distance from the Study Area may also have been considered.

3.1 Site history

3.1.1 Historical development record

The development history of the Study Area and surrounding area based upon assessment of historical plans and records is detailed in Table 3 and Table 4 respectively.

The historical maps reviewed are shown within the environmental database report in **Appendix C**.

Table 3 Summary of historical development within the Study Area

Date from	Date to	Historical Land Use (on-site)	Area of site
1870	1955	The western parcel (proposed development parcel) and part of the central parcel (outside of proposed development) are formed of rough pasture or bog. Waggle Cairn is mapped on the eastern edge of the western parcel. Tracks are present across the western parcel (future proposed development) from the southwest boundary, heading north and east.	Western parcel
		The central parcel (not proposed for development) is predominantly farmland with Northburnhill dwelling / farmstead, well and track, and rough pasture in the eastern inverted L-shaped limb.	Central parcel
1968	1995	The western parcel is mapped as coniferous forest. The formerly marked tracks are absent.	Western parcel
		A small gravel pit is mapped on the western site boundary, approximately level with the offsite Boghead dwelling.	Western parcel
		The centre of the Study Area remains as fields with Northburnhill dwelling/farmstead and track. The central-eastern inverted L-shaped limb are mapped as coniferous forest. New tracks are mapped within the central-eastern forest.	Central parcel
1999	2015	A track is visible in aerial photography on the western parcel of the Site (forest), in a different location from the	Western parcel

		1870 mapping. Two ponds are visible offsite, approximately 250 m east and 500 m east.	
		The eastern parcel has been logged between 2001 and 2009.	Central parcel
2021	2023	The western parcel has been logged between 2015 and 2021. Potential for historical logging in forestry plantations throughout 20th century.	Western parcel
January 2025		Client site reconnaissance photographs presented in Appendix E and Streetview photography indicate that the central parcel (not proposed for development) is predominantly comprised of open fields, including a track and structure at Northburnhill, and an inverted L-shape of parcel of coniferous forestry plantation in the east.	Central parcel (outside development boundary)
January 2025		Client site reconnaissance photographs presented in Appendix E and Streetview photography indicate that the eastern land parcel, outside of the preliminary risk assessment boundary, contains fields ploughed for arable planting.	Central parcel and offsite in eastern parcel
March 2025		The RSK walkover at the time of ground investigation has identified the western parcel (63 hectares, including proposed development) to comprise around 63 hectares of logged forestry plantation with frequent young to semi mature conifers, stumps, piles of rotten brash, and holes in the ground surface. The single width access track on site is raised above the surrounding forestry land with a steep sided embankment of up to 1.5m height. The access point is in the south, with turning circles in the centre and north, and occasional passing places in the centre and south.	Western parcel (contains proposed BESS development)

Table 4 Summary of historical development in the vicinity of the Study Area

Date from	Date to	Historical Land Use (off-site)	Distance (m) and orientation
1870	1902	The surrounds are generally rough pasture or bog.	All directions
		A tank is mapped 225 m south in 1901 only at Upper Greenfield.	South
		Gravel pits are recorded around 490 m north, at Hillhead of Teucher. These are not mapped past 1902. The track leading north past Northburnhill dwelling/farmstead continues north from the site past an unnamed croft (present until c. 1901) / dwelling / farmstead structures and associated wells located offsite to the north.	North
		Structures (unnamed) are 150m west, 120m south (marked as Berryhill and with well from 1955) and Upper	West and south

Date from	Date to	Historical Land Use (off-site)	Distance (m) and orientation
		Greenfield structure (with well) 200m south, Latch of Bogside 400m south.	
1902	1955	A track is present along the southern boundary of the Study Area from 1902 onwards, leading south and southeast from the site.	South
1969	2025	Fields offsite, to the north and southwest of the western parcel, are now forests or plantations. A tank is mapped approximately 350m northeast in 1969.	Detailed in text.

Water pumping stations are identified in the GroundSure report on site at Northburnhill, and 100 m - 250 m distant at the head of a stream and at Upper Greenfield dwelling/farmstead. It is considered likely that these are for groundwater or surface water abstractions.

3.1.2 Unexploded ordnance

A review of publicly available unexploded ordnance (UXO) risk maps indicates that the Study Area is located in an area with low potential for wartime bombs to be present (Zetica, 2025). A copy of Zetica risk map is present in **Appendix D**.

3.2 Information from environmental database report

Relevant environmental permits and incidents detailed within the environmental database report (see **Appendix C**) are summarised below in Table 5.

Table 5 Summary of environmental permits, landfills, and incidents

Data type	Entries within the Study Area	Entries <250m from the Study Area	Entries of relevance >250m from Study Area	Details
Hazardous substances/ industrial land uses				
Control of Major Accident Hazards (COMAH) sites	0	0	0	N/A
Explosives sites, Notification of Installations Handling Hazardous Substances (NIHHS), Planning hazardous substance consents/ enforcements	0	0	0	N/A
Contaminated land Part IIA register entries and notices	0	0	0	N/A
Fuel station entries	0	0	0	N/A
Note: Entries have only been included within the table where they are located within a 250 m radius of the Study Area or, where they fall outside of this radius but are considered to comprise a significant entry.				

3.2.1 Contemporary trade directory entries

Active potentially contaminative land uses identified in the contemporary trade directory of the GroundSure report and with potential to affect the area within the Study Area comprise a water pumping station within the central parcel (not proposed for development), at Northburnhill dwelling / farmstead. Two offsite water pumping stations are mapped in the eastern parcel (100m southeast) and at Upper Greenfield (247m south). These are considered likely to comprise pumps for groundwater or surface water abstraction.

3.3 Information from regulatory authorities

3.3.1 Aberdeenshire Council Enquiry

An information request was made with Aberdeenshire Council for information relevant to the Environmental Information (Scotland) Regulations 2004. The responses are summarised in Table 6 and presented in **Appendix D**.

Table 6 Summary of Aberdeenshire Council Responses

Enquiry	Response
1. Is the Council aware of any contamination issues or specific incidents in connection with the site or surrounds up to 250 m radius?	No
2. Has any area within 250 m of the site been identified under the Council's Contaminated Land Strategy for further investigation under the provisions of Part IIA of the EPA 1990? If so, please provide further details, including your predicted timescales for further action. If not, what is the likelihood of the site being identified in the future?	No
3. Are there any closed, licensed or unlicensed landfill sites within a 250 m radius of the site? If yes, what is their location (NGR) and what types of waste were deposited in them? Are there any known gassing issues? If any gas spiking/monitoring has been carried out, could you please supply the results?	No
4. Is the Council aware of any environmental assessments or remedial activities having been undertaken at the site or surrounds up to 250 m radius?	No
5. Is the Council aware of any fuel/chemical storage infrastructure at the site or within 250 m? If so please provide details	No
6. Is there any private drinking water supplies on your Local Authority Water Supply Register, within a 2 km radius of the site? If yes, what is the location (i.e. NGR) and the source of the abstraction and its purpose.	A spreadsheet with private water supply (PWS) records was provided in the email response; this included 61 records associated with current or historical properties within a 2km radius. This is presented in **Appendix D**.
7. Is there any other relevant information on land contamination that the Council hold for the site or surrounding area that may be relevant for an environmental assessment?	No records held

3.3.2 SEPA Environmental Searches

A search of the interactive mapping services on SEPA's informatics website and Scotland's Environment interactive map website has identified the following licences and authorisations for the Study Area and the surrounds, presented in Table 7.

Table 7 SEPA information search

Data type	Entries within Study Area	Entries <250m from Study Area	Entries >250m from Study Area of relevance	Details
Authorised sites – CAR registration, simple and complex				
Point Source – existing sewage treatment system	0	1	0	Boghead, Cuminestown
Sewage (private) primary	0	1	1	Within 250m: Upper Greenfield, Cuminestown >250m: Rashiepans, Cuminestown
Agency and hydrological				
Authorised sites and environmental permits – pollution prevention and control (PPC) Part A, PPC Part B, Waste management, Waste Exemption (simple/complex), other authorisations	0	0	0	None recorded within vicinity of site
Enforcement and prohibition notices	0	0	0	None recorded within vicinity of site
SPRI water releases, waste transfers, waste water releases, air releases	0	0	0	None recorded within vicinity of site
Water monitoring points, waste monitoring points, gaseous monitoring sites	0	0	0	None recorded within vicinity of site
Discharge consents	0	0	0	None recorded within vicinity of site
Registered radioactive substances	0	0	0	None recorded within vicinity of site
Landfill and waste				
Active landfills	0	0	0	N/A
Historic / closed landfills	0	0	0	N/A
Other waste management licences	0	0	0	N/A

Data type	Entries within Study Area	Entries <250m from Study Area	Entries >250m from Study Area of relevance	Details
Potentially in-filled land (pit, quarry, pond, marsh, river, stream, dock etc)	1	0	1	A historical gravel pit 490 m north is recorded in GroundSure directory. A small gravel pit is also recorded on site in 1968-1995 historical mapping on the western boundary.
Note: Entries have only been included within the table where they are located within a 250 m radius of the site or, where they fall outside of this radius but are considered to comprise a significant entry.				

3.3.3 SEPA Enquiry

An enquiry has been made with SEPA regarding the following information in the vicinity of the Study Area:

1. CAR licenses for groundwater and surface water abstraction;
2. SEPA recorded pollution incidents to groundwater or surface waters;
3. Data sheets associated with the Idoch Water and Little Water / Black Burn surface water bodies, and Ellon and New Byth groundwater bodies;
4. Available chemical testing results for dissolved oxygen concentration, pH, and calcium for the Idoch Water or Little Water / Black Burn upstream of site;
5. Copies of PPC permits and waste management licenses;
6. SEPA consultations and associated reports relating to environmental assessment or remedial activities;
7. Waste exemptions.

A response has not yet been received from SEPA relating to these enquiries.

3.3.4 Planning records

Planning records held by the Local Authority Planning Department (Aberdeenshire Council) pertaining to the Study Area and relevant to the current assessment are summarised in Table 7. In addition, Scottish Government Energy Consents Unit planning references flagged by the client have been included in the summary table. These are all enquiries for proposed energy infrastructure schemes across the region, and no work has been undertaken to date in the vicinity of the site.

Table 8 Planning information

Year	Details and application reference no.	Part of Study Area
2014	ENQ/2014/1145 Location: Land at Sandend Or Inverboyndie Banff Travelling to The South of New Deer Turriff Description: Installation of MORL Underground Cable Corridor and Erection of 2 no. Electricity Substations	Site and wider area: land between North Aberdeenshire Coast (35km northwest) and New Deer (10km east).
2014	APP/2014/2430 Location: Landing At Inverboyndie Bay Banff Travelling To Land West Of Cairnbanno House, New Deer Description: Construction of Onshore electrical transmission cables, comprising an onshore transition jointing pit, underground cables within a 33km (approximately) long cable corridor and the construction of 2 No. Substations southwest of New Deer, also including temporary construction compounds, access tracks, laydown areas and other associated works	Part of western parcel, and wider area: from Banff (35km northwest) to New Deer (3 km southeast)
2018	Energy Consents Unit reference: ECU00000677 Location: not named Description: North East 400 kV Overhead Line Reinforcement Works	Offsite: Peterhead to New Deer to Rothienorman to Keith to Blackhillock Closest point is New Deer substation, approximately 3 km southeast.
2022	ENQ/2022/1841 Location: Caledonia Onshore Transmission Infrastructure Land along Moray/Aberdeenshire Coast Description: Installation of Onshore Transmission Infrastructure (OnTI) – Scoping Request	Site and wider area: land between North Aberdeenshire Coast (35km northwest) and New Deer (7km southeast).
2023	APP/2023/1454 (alternative reference 100636176-001) Location: Land From North Of Peterhead To South Of New Deer Green Volt Offshore Windfarm Aberdeenshire Description: National for Formation of Onshore Landfall Point, Laying of Underground Cable and Erection of Substation	Offsite, closest point is New Deer substation, approximately 3 km southeast)
2024	ENQ/2024/1010 (energy consents unit reference ECU0005165) Location: Beaulyhill to Blackhillock to New Deer to Peterhead (BBNP) Description: EIA scoping request for Section 36 Application for Erection of Double Circuit Steel Structure 400KV OHL	Site and wider area: land between near Beaulyhill (36km west) and Peterhead (23km east). It is understood from reference ECU0005165 that this overhead transmission line would bisect the western parcel, running between the attenuation basin (north) and Bess compound (centre).

Year	Details and application reference no.	Part of Study Area
2024	ENQ/2024/0039 Location: Stromar Offshore Wind Farm Landfall Between Rosehearty and Fraserburgh to New Deer Description: Onshore Development (Scoping Opinion)	Site and wider area: land between near Cuminestowe (3km southwest) and Fraserburgh (25km northeast).
2024	ENQ/2024/0071 Location: Stromar Offshore Wind Farm Landfall Between Rosehearty and Fraserburgh to New Deer Description: Habitat Regulation Appraisal (HRA) (Screening Request)	Site and wider area: land between near Cuminestowe (3km southwest) and Fraserburgh (25km northeast).
2024	ENQ/2024/0675 Location: and at Wagglehill, Cuminestown, Turriff, Aberdeenshire Description: Erection Of A Single 225 kW Wind Turbine (Hub Height 30.52m, 45.07m to Blade Tip) and Associated Infrastructure	North end of western parcel: similar location to proposed attenuation basin, south of northern turning circle.
2024	APP/2024/1927 Location: Land at Mains of Greens Cuminestown, Aberdeenshire, AB53 5YQ Description: National for Erection of 400kV AC Substation and Associated Infrastructure	Eastern end of central parcel (forestry land) and farmland east of the Study Area.
2024	APP/2024/1812 Location: Boyndie Bay to New Deer Description: Onshore Transmission Infrastructure for Caledonia Offshore Wind Farm including Formation of Onshore Landfall Point, Laying of Underground Cables, Erection of 2 Co-Located Substations, and Associated Works to connect to the Transmission Grid.	Offsite: closest relevant point is just north of New Deer substation, 2.5 km southeast.
2025	ENQ/2025/0055 Location: Land Near Wagglehill North And South Cuminestown Turriff AB53 5YQ Description: Installation and Decommissioning of a Battery Energy Storage System (BESS) with a Installed Capacity of up to 400MW with Associated Infrastructure	Eastern parcel (offsite to east) and Study Area: western parcel (proposed for development) and central parcel (inside Study Area, no development proposed)

3.3.5 Site services

Obtaining a full set of service plans was outside the scope of this report.

Buried utility services and their backfill can represent a constraint to development and act as preferential migration pathways for gas, vapour or groundwater towards a receptor.

3.4 Summary of previous reports

A summary of pertinent information from previous reports pertaining to the site is included below in **Table 9**.

Relevant information relating to the identified ground and groundwater conditions has not been included within the table below but has been incorporated into the relevant parts of **Section 4.5 - geology**.

Table 9 Summary of previous reports

Report Details	**Lichfields, Briefing Note, Site Appraisal: New Deer, 65288/01/NOW/kmit, 18 April 2024**
Note on applicability	This Lichfields briefing note was prepared at an early feasibility stage; it is understood from the Client that the planning application reference ENQ/2025/0055 builds on the preliminary findings of this briefing note.
Site coverage	The Lichfields briefing note covers the proposed development site and surrounds. The redline boundary is not the same as for this report, and it largely focuses on proposed development within the western parcel. However, the total area considered remains valid.
Summary of report	The briefing note provides a summary on planning considerations for the proposed development. It includes details on existing records for planning history, flooding, heritage, topsoil, ecology, landscape, access, planning policy, the local development plan and supplementary guidance from Aberdeenshire Council.
Does the client have reliance upon the report?	Yes
Key factual findings	The Lichfields briefing note provides wider context on the likely planning constraints for the site. It provides information on single track access and notes that the western parcel was logged between 2019 and 2021. It lists three dwellings within 150 m of the site, of which Northburnhill (central parcel) is a farmstead. Several undesignated heritage assets are noted within and adjacent to the wider Study Area, including Northburnhill (farmstead and croft) and Waggle Cairn (croft) in the central parcel. In or close to the western parcel are Waggle Cairn (cairn) very close to, and northeast of, western parcel). It notes a high organic carbon concentration in topsoil on site of 47.92%, from Scotland's Environment online mapping.
Report Details	**WRc, New Deer 2 Bess: Peat Depth Survey Report, 2761193-01, 20 March 2025,**
Site coverage	This WRc report covers the western parcel, including the proposed development area.

Summary of report	This WRc report is based on fieldwork comprising peat depth probing of 288 locations across the 33 hectare western parcel of the Study Area.
Does the client have reliance upon the report?	Yes
Key factual findings	288 probing locations were undertaken in a grid of approximately 50m spacing, increasing to 25m intervals at proposed infrastructure locations (BESS compound and tracks). Probing was undertaken without sampling or direct inspection of soil. The WRc report had probe depths completed between 0.01 m bgl and 0.41 m bgl. WRc notes that Scottish peat is defined by a minimum thickness of 0.5m, and as such the western parcel was classed as containing Peaty Soil rather than Peat, which was significantly disturbed and in very poor ecological condition. WRc concluded that no peat management plan was required for the western parcel.

3.5 Site geology

3.5.1 Anticipated geological sequence

Published records (British Geological Survey, 2025) for the area indicate the geology of the site to be characterised by the succession recorded in **Table 10**.

There are no publicly available BGS historical boreholes located on or within 250 m of the site.

Table 10 Site geology

Strata	Description	Estimated thickness	Permeability
Superficial geology			
Peat	Mapped in the western parcel of the site, including underlying the proposed BESS compound and associated infrastructure.	Unknown	Very low to low.
Till, Devensian (diamicton)	Mapped in the central parcel, outside of the proposed development area.	Unknown.	Low to high
Bedrock geology			

Strata	Description	Estimated thickness	Permeability
Macduff Formation – micaceous psammite, semipelite and pelite	Metagreywacke: highly metamorphosed sedimentary rock, now slates, phyllites and mica-schists. The cordierite buffer zone is present in the central land parcel.	Unknown	Low
Relevant information sources: BGS Geoindex ☒ BGS borehole logs ☐ Previous SI reports ☐			

With reference to the historical data there have been access tracks in different locations across the former forestry plantations in the western and central parcels. Therefore, the presence of made ground should be expected. No work has been undertaken to date for the planning enquiries relating to regional energy infrastructure projects.

3.5.2 Radon

A radon 'Affected Area' is where 1% or more homes are estimated to be above the radon Action Level of 200 Bq m^{-3}. Although the radon data used in production of the radon atlas comes from measurements in homes, the maps indicate the likely extent of the local radon hazard and is thus applied in all buildings.

The environmental database report indicates that the site is not located within a radon 'Affected Area' and therefore radon protection measures are not considered to be necessary in the construction of non-domestic buildings.

Development details regarding structures and basements have not been provided. It is considered unlikely that a basement would be installed. However, in line with BRE 211 guidance, where basements are constructed radon ingress must be considered regardless of the sites geographical location. Radon resistance should be considered in the design of waterproofing measures by appropriate specialists with consideration to site conditions such as site geology and hydrogeology. In any basement, post-construction monitoring is recommended by BRE (2023) in all habitable basements.

3.6 Mining and quarrying

Evidence has been sought to identify any mining, quarrying, landfilling and land reclamation operations, past and present, which have taken place within 500 m of the site. An initial site appraisal has been carried out based on the information provided on the Coal Authority Interactive Viewer of the UK Coalfield areas and the commercial environmental databased report for information on non-coal mining.

3.6.1 Areas of coal mining

Use of the Coal Authority interactive viewer indicates the site lies outside their Coal Mining Reporting Area and therefore no further assessment of coal mining issues is required within this report.

3.6.2 Areas of other (rock or mineral) mining

Historical mining records in the vicinity include the Hillhead of Teuchar gravel pit, a former surface mineral working 491 m north. 184 m west is a zone with a class A vein mineral and a low risk of underground mine workings. Potential for difficult ground conditions is recorded at a level where they need not be considered.

3.7 Hydrogeology

A review of the Scottish Environmental Protection Agency (SEPA) informatics website and Scotland's Environment interactive map website indicate that the summary of the hydrogeological setting of the site, with respect to the anticipated geological sequence set out in Section 4.5 is as presented below in **Table 11.**

Table 11 Summary of hydrogeological setting

Condition	Description
Aquifer characteristics	For groundwater encountered underlying the site to be considered a potential receptor with respect to the assessment of historical land contamination, it must meet the aquifer characteristics outlined in SEPA position statement WAT-PS-10-02. To be classified as an aquifer, groundwater "must be capable of supplying 10m^3/day or 50 people (on a continuous basis)… such aquifers have future resource value". As per Annex 4 of SEPA WAT-PS-10-02, superficial deposits must as a minimum be of significant areal extent (>1 hectare) and contain more than 2 m thickness of continuous saturated sand or gravel (or coarser material). Further assessment e.g. slug testing may then be needed to support the classification. SEPA has identified all bedrock aquifers in Scotland as groundwater bodies with resource potential. Superficial groundwater bodies have also been mapped across selected areas. It should be noted that hazardous substances associated with recent or ongoing inputs should be prevented from entering any groundwater regardless of its resource value, in accordance with the requirements of the Groundwater Daughter Directive and associated Scottish legislation. SEPA has not classified the superficial deposits underlying the site as a groundwater body. Where present, groundwater in the superficial Peat and Till deposits is unlikely to meet the criteria of a groundwater body with resource potential. SEPA has classified the bedrock aquifer as being a part of the Ellon groundwater body (ID: 150676) underlying the whole site except for the western boundary. This groundwater body has been classified as having an overall status of 'Poor' (2023). The New Byth groundwater body (ID: 150454), underlies the western land parcel; this has been given an overall status of 'Good' (2023). According to the BGS hydrogeology interactive map, the bedrock comprises a low productivity aquifer with fissure/discontinuity controlled flow (Southern Highland Group). Small amounts of groundwater are anticipated in the near surface weathered zone and in secondary fractures.

Condition	Description
	159m west of the site and topographically downgradient is a moderately productive, locally important multi-layered aquifer, with fracture/discontinuity controlled flow (Lower Old Red Sandstone).
Depth to groundwater and flow	There are no available relevant local borehole records on the BGS GeoIndex. No depth to groundwater or piezometric flow surface can be inferred from the BGS 1:625,000 hydrogeological map of Scotland, dated 1988.
Groundwater recharge / attenuation	Most of the site is currently unsurfaced and will therefore drain to ground.
Licensed groundwater abstractions	Records of licensed groundwater abstractions are not provided on the SEPA, or Scotland Environment interactive maps.
Drinking Water Protected Areas (Groundwater)	Information available on the Scottish Government 'Drinking Water Protected Areas (Groundwater) in the Scotland River Basin District' (Map 20 of 22) indicates that the site lies within a groundwater drinking water protected area.

3.8 Hydrology

A summary of the hydrology within the site area is summarised in Table 12.

Table 12 Summary of hydrology in site area

Condition	Description
Surface watercourses/features	The topography of the site indicates drainage towards the east and the west, with the watershed located in the western parcel of land. Two ponds are noted in aerial photography, approximately 250 m east and 500 m east. There is one stream recorded within the Study Area (outside of proposed development are, approximately 100 m northeast of western parcel), which flows southeast across the central parcel of land. This stream flows southeast to a confluence approximately 1.1km southeast of the central parcel, then on to the Burn of Greens water body 1.4m east of the site. This flows into the Black Burn river (Black Burn River meets Little Water at approximately 2.8 km southeast of the site), which has moderate overall ecological status on the SEPA website and is positioned within the River Ythan catchment. The Little Water and Black Burn drains south towards the River Ythan, then east towards Ellon and enters the North Sea at the Ythan Estuary. The western site boundary drains towards the west, with the closest steams approximately 250 m west leading downgradient to Teuchar Stanks (stream) located approximately 750 m west, flowing north into Burn of Monquhitter at Cuminestown, then to the Burn of Turiff and via the River Deveron into the North Sea at Banff.
Surface water abstractions	Records of licensed surface abstractions are not provided on the SEPA or Scottish Environment websites.
Drinking Water Protected Area (Surface)	Source: SEPA Environment Map The site lies within the Burn Turriff drinking water protection zone.

Condition	Description
Site drainage	There is one stream present in the central parcel (outside of the proposed development, which is in the western parcel only); the stream flows downgradient towards the southeast. No drainage is mapped in the western parcel; however, localised drainage associated with the routes of existing and historical tracks may exist in the western parcel. One plastic pipe was identified under the track in the north of the western parcel, possibly connecting drainage across the site. This could not be confirmed in the walkover due to the uneven nature of the ground surface in previously logged or currently planted areas. The Client has advised that drainage walkover findings suggest connectivity to the north, leading to the Burn of Greens water body. Preferential pathways for the migration of contamination in the sub-surface may therefore exist beneath the site.
Preliminary flood risk assessment	The SEPA indicative flood risk map shows that there is an overall low risk from surface water flooding across the site. Localised pockets of higher risk are present across the western parcel, including along the existing track. A flood risk assessment (FRA) is outside the scope of this report.

3.9 Sensitive land uses

A summary of any environmentally sensitive areas identified within 250 m of the site based on the environmental database report, SEPA informatics website and Scotland's Environment interactive map website is presented in Table 13.

Table 13 Environmentally sensitive areas

Feature	Present within 250m of site?	Details	Likely pathways from site?
International designations – Ramsar wetland, Special Area of Conservation (SAC), Special Protection Area (SPA)	No	-	N/A
National designations – Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), ancient woodland	No	-	N/A
Local designations – Local Nature Reserve, Site of Importance for Nature Conservation (SINC)	Yes	The whole site lies within the Grampian conservancy boundary.	Development at the site has the potential to impact the SINC.
Forestry – conservancy boundaries, WIG restructuring regeneration, coniferous forest inventory, forest plan	Yes	The site lies within several forestry designations, which extend offsite to the northeast and south/southwest.	Development at the site has the potential to impactthe adjacent forestry belt on Waggle Hill.
Forestry – national forest estate	No	-	N/A

Feature	Present within 250m of site?	Details	Likely pathways from site?
Nearest high sensitivity development, e.g. residential	Yes	Sparse residential and farmstead development in the surrounds, including two residential dwellings within 150m to the south and west, and farm properties downgradient to the east.	Yes – possible noise, dust or runoff
Groundwater Dependent Terrestrial Environment	No	Given the low thickness and poor ecological condition of the peaty soil observed in the WRc report in area mapped as containing peat on the BGS GeoIndex and 1:50,000 geological mapping, it is considered unlikely that any peat would support a groundwater dependent ecosystem, which would be a sensitive water environment receptor as defined in WAT-PS-10-02.	N/A

3.10 Climate change

Planning policies place a requirement on developers to mitigate and adapt to future climate change.

LCRM (EA, 2023) requires land contamination assessments to '*factor in climate change impacts, including extreme weather events, to ensure site works and any long term remediation is sustainably robust*', this includes consideration in the CSM and potential pollutant linkages that may be affected and the related uncertainty.

The effects of climate change on the conceptual site model and the potential for climate change effects to improve or exacerbate site conditions with respect to potential pollutant linkages is uncertain. Effects identified in LCRM could include increased rainfall and extreme weather events (i.e. flood and storms), increased seasonal variations in groundwater levels, soil moisture content, and potential for mobilisation of contaminants.

RSK consider that sites that are likely to be more susceptible to climate change effects to be those located on or near to the coast and at risk of coastal flooding, or erosion and those located within the flood plain.

Qualitative consideration of climate change is provided for specific linkages in the qualitative risk assessment and in the assessment of uncertainty.

4 PRELIMINARY GEOTECHNICAL CONSTRAINTS

4.1 Design class

BS EN 1997-1 defines three different Geotechnical Categories that structures may fall into, which are summarised as follows:

- Category 1: Small and relatively simple structures for which it is possible to ensure that the fundamental requirements will be satisfied on the basis of experience and qualitative geotechnical investigations; with negligible risk
- Category 2: Conventional types of structure and foundation with no exceptional risk or difficult ground or loading conditions
- Category 3: Structures or part of structures, which fall outside limits of Geotechnical Categories 1 and 2. Examples include very large or unusual structures; structures involving abnormal risks, or unusual or exceptionally difficult ground or loading conditions; structures in highly seismic areas; structures in areas of probable site instability or persistent ground movements that require separate investigation or special measures.

Based on the information provided above on the proposed development and in view of the anticipated ground conditions, a Geotechnical Category of Category 2 has been assumed for the purposes of designing the geotechnical investigation. This should be reviewed at all stages of the investigation and revised where necessary.

4.2 Preliminary geotechnical hazards assessment

A summary of commonly occurring geotechnical hazards associated with the anticipated geology outlined in Section 4.5 above is given in Table 14 together with an assessment of whether the site may be affected by each of the stated hazards.

Table 14 Summary of preliminary geotechnical risks that may affect site

Hazard category	Hazard status based on desk study findings and proposed development		Engineering considerations if hazard affects site
	Could be present and/or affect site	Unlikely to be present and/or affect site	
Sudden lateral changes in ground conditions	☒	☐	Peat is present across part of the proposed development western parcel, anticipated to overlie hard bedrock. Till is mapped in the vicinity and its presence or absence has not been confirmed on site. Likely to affect ground engineering and foundation design and construction
Shrinkable clay soils[1)]	☒	☒	N/A

Hazard category	Hazard status based on desk study findings and proposed development		Engineering considerations if hazard affects site
	Could be present and/or affect site	Unlikely to be present and/or affect site	
Highly compressible and low bearing capacity soils, (including peat and soft clay)	☐	☒	Peat is mapped across half of the western parcel (proposed development area). However, given the findings of the WRc peat probing report, where peaty soil was identified to a depth between 0.01 m and 0.41 m, this is not considered likely to affect ground engineering and foundation design and construction.
Silt-rich soils susceptible to rapid loss of strength in wet conditions[1)]	☒	☐	Superficial peat and till are of unknown composition. May affect ground engineering and foundation design and construction.
Running sand at and below water table	☐	☒	N/A
Karstic dissolution features (including 'swallow holes' in Chalk terrain) [1)]	☐	☒	N/A
Evaporite dissolution features and/or subsidence [1)]	☐	☒	N/A
Ground subject to or at risk from landslides[1)]	☒	☐	Low risk from landslides identified at eastern edge of western parcel (proposed development) in GroundSure report. May require special stabilisation measures.
Ground subject to peri-glacial valley cambering with gulls possibly present	☐	☒	N/A
Ground subject to or at risk from coastal or river erosion[1)]	☐	☒	N/A
High groundwater table (including waterlogged ground) [1)]	☒	☐	Depth to water table in bedrock unknown. Water anticipated in peat. May affect temporary and permanent works.
Rising groundwater table due to diminishing abstraction in urban areas [1)]	☐	☒	N/A
Geological faults, fissures and break lines	☐	☒	N/A
Underground mining including shafts and adits (e.g. coal, mineral)	☐	☒	N/A

Hazard category	Hazard status based on desk study findings and proposed development		Engineering considerations if hazard affects site
	Could be present and/or affect site	Unlikely to be present and/or affect site	
Effects of extreme temperature (e.g. cold stores or brick kilns/furnaces)	☐	☒	N/A
Existing sub-structures (e.g. tunnels, foundations, basements, and adjacent sub-structures)	☐	☒	N/A
Filled and made ground (including embankments, infilled ponds and quarries)	☒	☐	Fill may be present at areas of historical development. Former tracks identified in historical maps. Likely to affect ground engineering and foundation design and construction.
Adverse ground chemistry (including expansive slags and weathering of sulphides to sulphates)	☒	☐	The ground chemistry is not known and will require characterisation.
Site topography, including presence of steep slopes	☐	☒	N/A
Note: Seismicity is not included in the above table as this is not normally a design consideration in the UK. [1)] The potential for these geohazards to impact the site may be exacerbated by climate change related fluctuations in temperature and precipitation.			

5 INITIAL CONCEPTUAL SITE MODEL

In the UK, land contamination is assessed using a risk-based approach taking account of the magnitude (severity of the hazard) and likelihood (probability) of occurrence. A 'receptor' is something that could be adversely affected by contamination (e.g. people, an ecological system, property or a water body). A 'pathway' is a route or means by which a receptor is or could be exposed to or affected by a contaminant. A 'contaminant source' is a hazard but it can only pose a risk to a receptor where a pathway is present.

The relationship between sources, pathways and receptors are referred to as a conceptual site model. A risk can only be realised where a contaminant source, pathway and receptor are all in place, referred to as a 'pollutant linkage'.

In line with CLR11 and BS 10175: 2011 + A2 2017 (BSI, 2017), RSK has used information in the preceding sections to identify hazards (sources of contaminants), receptors that may be impacted and plausible linking pathways. Where all three are present this is termed a potentially complete pollutant linkage and a qualitative risk estimation is made.

The conceptual site model has been considered in context of the proposed development as understood at the time of writing this report. Should the site development proposals change, the CSM and the associated pollutant linkages identified may need to be revised.

5.1 Potential soil, soil vapour and groundwater linkages

5.1.1 Potential sources of contamination

Potential sources of soil and groundwater contamination identified from current activities and the history of the site and surrounding area are presented in Table 15. A gravel pit is on the western site boundary (level with Boghead) between 1968 and 1995. The locations of access tracks have changed over time in the central and western parcels; fill may be present in these locations or in areas of unrecorded historical development.

Table 15 Potential sources of soil and groundwater contamination

Potential sources	Contaminants of concern
On-site	
Made ground (i.e. fill material)	Unknown fill material but potentially including uncontrolled waste material such as brick, ash and clinker and containing toxic and phytotoxic metals, inorganics, polycyclic aromatic hydrocarbons (PAHs), asbestos.
Logging activities (historical timber plantation) Water pumping station (outside of proposed development area)	Metals, lube oil, petroleum hydrocarbons, solvents. Possible point source of non-aqueous phase liquid (NAPL).
Offsite sources	

Potential sources	Contaminants of concern
Historical tanks are recorded 350m northeast (1969) and 225m south (1901) of the site.	Given the distance from site and topographic gradient, these are considered unlikely to affect the site and will not be considered further.
Historical gravel pits are mapped 490m north until 1902	Given their size, time since mapped date, and the intervening distance from site, these are discounted from further investigation.
The two pumping stations	100-250m distance, are downgradient of the site and of limited size. As such, they are considered unlikely to impact the site. Sensitive receptors

Sensitive receptors identified at or in the vicinity of the site that could be affected by the potential sources identified above comprise:

- future site users (battery energy storage system compound).
- adjacent site users (residents and farm workers).
- future buildings and services (i.e. foundations and potable water pipes).
- any groundwater underlying the site with respect to entry of hazardous substances
- groundwater in the low and moderate productivity aquifers beneath the site, and associated groundwater drinking water protection areas.
- water pumping stations identified within 250m of proposed development area; these may be groundwater or surface water abstraction points. The response from Aberdeenshire Council listed records for 61 current or historical private water abstractions within 2km, but notes that this data may not be complete.
- surface water in stream cutting through central parcel (flows southeast towards Burn of Green water body within River Ythan catchment). Offsite streams 250m west (within Burn of Turriff catchment) are also downgradient from the site – and associated surface water bodies with drinking water protection areas.
- the Client has advised that drainage surveys suggest a northward connection from local drainage routes on site towards the Burn of Greens, which is 1.4 km offsite to the east.
- ecological receptors including the onsite site of importance for nature conservation, and various forestry designations for the site and surrounds.

5.1.2 Potential contaminant pathways

Exposure pathways applicable to human health receptors include:

- direct ingestion, inhalation and dermal contact with soil and soil-derived dust
- vapour migration followed by indoor and/or outdoor inhalation
- soil-derived dust migration followed by off-site deposition and ingestion, inhalation, and dermal contact
- asbestos fibre release followed by inhalation

- wind-blown dust and deposition off-site followed by direct ingestion, inhalation, and dermal contact.

Pathways applicable to environmental pathways include:

- direct contact of foundations/services with contamination in soil and/or groundwater
- leaching from soil followed by percolation in the unsaturated zone and entry into groundwater
- migration in groundwater
- migration via run-off through drainage
- discharge to surface water
- wind-blown dust and deposition off-site followed by direct ingestion, inhalation, and dermal contact.

Ecological receptors are only considered within the conceptual model in the context of statutory protected sites.

Please note that construction workers and future maintenance workers have not been identified in the conceptual model as receptors because risks are considered to be managed through health and safety procedures according to the Health & Safety at Work Act 1974 and associated regulations and guidance.

Where there are potential instances that construction methods may result in short term environmental impacts, these will need to be assessed at design stage, within a construction phase environmental management plan and mitigation measures put in place where required.

5.2 Potential ground gas linkages

5.2.1 Ground gas generation potential

Potential ground gas sources identified for the site and surrounding are shown in Table 16.

Table 16 Potential ground gas sources (excludes mine gas)

Potential sources	Indicative ground gas generation potential (CIEH, 2008)	Additional information
On-site		
Natural soil strata with a low degradable organic content, e.g. alluvium, peat	Very low	Peat identified in geology records for the site. High carbon content in topsoil.
Made ground with low degradable organic content (e.g. up to 5% organic material and no easily degradable waste).	Very low	Localised made ground possible from historical tracks.

The potential sources of ground gas identified have a very low indicative gas generation potential; however the extent of made ground s not known, but peat thickness has been identified as being shallow. In addition, a review of Scotland's Soils Topsoil Organic Carbon Concentration Map (flagged in the Lichfields briefing note and verified by RSK) indicates a carbon concentration of 47.92%, which suggests a potential carbon rich soil source for ground gas generation.

As such, it is recommended to undertake gas monitoring to characterise the gassing regime beneath the site and classify risk to end users.

5.2.2 Radon

The site is in an area where the estimated percentage of homes exceeding the action level of 200 Bq m^3 is <1% as indicated on available radon potential mapping (UKHSA & BGS, 2022).

In accordance with BRE 211 guidance (2023) and associated building regulations/standards no protection measures are considered to be required in new developments.

5.2.3 Sensitive receptors and ground gas linking pathways

Sensitive receptors identified at or in the vicinity of the site that could be affected by the potential ground gas sources identified above comprise:

- on-site human receptors - migration and ingress of ground gases into buildings or confined spaces followed by explosion / asphyxiation
- current / adjacent site users – migration off-site and ingress of ground gases into buildings or confined spaces followed by explosion / asphyxiation
- current / future* buildings and services - migration and ingress of ground gases into buildings or confined spaces followed by explosion.

The assessment has identified receptors to include building structures and proposed end-users.

Construction workers have not been identified as receptors for the purposes of this assessment. Risks may still be present to construction workers especially where works include the entry into excavations within the ground. Construction workers should undertake appropriate risk assessments and risks should be managed through health and safety procedures and the use of PPE.

5.3 Preliminary risk assessment

The preliminary risk assessment findings and potentially complete pollutant linkages are shown in Table 17. These are considered relative to the Study Area, including the western parcel (including proposed BESS) and central parcel (no proposed development).

The risk classification is based on the combination of hazard consequence and probability using a risk matrix from CIRIA C552 (Rudland et al., 2001). The requirement for a preliminary qualitative risk assessment is in accordance with LCRM. A summary of the risk assessment process is in **Appendix F**.

Table 17 Risk estimation for potentially complete pollutant linkages

Potential source	Potential receptor	Possible pathway	Likelihood	Severity	Risk Rating	Justification
On-site Made ground (i.e. fill material associated with historical site development)	Current and future users (residents – in central parcel only, visitors, workers)	Direct oral ingestion, inhalation and dermal contact with soil and soil-derived dust	Unlikely	Medium	Low	Exposure to chemical constituents over chronic timeframes is considered to be of medium severity. The potential constituents and composition of the made ground are unknown; however, it is considered, based on historic activities including potential timber logging, that the potential for significant contamination in the ground is unlikely. Therefore, considering the site use and low likelihood for significant contamination within the made ground, the overall risk is considered to be low. Site investigation would be required to confirm the potential risk.
		Accumulation of ground gas leading to explosion or asphyxiation *	Unlikely	Severe	Moderate / Low	The potential for ground gas generation arising from infilled materials at the site is unknown and the made ground is expected to be limited to the located of former tracks. The time since previous development (>40 years) indicates the potential for ongoing gas generation to be unlikely; however, owing to the severity of hazardous gas further characterisation of a potential source is considered to be required. Additionally, there is a potential for peat to be present beneath the site.
Historical timber logging activities	Current and future buildings and services	Direct contact with impacted soil and/or groundwater	Unlikely	Medium	Low	Exposure to chemical constituents over chronic timeframes is considered to be of medium severity. The potential constituents and composition of the made ground are unknown; however, it is considered, based on historic activities including potential timber logging, that the potential for significant contamination is unlikely. Therefore, considering the site use and low likelihood for significant contamination within the made ground, the overall risk is considered to be low. Site investigation would be required to confirm the potential risk.
		Accumulation of ground gas leading to explosion *	Unlikely	Severe	Moderate / Low	The potential for ground gas generation arising from infilled materials at the site is unknown and unlikely to be significant due to the time since previous development (>40 years). However, considering the elevated concentrations of ground gas measured previously and

Potential source	Potential receptor	Possible pathway	Likelihood	Severity	Risk Rating	Justification
						sewage work on site and in the vicinity, further assessment is considered to be required. Additionally, there is a potential for peat to be present beneath the site.
	Grampian conservancy boundary and offsite forestry land	Wind blown dust and deposition and Lateral migration in ground water	Unlikely	Mild	Low	The potential constituents and composition of the made ground are unknown; however, it is considered, based on historic activities including potential timber logging, that the potential for significant contamination in the ground is unlikely. Therefore, considering the site use and low likelihood for significant contamination within the made ground, the overall risk is considered to be low.
	Any groundwater underlying the site regardless of resource value	Leaching and/ or migration of substances hazardous to groundwater from the unsaturated zone	n/a as prevention of entry of hazardous substances to groundwater is an absolute requirement, not a risk-based assessment			As referred to above, the Water Framework Directive (and associated Scottish legislation) includes a requirement to prevent the entry of hazardous substances into groundwater. In the case of historical land contamination, if hazardous substances have already entered groundwater, further risk assessment can take place to assess the magnitude of the impact. Given the limited, small scale and point source nature of the sources identified at the site, they are likely to be of limited extent. It is considered likely that any hazardous substances present will have already entered groundwater. The likelihood of continued entry of hazardous substances to groundwater is considered to be low, although this can be further assessed through ground investigation.
	Groundwater (low to moderate productivity aquifers) and water	Leaching to groundwater and migration in groundwater*	Unlikely	Medium	Low	There is a potential for leaching from made ground. The potential constituents and composition of the made ground are unknown; however, it is considered, based on historic activities, that the potential for significant contamination is unlikely. Therefore, the potential for leaching to groundwater is unlikely to be significant. The geology on site is a low productivity aquifer, with a moderate

Potential source	Potential receptor	Possible pathway	Likelihood	Severity	Risk Rating	Justification
	pumping stations					productivity aquifer downgradient from site. The depth to groundwater, extent of made ground on site and proposed development foundations / groundworks are unknown. The pumps recorded on site(central parcel: outside of proposed development) and within 250m may be for groundwater abstraction and should be considered as a potential receptor. Therefore, the overall risk via the leaching to groundwater and lateral migration is considered to be low. Further investigation would be required to confirm the risk to groundwater.
	Surface water (streams flowing east into Black Burn and Little Water, and west into Teuchar Stranks)	Leaching to groundwater followed by migration in groundwater *	Unlikely	Medium	Low	There is a potential for leaching from made ground. The potential constituents and composition of the made ground are unknown; however, it is considered, based on historic activities, that the potential for significant contamination is unlikely. Therefore, the potential for leaching to and migration within the groundwater is unlikely to be significant.
		Discharge to surface water	Likely	Medium	Moderate	There is an onsite stream, therefore, there is potential for direct discharge of surface runoff into the surface water. Therefore, the risk is considered to be moderate/low. Further investigation would be required to confirm the potential risk.
	and water pumping stations	migration in groundwater *	Low Likelihood	Medium	Low	The potential constituents and composition of the made ground are unknown, and it is considered, based on historic activities including potential timber logging, that the potential for significant contamination is unlikely. Therefore, the potential for leaching to and migration within the groundwater is unlikely to be significant. Should the water pumping stations within 250 m be for groundwater abstraction, the potential risk is considered to be low.
		Discharge to surface water	Likely	Medium	Moderate	There is an onsite stream, therefore, there is potential for direct discharge of surface runoff into the surface water. Therefore, the risk is considered to be moderate/low. Further investigation would be