

Botley West Solar Farm

Environmental Statement

Volume 3

Appendix 11.12 Cable Route - Botley Northern to Central Site Areas Desktop Study and Preliminary Risk

Assessment

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Glossary

Term	Meaning
The Applicant	SolarFive Ltd
The Project	The Botley West Solar Farm (Botley West) Project
Conceptual Site Model	used to identify potential sources, pathways and receptors and how they interact (i.e. potential pollutant linkages) on site post development
Controlled Waters	Controlled waters means territorial waters within the 3 nautical mile limit, coastal waters extending inland, inland waters and ground water
Desk Top Study	A desk study is the collation and review of information already available in the public domain and is carried out at an early stage of site appraisal and forms the basis of the preliminary risk assessment
Pathway	How the contaminant may be expected to move/migrate to a receptor
Preliminary Risk Assessment	Report that presents a summary of readily-available information on the geotechnical and/or geo-environmental characteristics of the site and provides a qualitative assessment of geo-environmental and/or geotechnical risks in relation to the proposed development.
Principal Aquifer	These formations provide a high level of water storage and may support water supply and / or river base flow on a strategic scale
Receptor	Target that could be adversely affected by contaminants
Secondary A Aquifer	These formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers.
Secondary B Aquifer	These formations are generally formed of lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering
Secondary Undifferentiated Aquifer	Secondary undifferentiated are aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value
Site of Special Scientific Interest	Sites designated by Natural England under the Wildlife and Countryside Act 1981. This can include sites of national and international importance for sediments, rocks, fossils, and features of the landscape
Source	Source of contamination
Unproductive Strata	These formations have a low permeability and have negligible significance for water supply or base flow





Abbreviations

Abbreviation	Meaning
AOD	Above Ordnance Datum
bgl	Below Ground Level
BGS	British Geological Survey
CIRIA	Construction Industry Research and Information Association
CSM	Conceptual Site Model
DTS	Desk Top Study
EA	Environment Agency
HDD	Horizontal Directional Drilling
NGET	National Grid Electricity Transmission
NGR	Ordnance Survey National Grid Reference
NPPF	National Planning Policy Framework
NVZ	Nitrate Vulnerable Zone
PAOC	Potential Areas of Concern
PRA	Preliminary Risk Assessment
PV	Photovoltaic
PVDP	Photovolt Development Partners GmbH
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SPA	Special Protection Area
SPZ	Groundwater Source Protection Zone
SSSI	Site of Special Scientific Interest
UXO	Unexploded Ordnance
WFD	Water Framework Directive

Units

Unit	Description
%	Percentage
m	Metres
kV	Kilovolt
km	Kilometre
MW	Megawatt
MWh	Megawatt hour





1 Land Parcel 15 (Cable Route Botley Northern Site Area to Central Site Area) DTS and PRA

1.1 Introduction

- 1.1.1 This Appendix of the Environmental Statement (ES) has been prepared by RPS on behalf of Photovolt Development Partners GmbH. (PVDP) for the Applicant, SolarFive Ltd. (SolarFive). This Appendix supports Chapter 11 of the ES.
- 1.1.2 RPS Consulting Services Ltd (RPS) was commissioned by PhotoVolt Development Partners Ltd on behalf of SolarFive Ltd to undertake a Desk Top Study (DTS) and Preliminary Environmental Risk Assessment (PRA) of Botley West Solar Farm, Oxfordshire (The Project). The report has been commissioned prior to the proposed construction of the Project.
- 1.1.3 The Project will be located in the county of Oxfordshire, across an area of approximately 1, 300 ha. The Project extends from an area of land in the north, situated between the A4260 and the Dorn River Valley near Tackley and Wootton (Northern Site Area), through a central section, situated broadly between Bladon and Cassington (Central Site Area), and connecting to a section further south near to Farmoor Reservoir and north of Cumnor (Southern Site Area), where the Project will connect to the National Grid transmission network. The name 'Botley West' is derived from the location of the grid connection point. The consent being sought for the Project is a temporary one. Temporary consent is being sought for a 42-year period during which the solar farm will be constructed, operated decommissioned.
- 1.1.4 The Project comprises three main temporary development sites as set out above for the installation of ground-mounted solar photovoltaic (PV) panels (Northern, Central and Southern Site Areas). The Project's solar arrays will be connected by electrical cables within each of the Site Areas. The interconnecting cable routes between the Site Areas will largely follow the public highway, but some parts will cross land either leased by the Client or the subject of an easement agreement.
- 1.1.5 A Site Location Plan showing the location and order limits for The Project is presented as Drawing 1.
- 1.1.6 The 220 kV cables are required to connect the development sites with the main substation called Botley West. To provide sufficient detail for the PRA, the three main areas of The Project have been sub-divided by RPS into fourteen land parcels (referenced as Land Parcels 01 14) and two linking cable route corridors (referenced as Land Parcels 15 and 16). Land Parcel 1 was discounted from requirement for further assessment following completion of an initial EIA Scoping exercise undertaken by RPS in February 2023.
- 1.1.7 This report presents the DTS and PRA for Land Parcel 15 (Cable Route). This comprises the cable route connecting land parcels 4 (Northern Site Area) and 6 (Northern Site Area)as highlighted in Figure 1.





1.1.8 The Desk Study assessment is based upon a review of published information available from local, regional, and national agencies. The desk study information is derived from Insights Reports provided by Groundsure, Refs GSIP-2022-12757-10507_1 and GSIP-2022-12757-10508_1, which were obtained for land parcels 1-4 and GSIP-2022-12757-10509 obtained for land parcel 6. Please note the terms and conditions attached to the supply of data from Groundsure. It should be noted that the reports listed above have been utilised for assessment of data as finalised cable routes were still to be confirmed at the time of purchase of the Groundsure reports.

1.2 Objectives

- 1.2.1 The principal objectives of this assessment were as follows:
 - Establish from published sources the geological sequence for Land Parcel 15 and potential for ground instability to occur through development proposals and the extent and nature of any safeguarded minerals reserves;
 - To assess potential sources of contamination at the site, associated with historical and current land uses both on site and in the surrounding area;
 - To review the environmental setting to assess the sensitivity of the surrounding area to contamination/pollution;
 - To produce an outline Conceptual Site Model (CSM) detailing how any contamination may impact the identified receptors via pollutant linkages; and
 - To conclude on the likely requirement for any further assessment and ground investigation required in support of the planning application.
- 1.2.2 The PRA methodology utilised in the preparation of this assessment is presented in detail in Annex A.

1.3 Legislation and Guidance

- 1.3.1 The assessment has been undertaken in general accordance with British Standard BS EN ISO 21365:2020 and is considered suitable to meet the initial requirements of planning as outlined within the National Planning Policy Framework (NPPF). The assessment also reflects the recommendations of Environment Agency guidance, Land Contamination: Risk Management, (LCRM 2023).
- 1.3.2 This report has been produced in general accordance with:
 - Contaminated Land (England) Regulations 2006 (as amended);
 - DEFRA Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012);
 - Environment Agency (2023) Land Contamination: Risk Management (LCRM 2023);
 - National Planning Policy Framework (2023);





- CIRIA Document C665: Assessing Risks Posed by Hazardous Ground Gases to Buildings;
- British Standard requirements for the 'Investigation of potentially contaminated sites - Code of practice' (ref. BS10175:2011+A2:2017);
- British Standard requirements for the 'Code of practice for ground investigations' (ref. BS5930:2015+A1:2020); and,
- British Standard requirements for the 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' (ref BS8485:2015+A1:2019).
- 1.3.3 Details of the limitations of this type of assessment are described in Annex B.

2 SITE DESCRIPTION AND DESK STUDY

2.1 Site Location (Land Parcel 15)

2.1.1 Land Parcel 15 comprises the proposed 275 kV cable route linking Land Parcels 1-4 forming North Botley, with Land Parcel 6, the northern most part of Botley Central. To the north of land parcel 4 the route closely follows existing roads bordering land Parcels 1 and 4 and existing fields (see Figure 1 below) where there is considered to be low contamination risk potential based upon the DTS findings for these areas.

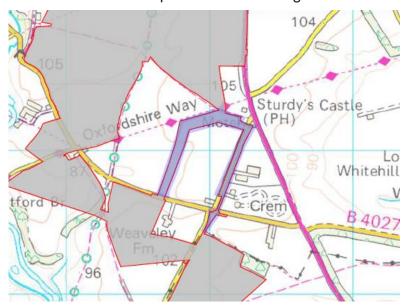


Figure 1: Extent of cable route corridor linking Land Parcels 1-4

2.1.2 The route then comprises a 20 m working corridor which initially follows the western boundary of Land Parcel 4 and then the Council District boundary on the eastern side of Woodstock before deviating eastwards and linking to the A4095 (Upper Campsfield Road) either following the route of Shipton Road or across field boundaries 500 m north of Shipton Road. The route then follows the alignment of the A4095 southwards to the roundabout of the A4095 with the A44 next to Oxford Airport. To the south of the roundabout the route then follows the eastern edge of the village of Bladon before joining with Land Parcel 6 as shown on Figure 2 below.







Figure 2: Extent of cable route corridor linking Land Parcels 4 and 6

- 2.1.3 The topography of this section of the cable route shows little variation typically approximately 90 m Above Ordnance Datum (AOD) based upon OS map contours.
- 2.1.4 A targeted site inspection has not been undertaken on this land parcel given time constraints in completion of this assessment following confirmation of cable route layout.
- 2.1.5 From 2022 Google Earth aerial photo images, cable route corridor is located in an area of predominantly arable agricultural land use and follows field boundaries or existing roads. Identified neighbouring land consisted of the following:

Table 2.1: Neighbouring Land Uses

Direction	Description
North:	Arable Land
East:	A4095, Oxford Airport, Arable Land
South:	Arable land
West:	Settlements of Woodstock and Bladon

2.2 Proposed Development

2.2.1 The proposed development is to comprise a temporary 1,307 MWp solar farm installation. The Project will connect to a new National Grid Electricity Transmission (NGET) system, via a new National Grid 400kV substation, to be located close to the existing National Grid 400kV line that runs between Cowley in Oxford, westwards to Walham, in Gloucestershire. The majority of the development (840 ha) will comprise solar PV modules (solar panels). At the highest point the modules will be 2.2m and at the lowest point the modules will be 0.8m. The arrays are intended to be fixed, not rotating. The





- construction of all aspects of the Project is subject to the final Project design and potential environmental constraints.
- 2.2.2 The method of foundation support and anchoring of the solar panels has not been confirmed however it is likely that this will be through use of galvanised steel piles or screws driven into the ground by an impact piling or screwing rig, to a depth of approximately 1.0 to 2.5 m below ground level (bgl).
- 2.2.3 Cable routes are to be installed at depths ranging from 1.5 m to 30 m bgl with Horizontal Directional Drilling (HDD)to be utilised where it is not feasible to use the 'open cut' method to cross obstacles such as hedges, rivers, railway lines, public rights of way, roads and sensitive archaeological or ecological areas.
- 2.2.4 There are likely to be four main temporary construction compounds in the development areas, one in the North, two in the Central area and one in the South. All compounds have been carefully sited in order to minimise potential adverse environmental impacts. Topsoil and subsoil will be stripped from such areas and stored on site for replacement following the completion of construction works. Each compound will have fencing and suitable hard standing, offices, welfare facilities and generators to supply electricity.

2.3 Site History

Historical Map Review

2.3.1 The following review is based on past editions of readily available 1:10,560 and 1:10,000 Ordnance Survey (OS) maps dated 1876 to 2022. Extracts from historical maps are included in the DTS and PRA reports for Land Parcels 1-4 and 6 respectively and should be referenced for further details.

Table 2.2: Historical Site Uses

On-site Land Use and Features	Dates
GWR (Woodstock Branch) Railway cutting (east of Hensington)	1898 - 1950
Refuse tip (above)	1974 - current
Agricultural fields (east of Woodstock)	1876 - current
Shipton Road (east of Woodstock)	1876 - current
Upper Campsfield Road between junction with Shipton Road and Oxford Road.	1876 - current
Oxford Road (A44) including roundabout (approx. 1 km south-east of Woodstock)	1880 - current

2.3.2 Pertinent off-site historical site uses within 250 m are presented below.

Table 2.3: Historical Neighbouring Site Uses

Surrounding Land Uses	Orientation	Distance	Dates	
(250 m radius)			From	То
Isolation Hospital	South of Shipton Road	100 m	1919	1923





Surrounding Land Uses	Orientation	Distance	Dates	
(250 m radius)			From	То
Allotments - subsequently built on	West of Shipton Road	10 m	1919	1955

Site Planning History

- 2.3.3 Relevant and readily available planning records for the site, as obtained from the Cherwell District Council (CDC) planning website are summarised as follows:
 - 14/00049/SCOP Land South Of Perdiswell Farm Shipton Road. –
 Application for erection of up to 1,500 dwellings including affordable housing, care village, school, supermarket, Public Open Space, sports pitches and park and ride. Scoping opinion issued. A small section of this site between Shipton Road and Hensington lies within Land Parcel 15.
 - 14/02004/OUT Land South Of Perdiswell Farm Shipton Road -Outline planning application for a mixed use development comprising: up to 1,200 dwellings, care village primary school, retail space, employment including transport interchange and sports facilities – application refused due to location outside land allocated for development in Local Plan and concerns on possible detrimental impact on Blenheim Palace and park or Blenheim Villa Scheduled Ancient Monument. EIA and ground investigation were undertaken on the site including on the site of the former isolation hospital, targeted with four trial pits and a borehole. No evidence of Made Ground was identified and laboratory testing of soil samples indicated no elevated contaminant concentrations in shallow soils. Assumed to cover the same area as application 14/00049/SCOP.

2.4 Environmental Setting

Geology

2.4.1 Based on British Geological Survey (BGS) mapping (1:50,000-scale) obtained from the BGS Geoindex and the Environment Agency (EA) Groundwater Vulnerability mapping (1:100,000-scale), the stratigraphic sequence and aquifer classifications beneath Land Parcel 15 are indicated to be as follows:

Table 2.4: Descriptions of Geological Strata

Stratum	Description & approximate thickness	Aquifer Classification
Artificial Ground	None recorded	-
Superficial deposits	None recorded	-
Kellaways Clay Member	Silicate mudstone, grey, locally with thin beds of siltstone and sandstone, and nodules of argillaceous limestone. Typically 0 – 20 m thick.	Unproductive Strata





Stratum	Description & approximate thickness	Aquifer Classification
Cornbrash Formation (Limestone)	Medium to fine-grained limestone. Up to 10.50 m thick.	Secondary A
Forest Marble Formation (Mudstone or Limestone)	Silicate-mudstone, greenish grey, variably calcareous with limestone bands in the lower part. 10 – 30 m thick.	Secondary A

- 2.4.2 From the published mapping it is expected that the northern section of the cable route from Land Parcel 4 would coincide with outcropping strata of the Kellaways Clay Member and Forest Marble Formation extending as far south as the infilled railway cutting, south of which the Cornbrash Formation are likely to be encountered at shallow depth.
- 2.4.3 The cable route corridor from land Parcel 4 to Shipton Road closely follows the alignment of a series of boreholes and trial pit records held by BGS for a previous 1990 investigation for the A34 Woodstock bypass (Refs SP41NE/65-71). In summary the records confirm the absence of identifiable superficial deposits. The northernmost records indicate interbedded moderately strong limestones and stiff clays recorded as of the Cornbrash Formation. This Is also the case over the southern section with a borehole close to the roundabout (SP41NE/68) indicating very stiff clay to 1.00 m below ground level (bgl) underlain by cobble and boulder size limestone fragments to 2.60 m bgl followed by alternating bands of silty clays and strong limestone to completion depth.
- 2.4.4 In the central area, a thin cover of Cornbrash was recorded in SP41NE/66 consisting of firm clays and limestone cobbles to a depth of 1.90 m bgl overlying assumed Forest Marble Formation strata of stiff shelly silty clay and strong limestone interbedded with very thin bands of silty clay.
- 2.4.5 It is noted that borehole SP41NE/65 recorded 4.80 m of Made Ground of typical landfill composition consisting of loose brick, limestone, concrete and bitumen fragments, with wood, paper and textiles between 1.00 m bgl and 3.10 m bgl, in a sandy clay or clayey sand matrix. The stratum between 1.00 m bgl and 3.10 m bgl were also described as 'odorous'. This would coincide with the location of the former Hensington Landfill site.
- 2.4.6 No groundwater strikes were recorded in the trial pit excavations and in the boreholes only in SP41NE/66 at 5.22 m bgl (limestone) and in SP41NE/67 at 1.68 m bgl (mudstone).
- 2.4.7 Localised Made Ground is also likely to be present across the portions of the cable route coinciding with close proximity to existing roads typically expected to be hardstanding cover and sub-base materials. No site investigation reports have been reviewed to verify this.





Hydrogeology

- 2.4.8 The cable route corridor is primarily located above Secondary A Aquifer strata of the Forest Marble Formation and Cornbrash Formation. These formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers.
- 2.4.9 According to EA data, Land Parcel 15 is not located in a groundwater Source Protection Zone (SPZ).
- 2.4.10 Information provided by the EA indicates that there is an active licensed groundwater abstraction within 1 km of Land Parcel 15. This is located approximately 220 m north-east of Shipton Road and utilised for 'make up or top up water'.

Surface Water

2.4.11 There are no watercourses within 1 km of the cable route corridor which are classified within a River Basin Management Plan published by the EA under the European Water Framework Directive (2000). A list of readily identifiable nearby watercourses and water bodies is as follows:

Table 2.5: Nearby Surface Watercourses

Watercours	se / Body	Quality Classification	Approx. Distance and Direction from Site
River Glyme		N/A	1000 m west
2.4.12	•	y the EA indicates that the ions within 500 m radius.	nere are no records of licensed

2.4.13 Natural England data indicates that the area of the Application Site to the

Ecologically Sensitive Sites

south of the roundabout is within designated Oxford Green Belt. There are no other ecologically sensitive sites, that constitute environmental receptors as defined within Table 1 of the DEFRA Environmental Protection Act 1990: Part 2A - Contaminated Land Statutory Guidance (2012), located within a 500 m radius of Land Parcel 15.

Radon

2.4.14 Radon can be a risk to human health from inhalation of radioactive elements. According to the Indicative Atlas of Radon in England and Wales published by the Health Protection Agency (part of Public Health England) and the British Geological Survey, the site area is not located in an area at risk from radon gas with a maximum estimation of between 1 % and 3 % affected properties (BGS and Public Health England) which would indicate no requirement for radon protection measures for new development. The nature of the construction on this land parcel (cable trenches) would indicate no feasible risk from radon exposure to future site users.





Coal Authority

2.4.15 The Interactive Map Viewer on the Coal Authority website indicates that the site is not located in a coal mining reporting area.

Non-Coal Mining

2.4.16 BGS sources indicate that Land Parcel 15 is not located in an area of recorded non-coal mining (vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities including ball clay, jet, black marble, graphite and chert).

BGS Ground Stability Hazard Ratings

2.4.17 British Geological Survey Ground Stability Hazard ratings for the site are summarised as follows:

Table 2.6: BGS Ground Stability Hazard Ratings

Ground Stability Hazard	BGS Risk rating
Collapsible ground	Very low
Compressible ground	Negligible
Ground dissolution	Negligible/Low
Landslide	Very Low
Running sand	Negligible/Very Low
Shrinking or swelling clay	Negligible to Moderate

2.4.18 The Moderate rating for shrinking/swelling clays is restricted to the localised area of outcropping Kelllaways Clay Member mudstone close to the point of connection with Land Parcel 4. For the remainder of the route corridor the risk rating is negligible to low.

2.5 Authorised Processes and Pollution Incidents

Landfills and Waste Sites

- 2.5.1 Data provided by the EA, Local Authority and BGS indicates that there is a former landfill site identified as 'Hensington Railway Cutting' crossing the cable route corridor to the north of Shipton Road and approximately 260 to 320 m south of Land Parcel 4. This was licensed for disposal of Inert, Industrial, Commercial, Household, Special Waste and Liquid sludge between 1979 and 1980. This location coincides with the borehole record described in Paragraph 2.4.5.
- 2.5.2 There are no other identified waste treatment or disposal sites within 500 m radius.





Environmental Permits

2.5.3 EA Local Authority data indicates that there are no identified locations regulated by an Environmental Permit (under the Environmental Permitting Regulations (2010)) within 500 m.

COMAH Sites

2.5.4 There are no records of any operations under the Control of Major Accident Hazards (COMAH) Regulations (1999), located within 500 m.

Pollution Incidents

2.5.5 Environment Agency data indicates that there are no records of 'major' or 'significant' pollution incidents within 500 m radius.

2.6 Unexploded Ordnance

- 2.6.1 CIRIA Report C681 (Stone et al (2009)) outlines recommendations for dealing with the potential risk associated with the legacy of Unexploded Ordnance Risk, largely relating to WWII bombing and military sites.
- 2.6.2 Reference to the Zetica Unexploded Bomb Risk mapping indicates that the site is in an area of low potential risk from Unexploded Bombs. As the site is not within an area of known military history, in general accordance with CIRIA Report no further consideration of Unexploded Ordnance is considered necessary.

3 Outline Conceptual Site model

3.1 Background

- 3.1.1 An outline conceptual site model (CSM) consists of an appraisal of the source-pathway-receptor 'contaminant linkages' which is central to the approach used to determine the existence of 'contaminated land' according to the definition set out under Part 2A of the Environmental Protection Act 1990. For a risk to exist (under Part 2A), all three of the following components must be present to facilitate a potential 'pollutant linkage'.
 - Source referring to the source of contamination (Hazard).
 - **Pathway** for the contaminant to move/migrate to receptor(s).
 - Receptor (Target) that could be affected by the contaminant(s).
- 3.1.2 Receptors include human beings, controlled waters and buildings / structures. The National Planning Policy Framework, used to address contaminated land through the planning process, follows the same principles as those set out under Part 2A.
- 3.1.3 As part of the assessment the potential risks to receptors for potential source is given one of the following classification:
 - Low risk it is considered unlikely that issues within the category will give rise to significant harm to identified receptors





- Moderate risk it is possible, but not certain that issues within the category will give rise to significant harm to receptors
- High risk there is a high potential that issues within the category will give rise to significant harm to identified receptors

3.2 Potential Pollutant Linkages

3.2.1 Each stage of the potential pollutant linkage sequence has been assessed individually on the basis of information obtained during the desk study exercise and are discussed in the following section.

Potential Contaminant Sources

On Site - Current

- 3.2.2 Current on site potential sources of contaminants of concern include:
 - The southern part of the cable route follows existing roads for much of the route, which potentially present a source of localised soil/groundwater contamination through rain wash-off of water that may have been contaminated by minor oil/fuel spills.

On Site - Historical

- 3.2.3 Historical maps indicate the following potentially contaminative historical sources:
 - Former landfill site identified as 'Hensington Railway Cutting', licensed for disposal of Inert, Industrial, Commercial, Household, Special Waste and Liquid sludge between 1979 and 1980. Investigatory borehole for the proposed Woodstock bypass confirmed Made Ground containing putrescible material to in excess of 4.00 m depth and evidence of malodour suggesting ground gas is being generated. No evidence of whether the site has been lined or had gas mitigation measures installed.

Off-site - Current

3.2.4 Current off-site potential sources of contaminants of concern include the existing road network as described above.

Off-Site - Historical

3.2.5 Historical maps indicate a former isolation hospital approximately 100 m south of Shipton Road. As part of a previous planning application for a mixed use development on land including sections of the Application Site, there were a number of exploratory hole locations targeting the former location of the isolation hospital. The investigation included sampling and testing soils obtained from these exploratory holes with results compared against standard residential land use Generic Assessment Criteria (GACs). No evidence of Made Ground and no elevated contaminant concentrations were recorded. On the basis of these findings the isolation hospital is discounted further as a potentially significant contamination source.





Potential Pathways

- 3.2.6 The risks to any future on site human health receptors via the pathways of dermal contact and ingestion will be mitigated by reinstatement of hardstanding following placement of cables and use of clean inert material to infill service trenches. Given the absence of recorded significant sources of on-site Made Ground (other than the former landfill site) and the neighbouring ground investigation findings there is not considered to be a risk to human health posed by exposure in soft landscaping areas where Made Ground is likely to be absent or minimal in thickness.
- 3.2.7 There is the potential for ground gas and volatile contaminants of concern (if present) associated with the Hensington Landfill Site to migrate off-site via granular horizons of weathered limestone or fractures in intact limestone of the Forest Marble or Cornbrash Formation. These may impact on off-site human heath receptors/structures via the inhalation pathway and accumulation in indoor areas.
- 3.2.8 It should be noted that pathways may be modified or exacerbated by disturbance of cable route corridor, for example removal or damage during excavation to any lining or capping or gas mitigation measures applied to the landfill site.

Potential Receptors

Controlled Waters

- 3.2.9 The outcropping bedrock comprise Secondary A Aquifers which represent a potential significant receptor, however the absence of identified abstractions and source protection zones within 500 m would indicate low sensitivity.
- 3.2.10 The nearest surface water feature classified within a River Basin Management Plan is approximately 1 km west. Given the distance involved and limited contamination source potential, surface water has been discounted as being a significant receptor based upon the site setting and Desk Study findings.

Human Health

- 3.2.11 Following construction of the Project it is not envisaged that there will be any occupancy of the site although it is possible that there will be periodic requirements for maintenance work/checks of the cables. Maintenance workers therefore represent the most likely potential future human health receptor. The risks posed to maintenance workers are considered to be limited to any works in the vicinity of the identified potential contamination source ('Hensington Railway Cutting') where there may be a short-term risk of direct contact, inhalation or ingestion of contaminated soil or gases/vapours. The remainder of the site is identified as comprising roads, pathways, or agricultural land.
- 3.2.12 Off -site human health receptors include nearby residents. It is noted that there is residential development within 50 m to the west in Hensington. This section of the cable route is indicated to be underlain by limestones of the





Forest Marble and Cornbrash Formations which could allow migration of mobilised gaseous and liquid contaminants from the landfill via fracture flow or through strata weathered to gravel/cobbles.

3.2.13 The assessment does not consider the risk to construction/demolition workers during redevelopment. These risks will be managed through appropriate H&S legislation including the H&S At Work Act and CDM regs.

Structures

3.2.14 Another potential receptor are the cables and any concrete for duct formation likely to be placed within the shallow soils (and possibly through Made Ground in the vicinity of the former landfill). Cable placement could be affected by a high-water table or acidic ground conditions.

Sensitive Land Use

3.2.15 The construction/operational phases of the Project are considered unlikely to adversely impact on any sensitive land uses.

3.3 Outline Conceptual Site Model

3.3.1 An outline CSM has been developed on the basis of the site reconnaissance and desk study. The CSM is used to identify potential sources, pathways and receptors (i.e. potential pollutant linkages) on site post development.





 Table 3.1:
 Outline Conceptual Site Model

Potential Source	Contaminants of Concern	Via	Potential Pathways	Linkage Potentially Active?	Receptors	Qualitative Risk Rating	Notes
On site/Off site current: roads/sub-base, agricultural land use	Metals, pH, PAHs, hydrocarbons,	Soil	Direct contact/ingestion	×	Future site users	N/A	No regular occupation of the Application Site post development. Exposure
			Inhalation of volatiles	×			pathway will be mitigated by reinstatement of trenches following placement of cables with clean inert material and hardstanding.
			Leaching of mobile contaminants	×	Secondary A Aquifers	N/A	Post construction drainage patterns unlikely to be altered by proposed development.
			Chemical Attack via direct contact	×	Utility/Service cables	N/A	Depth of placement of cables likely to be in natural strata below depth expected of sub-base to hardstanding.
		Groundwater	Direct contact/ingestion	*	Off-site users	N/A	Exposure pathway via groundwater unlikely post development. Shallow excavations for cable laying are unlikely to alter the groundwater drainage pattern and impact on off-site human health receptors.
			Inhalation of volatiles				
			Vertical and lateral migration in permeable strata	×	Secondary A Aquifers	N/A	Post construction drainage patterns unlikely to be altered by proposed development.
On site – historical: former Hensington Railway Cutting Landfill Site	Hydrocarbons, metals, PAHs, sulphates, VOCs, pH, asbestos	Soil	Direct contact/ingestion/	✓	Future Site Users	Low	Unlikely maintenance would be required. If so short term period of exposure likely.
			inhalation				
	p. 1, accounts		Chemical Attack via direct contact	✓	Utility/Service cables	Moderate	Potentially deleterious Made Ground from past landfill activities may be present on





Potential Source	Contaminants of Concern	Via	Potential Pathways	Linkage Potentially Active?	Receptors	Qualitative Risk Rating	Notes	
							site	
			Vertical and lateral migration in permeable strata	√	Secondary A Aquifers	Moderate	Risk of creation of preferential contaminant migration pathway for mobilisation of leachate cannot be discounted. Particularly if landfill has lining.	
	Carbon dioxide and methane	_	Inhalation of ground gas	√ ✓	Off-site users Future Site Users	Moderate Low	Buildings do not form part of the development plans. Future usage likely to be restricted to sporadic maintenance checks.	
			Explosive risks	✓	Off-site users	users Moderate	Risk of creation of preferential contaminant migration pathway for	
			✓	Off-site Structures	Moderate	mobilisation of ground gases to impact on off-site users and structures through excavation into landfill cannot be discounted.		

* The Qualitative Risk Rating does not consider the potential for the pathway to be active. In the event that a Moderate or High Qualitative Risk Rating is identified further assessment is recommended.

Note





Based on the identified potential sources and the site setting there is not 3.3.2 considered to be a significant risk to ecological receptors, crops/vegetation or archaeological receptors.





4 Conclusions and Recommendations

4.1 Preliminary Geo-environmental Conclusions

- 4.1.1 The PRA undertaken has not identified any potentially significant potential source-pathway-receptor linkages relating to the proposed cable route installation on Land Parcel 15, other than the former Hensington railway cutting utilised for landfill disposal of mixed wastes including special waste.
- 4.1.2 The outline CSM has identified potential pollutant linkages that may be active upon the completion of the proposed trench excavation through the landfill. It is therefore recommended that unless an above ground section of cable route can be utilised or the cable route can be installed utilising horizontal directional drilling beneath the base of the cutting, that the potential for these linkages to be active is assessed through a Phase 2 Site Investigation. The scope of this investigation should include the following:
 - Liaison with Local Authority to determine whether there are details on construction/composition of the landfill site, whether there are existing gas monitoring wells associated with the landfill site and if so the results obtained. Ground gas risk assessment based upon available data and reassessment of the CSM accordingly (Gap analysis);
 - If no existing data is available, drilling of a small number of boreholes across the landfill site including sampling of soils for laboratory analysis for a typical generic suite of contaminants to determine possible risks to cable placed in the material;
 - Installation and monitoring of gas monitoring wells;
 - Assessment of ground conditions and generic quantitative risk assessment of chemical analysis results to determine the potential for the identified potential pollutant linkages to remain active upon redevelopment of the site; and
 - Provision of recommendations (where necessary) for remediation/mitigation measures to ensure that any identified potential pollutant linkages are not active upon redevelopment of the site.
- 4.1.3 The presence of unknown soil contamination being discovered elsewhere across the cable route during construction works cannot be discounted entirely and it is recommended that if encountered works should stop and specialist advice obtained on how to proceed.

4.2 Preliminary Geotechnical Conclusions

- 4.2.1 The available geological data suggests that bedrock strata of the Cornbrash Formation and Forest Marble Formation outcrop across the majority of Land Parcel 15, the former likely to comprise predominantly limestones and the latter interbedded mudstones and limestones.
- 4.2.2 The ground investigation data for both the proposed Woodstock Bypass and that undertaken in support of a planning application for mixed land use on the eastern side of Woodstock indicate frequent shallow refusals, shallower than





the proposed cable trench depth, in trial pit excavations on the outcropping Cornbrash Formation.

4.2.3 It is recommended suitable engineering practices are adopted to ensure the required installation depth is achieved.





5 References

BGS. British Geological Survey Onshore Geolndex. [online] Available at: http://www.bgs.ac.uk/geoindex/ [Accessed 13th June 2023].

Building Research Establishment (2008): Guidance for the Safe Development of Housing on Land Affected by Contamination. R&D Publication 66.

British Standards Institution (2019): Soil quality — Conceptual site models for potentially contaminated sites. BS EN ISO 21365:2019.

Environment Agency (2023): Land Contamination: Risk Management (LCRM 2023).

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https://magic.defra.gov.uk/

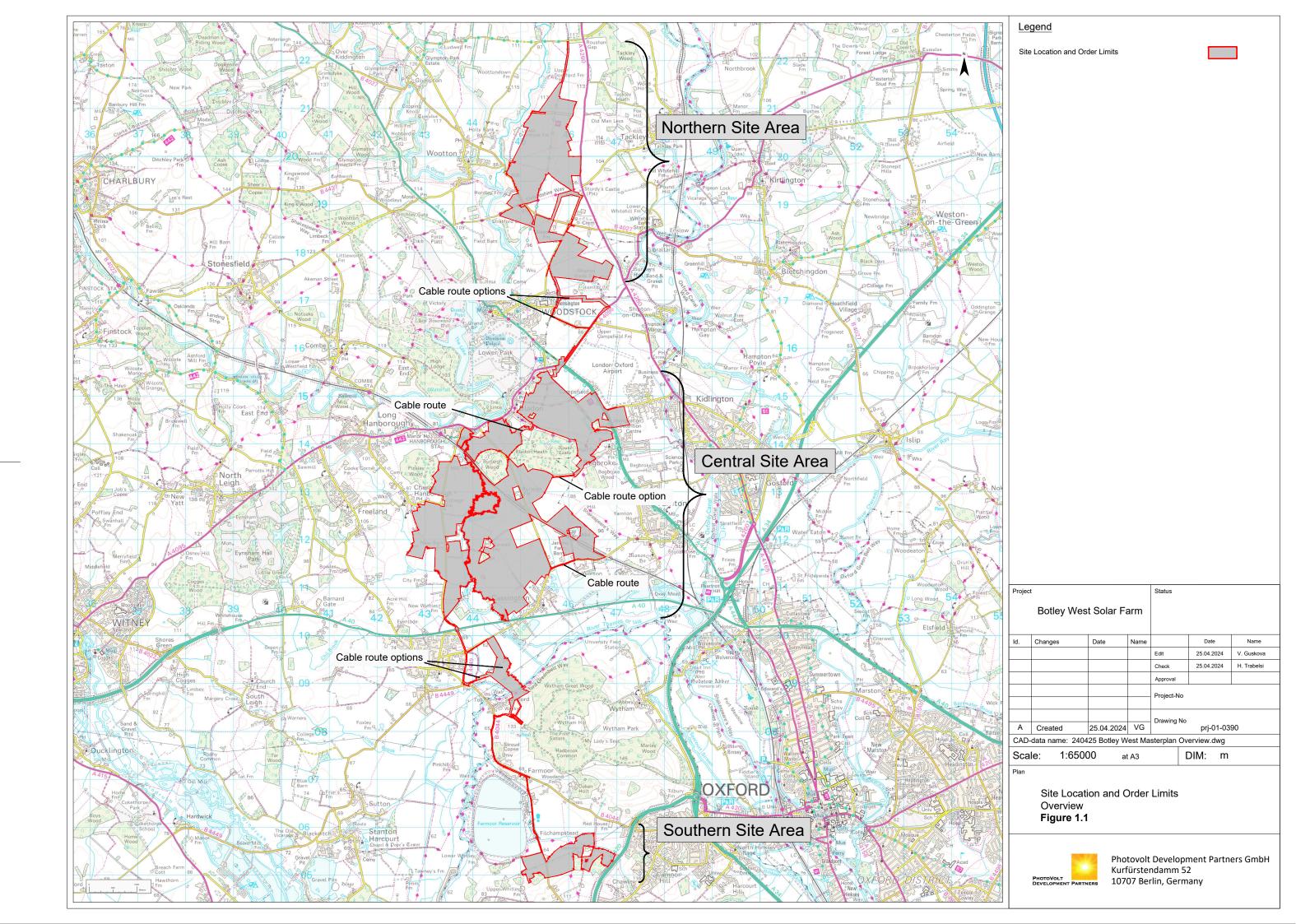
https://zeticauxo.com/downloads-and-resources/risk-maps/

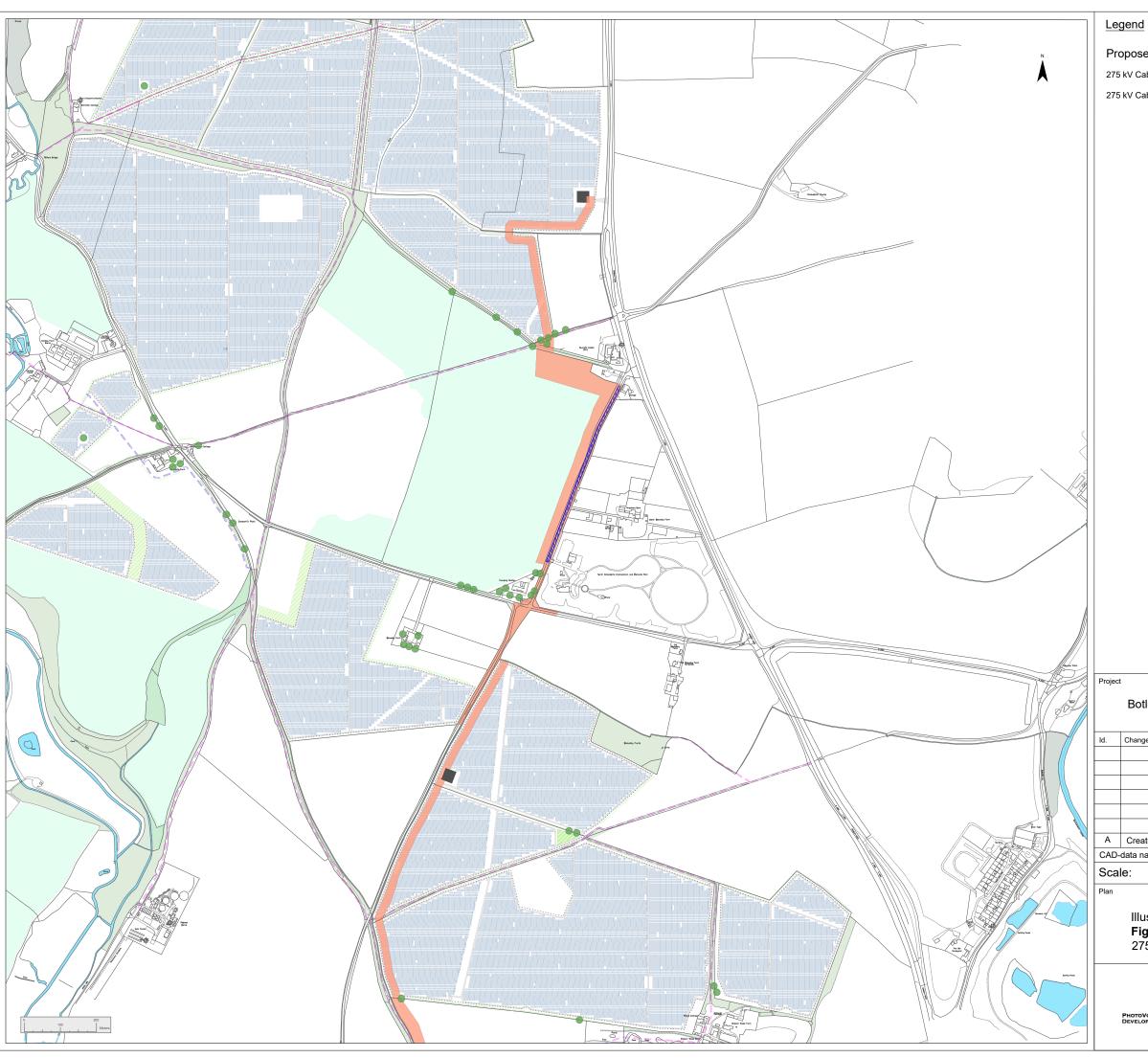
RPS (2023): Botley West Solar Farm, EIA Scoping Report, Ground Conditions Ref 230403_R_JER9429_BOTLEY WEST SOLAR FARM_Scoping Report v1 r2.





Drawings Drawing 1: Site Location Plan





Proposed Infrastructure Elements

275 kV Cable Corridor

275 kV Cable Preferred Route Options



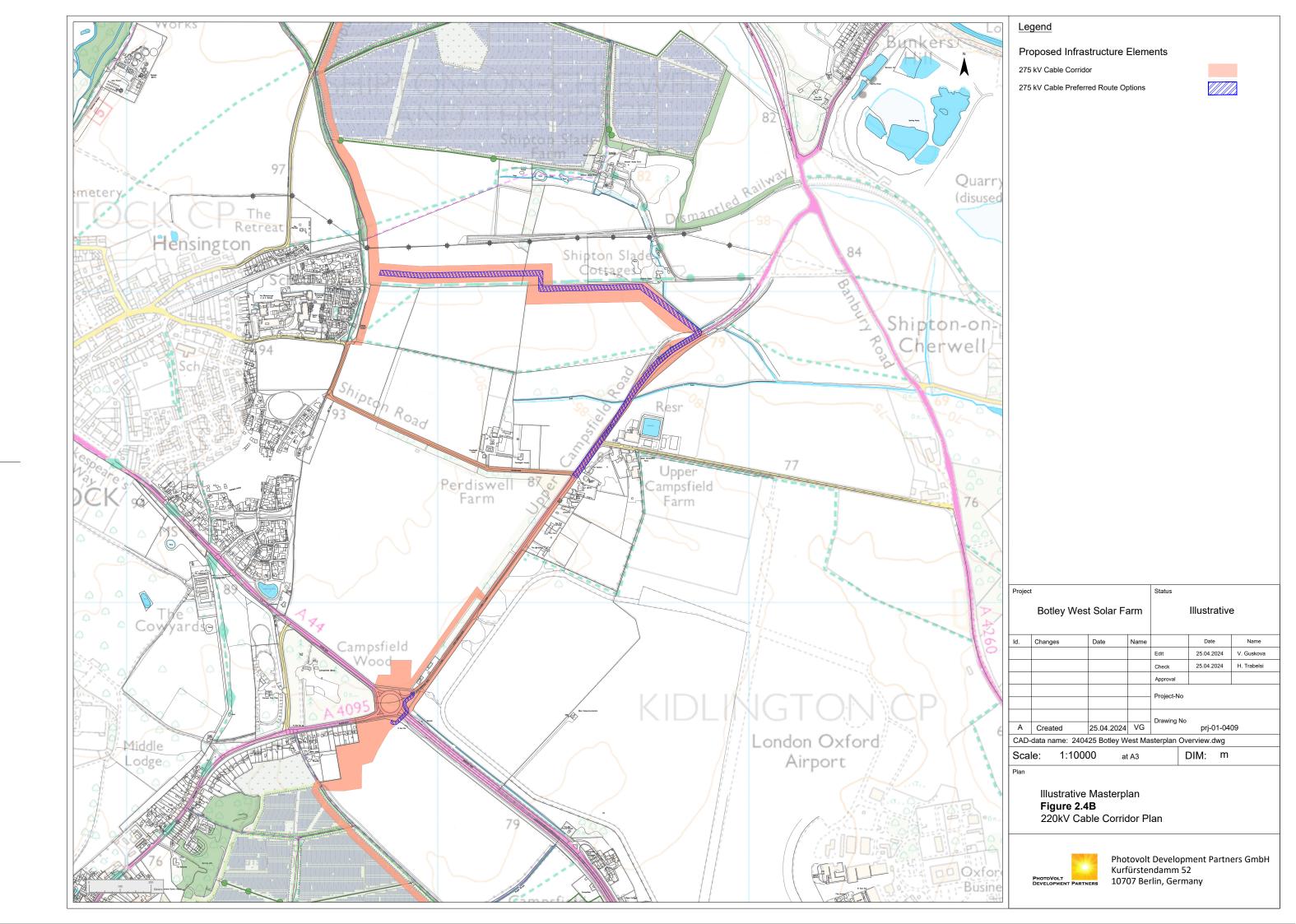
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ld.	Changes	Date	Name		Date	Name		
				Edit	25.04.2024	V. Guskova		
				Check	25.04.2024	H. Trabelsi		
				Approval				
				Project-No				
				Drawing No				
Α	Created	25.04.2024	VG	prj-01-0408				

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Illustrative Masterplan **Figure 2.4A** 275kV Cable Corridor Plan

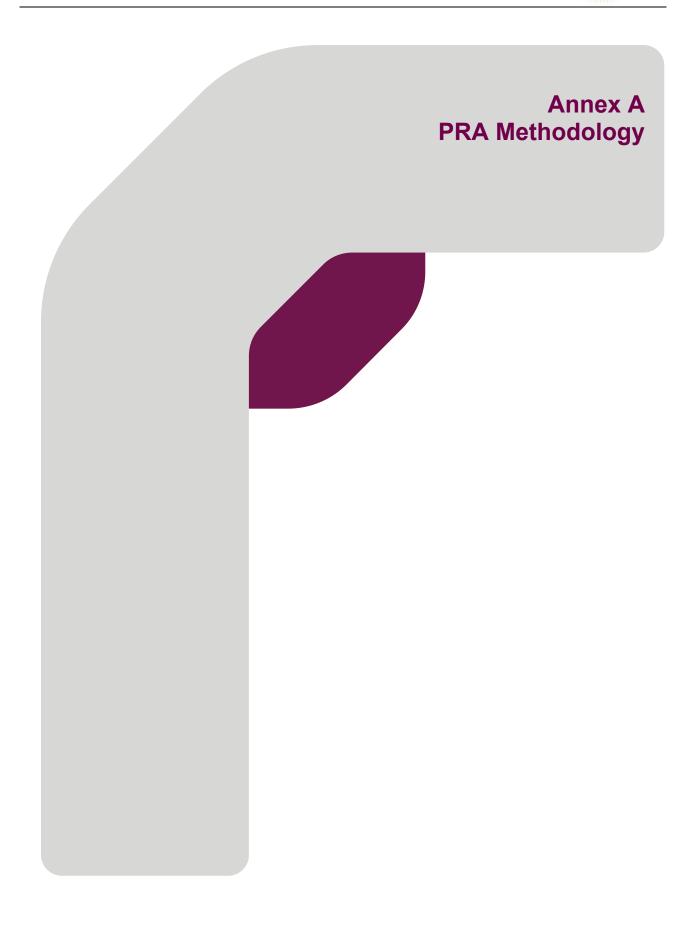


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PRA METHODOLOGY

INTRODUCTION

This report provides available factual data for the site obtained only from the sources described below and related to the site on the basis of the location provided by the client. The desk study information is not necessarily exhaustive and further information relevant to the site may be available from other sources. No responsibility can be accepted by RPS for inaccuracies in the data supplied by any other party.

This report is written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information and changes in legislation may necessitate a re-interpretation of the report in whole or in part after its original submission. The report is provided for sole use by the client and is confidential to them and their professional advisors. No reliance whatsoever is provided to any party other than the client unless otherwise agreed.

INFORMATION SOURCES

Current and Historical Land Use

This section establishes the former and current uses of the site, which could have caused contamination. Details of the site location, the current and proposed site uses have been provided by the client.

Information about the history of the site has been obtained through an inspection of historical maps at 1:10,000, 1:2,500 and 1:1,250 scales and historical aerial photographs (where available). The accuracy of maps cannot be guaranteed, and it should be recognised that different conditions on-site may have existed between, and subsequent to, the map survey dates.

Regulatory Records

Regulatory records including landfills, pollution incidents ('major' and 'significant' only), industry authorisations and licensed water abstractions are derived from information purchased from Groundsure Ltd (unless otherwise specified).

Environmental Setting

The geological sequence underlying the site and the approximate depths of strata are provided by maps published by the British Geological Survey (BGS) 1:50,000 scale and available borehole records held by the BGS.

The hydrogeological classification is obtained from Groundwater Vulnerability mapping by the BGS/EA/National Resources Wales (NRW). The vulnerability of groundwater is determined from this mapping and geological information.

The location of surface watercourses is obtained from an inspection of current OS maps. Flood risk details and information on groundwater Source Protection Zones are obtained from readily available EA/NRW information published on-line and supplied by Groundsure Ltd.

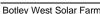
Details of sensitive ecosystems/habitats and coal mining areas are supplied by Natural England, Natural Resources Wales and Scottish Natural Heritage and the Coal Authority respectively via Groundsure Ltd and inspection of the MAGIC website.

Radon is a radioactive gas produced naturally by certain types of geology. This report uses the Indicative Atlas of Radon in England and Wales (2007) produced by the Health Protection Agency (HPA) and the British Geological Survey (BGS) to determine whether the site is located in an area at risk from radon gas. Where potential issues are identified, a site-specific radon report is obtained from the HPA and BGS to provide a more accurate estimate of the probability of the site being affected by radon gas ingress.





Annex B Limitations of Assessment





General Notes

RPS Consulting Services Ltd

Phase 1 - Environmental Risk Assessment / Desk Study Environmental Review

- A "desk study" means that no site visits have been carried out as any part thereof, unless otherwise specified.
- 1. This report provides available factual data for the site obtained only from the sources described in the text and related to the site on the basis of the location information provided by the Client.
- 2. The desk study information is not necessarily exhaustive and further information relevant to the site may be available from other sources.
- 3. The accuracy of maps cannot be guaranteed and it should be recognised that different conditions on site may have existed between and subsequent to the various map surveys.
- 4. No sampling or analysis has been undertaken in relation to this desk study.
- 5. Any borehole data from British Geological Survey sources is included on the basis that: "The British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation".
- 6. Where any data supplied by the Client or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by RPS for inaccuracies in the data supplied by any other party.
- 7. This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a re-interpretation of the report in whole or in part after its original submission.
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