Appendix 10A

Phase 1 Land Quality Assessment to Inform Proposed Development for 12 mppa Planning Application

Bristol Airport Limited

Phase 1 Land Quality Assessment to Inform Proposed Development for 12 mppa Planning Application

Wood Environment & Infrastructure Solutions UK Limited – December 2018

Report for

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BS48 3DY

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Document revisions

No.	Details	Date
1	Draft Preliminary Phase 1 LQA Report for Client Comment	30.05.18
2	Draft Phase 1 LQA Report including UXO assessment and summary of previous SI reports	26.09.18

Executive Summary

Background	Wood Environment & Infrastructure Solutions UK Ltd (Wood) was commissioned by Bristol Airport Limited (BAL) to prepare a Phase 1 Land Quality Assessment (LQA), including a review of available existing information in relation to the Proposed Development. The Proposed Development comprises enhancement of existing facilities at the application site including car parking, roads and extensions to the terminal.
Purpose of the report	This report has been produced for the purpose of supporting a planning application for the Proposed Development to facilitate a proposed increase to 12 million passengers per annum (mppa).
Site description	The application site covers an area of approximately 192 hectares (ha). this report focuses on specific parts of the application site associated with the Proposed Development; these are in the north-eastern landside and airside zones, and the southern landside zone.
Site history	The application site was undeveloped farmland prior to the World War Two (WWII), other than historical areas of former quarrying and lead and calamine workings. From 1941 the application site was developed as a Royal Air Force (RAF) training airfield known as Lulsgate Bottom. After WWII, the airfield was disused until 1955 when it began to be developed as a civil airport. The application site has undergone a number of infrastructural enhancements over the years, including a substantial westward extension to the runway in the 1960s.
Geology, hydrogeology and hydrology	The application site is likely to be underlain by widespread Made Ground associated with the existing infrastructure; underlain by superficial deposits of clay and limestone bedrock. There are a number of collapse features and voids, associated with the natural geology, noted within and adjacent to the Proposed Development. The British Geological Survey (BGS) indicate that the application site is within a higher probability radon area. The groundwater sensitivity is assessed as high; the application site is underlain by a Principal Aquifer (the Black Rock Limestone) and a Secondary A Aquifer (the Brockley Down Limestone) with relatively thin and intermittent drift cover (unproductive strata). The majority of the application site lies within a Zone 2 outer Source Protection Zone (SPZ). In addition, an inner Zone 1 SPZ is located directly to the east of the A38. Surface water sensitivity is assessed as low due to the absence of surface water features.
Ecology	There is a Local Nature Reserve to the east of the A38 at Feltham Common. There are no other statutory ecological designations (SSSI etc.) within the vicinity of the application site and Proposed Development. The ecological sensitivity is assessed as low.
Regulatory information	There are no known regulatory issues relating to land quality pertaining to the application site. There are a number of surface water drainage discharge consents via soakaways at the application site and a permitted landfill site close to the north-eastern boundary of the Proposed Development.
Findings of previous reports	Six reports have been provided by BAL which investigate and report ground conditions outside of the Proposed Development areas. No reports have been provided that detail intrusive work to investigate the ground conditions within the Proposed Development. The reports indicate that shallow ground conditions in the investigated areas are not significantly affected by contamination, although concentrations of arsenic and lead are higher than would be expected of a typical natural soil and asbestos fibres have been identified within topsoil in one location. The reports indicate that localised elevated metal concentrations reflect the underlying bedrock mineralogy. Shallow bedrock was encountered in many areas and this is likely to be typical of most parts of the Proposed Development although there will be local variations. Deeper borehole investigations have identified an area of hydrocarbon contamination east of the terminal building. It is understood that groundwater monitoring is on-going.
Potentially contaminative land uses and ground conditions	Potential contamination sources at the application site that are either within, or in close proximity to the Proposed Development, include historical and current potential contaminant sources and poor ground conditions: • Made Ground, level-raising and infilling of features (such as historical quarries); • Former sewage works; • Potentially contaminative WWII site uses, aircraft operation and maintenance facilities; • Electricity substations; • Bulk oil and fuel storage; • Hydrocarbon contaminated shallow groundwater; • Historical quarrying and historical lead workings; and

	• Geological hazards including collapse features and voids (including "swallets" marked on geological map), geological fault lines (at the northern extent of the Proposed Development) and natural radon gas (the application site is with a higher probability radon area). Potential risks from unexploded ordnance (UXO) and radioactive contamination, are considered to be low based on the information that has been made available.
Preliminary risk assessment summary	Made Ground is considered likely to be present throughout the application site and limited specific investigation information is available to identify or quantify potential contaminants within the Proposed Development areas. The preliminary risk assessment has assessed the potential risks to future site users associated with Made Ground from previous application site uses as Moderate. Kerosene contamination has been reported in the area east of the existing terminal building. Specific detailed information has not been provided and it is not known whether any further measures have been implemented. Potential risks to future site users and groundwater have been assessed as Moderate. The presence of collapse features and voids has been noted at the application site. it is not known whether any investigation of potential voids and collapse features has been carried out within the Proposed Development, and in the absence of such information the risk to property has been assessed as Moderate. Environmental database information indicates that the BGS reports that the application site is **within a higher probability radon area, such that 10 to 30% of homes are above the Action Level. In the absence of any site-specific information to indicate otherwise, the risk to future** site users has been assessed as Moderate. All other potential risks at the application site have currently been assessed as either Low or Low to Moderate. The risk assessment should be revised as more information becomes available.
Conclusions	Where Moderate or greater risks are identified, further investigation is normally required to clarify the risk and to determine the potential liability. The preliminary risk assessment has identified Moderate risks to future site users within the Proposed Development associated with Made Ground from previous site uses; spillage or leakage associated with bulk fuel storage and use; and radon gas from the natural geology underlying the site. In addition, the presence of collapse features and voids has been documented at the application site and a Moderate risk has been assessed to property. All other potential risks at the application site have currently been assessed as either Low or Low to Moderate. Following development, it is anticipated that the majority of the Proposed Development will be occupied by either buildings or hard surfacing, which will effectively break potential contaminant pathways to human receptors, such as dermal contact and ingestion pathways**, and will limit infiltration to underlying ground. It should be noted that risks to current** site users and redevelopment workers have been excluded from this assessment. **Should further information become available, or further investigation be completed to clarify risks and potential liabilities, the risk assessment should be reviewed and revised. This may decrease or increase the assessed risk depending on the information.**
Recommendations	The following specific actions are recommended to permit refinement of the risk assessment and Conceptual Model, and to determine whether any remedial action is required: • Acquire further information regarding potentially contaminated ground conditions within and adjacent to the footprint of the Proposed Development. This may include ground investigations where information is unavailable; • Acquire further information regarding possible voids, collapse features, infilled solution cavities, and historical limestone quarrying and lead workings within the footprint of the Proposed Development. This may include geophysics and/or targeted ground investigation where supplementary information is unavailable; • Ensure that radon protection measures are designed to be installed where required and consideration is to be given to commissioning a site-specific radon assessment report; • Include all relevant information or references associated with contamination and ground conditions within the pre-construction information for the Proposed Development; • Ensure that the integrity of drainage systems and soakaways is maintained during the construction phase; • Manage earthworks appropriately to avoid exacerbating risks associated with contamination, including potentially increased risk from mobilisation of contamination as windblown dust, run off to surface water and leaching to groundwater; and • Include provision for dealing with any unforeseen contamination that may be encountered during site works and construction within the Construction Phase Plan for the Proposed Development.

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1. Introduction

Background	Wood Environment & Infrastructure Solutions UK Ltd (hereafter referred to as 'Wood') was commissioned by Bristol Airport Limited (BAL) to prepare a Phase 1 Land Quality Assessment (LQA) on land contamination and ground conditions, including review of available information in relation to the Proposed Development at the application site. It is understood that the principal objective of the Proposed Development is to facilitate increased growth to 12 million passengers per annum (mppa) from 10 mppa. The Proposed Development to facilitate this growth and which forms the subject of this report, comprises: extensions to the existing terminal building, including walkways and a new pier; new airside facilities and aircraft stands; taxiway widening; new car parking facilities in the north and south of the site; modifications to the A38 junction in the north east; and enhancements of the internal road network (further details are outlined in Section 2).
Purpose of the report	The purpose of the report is to provide updated desk-based information to input into the Environmental Impact Assessment (EIA) to support production of the Environmental Statement (ES) for land quality. To this end, the report identifies potential land quality related constraints and risks associated with the Proposed Development of the application site. The Proposed Development areas are presented in **Figure 1** and **Figure 2** in **Appendix A**.
Legislative context	Planning guidance relating to the development of land potentially affected by contamination is detailed in the *National Planning Policy Framework* (NPPF)[1]. The NPPF sets out the Government's planning policies for England and how these should be applied, it states that: • Paragraph 118: Requires decisions to support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land; • Paragraph 170: Requires decisions to contribute to and enhance the natural and local environment by: *e) "preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability";* *f) "remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate";* • Paragraph 178: Requires decisions to ensure that: *a) "a site is suitable for its proposed use taking account of the suitability of the site for its proposed use, taking account of ground conditions, land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation)";* *b) "After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990";* *c) "Adequate site investigation information, prepared by a competent person, is available to inform these assessments"; and* • Paragraph 179: Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.

[1] Ministry of Housing, Communities and Local Government (2018). National Planning Policy Framework, [online]. Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 [Checked 26/09/2018].

	In addition, the *North Somerset Council (NSC) Core Strategy (CS), January 2017*[2], states in CS3: *"Environmental impacts and flood risk assessment – Development that, on its own or cumulatively, would result in air, water or other environmental pollution or harm to amenity, health or safety will only be permitted if the potential adverse effects would be mitigated to an acceptable level by other control regimes, or by measures included in the proposals, by the imposition of planning conditions or through a planning obligation".*
Scope of work	The scope of work comprises the following: • Review of previous reports: ▸ Phase 1 Contaminated Land Desk Study report [3]. This report includes a preliminary unexploded ordnance (UXO assessment; ▸ Environmental database information reported by Envirocheck, 2017[4] (presented in **Appendix B**); ▸ Ground investigation reports made available by BAL; and ▸ Interim Constraints Overview Report[5]; • Site walkover; • Review of information made available by BAL, including drainage plans rts; • Commission and review a UXO desk study and risk assessment for the application site (presented in **Appendix C**)[6]; • Develop a Conceptual Site Model (CSM) and complete a Preliminary (Qualitative) Risk Assessment for the Proposed Development; and • Provide conclusions and recommendations.
Limitations	The conclusions and advice given in this report are based in part upon information and/or documents that have been prepared by third parties. In view of this, we accept no responsibility or liability of any kind in relation to such third-party information and no representation, warranty or undertaking of any kind, express or implied, is made with respect to the completeness, accuracy or adequacy of such third-party information. In preparing this report we have assumed that all information provided is complete, accurate and not misleading.

[2] North Somerset Council (2017). North Somerset Core Strategy, adopted 2017, [online]. Available at: http://www.n-somerset.gov.uk/my-services/planning-building-control/planningpolicy/core-strategy/corestrategy/ [Checked 26/09/18].

[3] Entec UK Limited (2011). Bristol Airport Limited, Post Planning Application Conditions: Phase 1 Contaminated Land Desk Study, Report Reference 28770 RR002i4.

[4] Envirocheck Report (2017). Ref. 128842570_1_1 (presented in Appendix B).

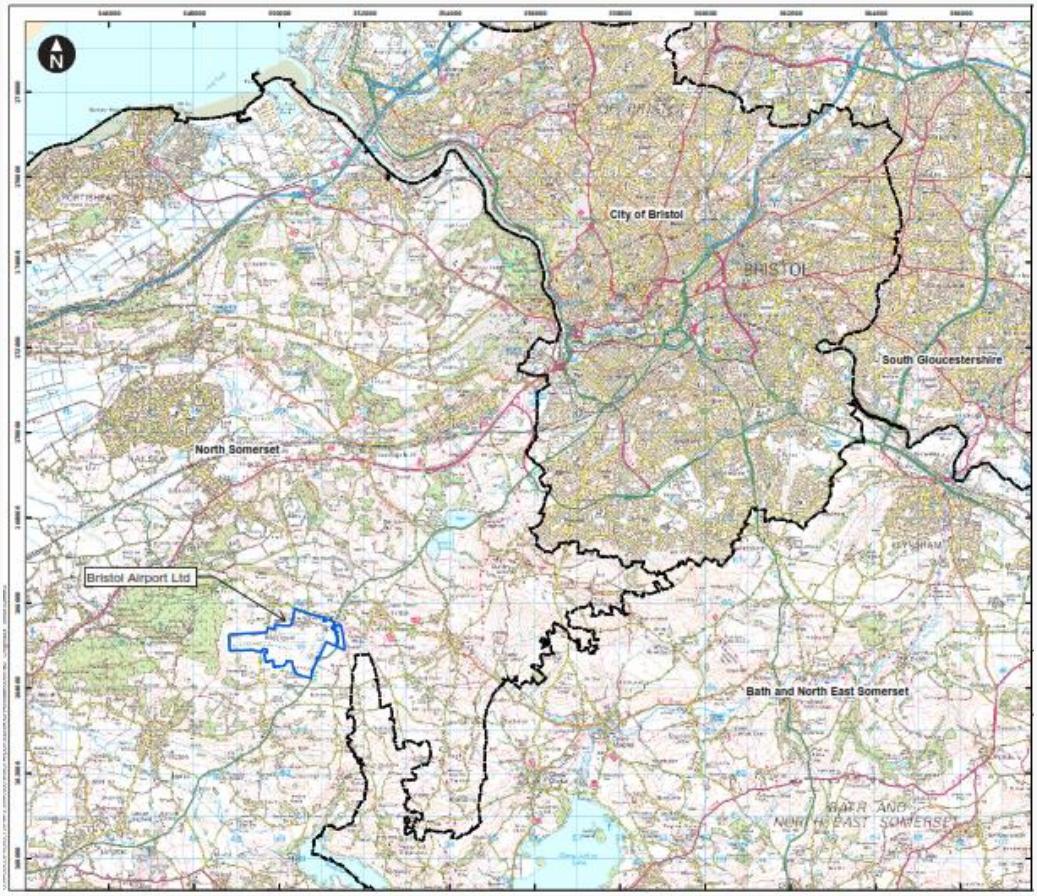
[5] Amec Foster Wheeler E&I UK Ltd (July 2017). Report Ref. 38970C0143i3, Bristol Airport Limited, Interim Constraints Overview Report.

[6] Rev A, Zetica (2018). Bristol Airport – UXO Desk Study & Risk Assessment Report Reference P7872-18-R1.

2. Site details and environmental context

2.1 Site details

Site location and address	The Proposed Development is located at Bristol Airport, Bristol BS48 3DY. The location and extent of land ownership at the application site is presented below (ownership boundary demarcated in blue).



Grid reference	350280, 165090
Site description	The application site is in a generally rural setting, bounded by the main A38 road on the eastern side, farmland and woodland to the south and east, and residential housing, farmland, a golf course and a sewage treatment works to the north. The application site comprises a 192 hectare (ha) irregular shaped area of land. The main Proposed Development areas are presented on **Figure 1** (north-eastern area) and **Figure 2** (southern area) in **Appendix A.** The north-eastern area contains most of the existing administrative facilities including the terminal building, car parks and other infrastructure, including the A38. Most of the Proposed Development in this area is on land which has been previously developed since the 1940s, much of it is currently covered by hard surfacing or existing buildings, surrounded by similar land uses including small islands of soft landscaping. The exception is a strip of proposed taxiway widening which is currently grass alongside the existing taxiway. The southern area contains the proposed Silver Zone Extension (Phase 2) Car Park. This area is currently undeveloped agricultural land. The central area of the application site is relatively flat, at approximately 185m above ordnance datum (AOD). The surrounding land generally falls away more or less steeply on all sides, including within the Proposed Development areas at the north-east and south of the application site.

Current boundaries to the application site (land uses and relevant features)		**Adjacent**	**Beyond (within 200m)**
	North	Downside Road, scattered residential properties, golf course	Farmland
	East	A38 carriageway	Farmland
	South	Farmland	Farmland
	West	Farmland	Woodland
Current site activities	The application site is currently an operational civil airport and will continue as such during construction and post construction of the Proposed Development. There are on-going potentially contaminative activities typical of airport operations, notably fuel storage and handling facilities, aircraft de-icing, fire training maintenance and car parkin. A site walkover was carried out by Wood on 5 March 2018. No significant potentially contaminative activities or evidence of contamination were noted within the Proposed Development areas of the application site.		
Services	Site drainage plans have been provided for the application site and indicate that surface water drainage in the northern area discharges to soakaways (i.e. to groundwater) in various locations around the application site. The surface water system is protected by a number of oil separators. Drainage plans have not been provided for the Proposed Development in the south; it is presumed that as the land is currently undeveloped, no engineered drainage exists. No other services information has been obtained for the application site.		
Proposed Development	It is understood that BAL intends to enhance the existing facilities at the application site by means of the Proposed Development. The areas of specific interest that are covered by this report are as follows: ● 1 – West, south and east terminal extensions; ● 2 – East pier; ● 3 – Multi-storey car park; ● 4 – Taxiway widening; ● 5 – New taxiway; ● 7 – Silver Zone Extension (Phase 2) Car Park (in southern area); ● 8 – Gyratory road; ● 9 – A38 highway improvements; ● 10 – New canopy over plaza; and ● 11 – New service yard. These areas are presented in **Figure 1** (northern) and **Figure 2** (southern) in **Appendix A**. All of these areas except the Silver Zone Extension (Phase 2) Car Park have previously been developed for a range of airport facilities. Note: Areas 6 and 12 are not included above, as the Proposed Development within these areas entails operational changes only, not affecting or affected by land quality.		

2.2 Environmental context

Geology & hydrogeology

Geology and hydrogeology information has been taken from the following: the British Geological Survey (BGS) Geology of Britain website[7]; Magic.gov.uk website[8]; the Entec report[3]**;** and the Envirocheck report (presented in **Appendix B**); together with borehole logs from previous investigations supplied by BAL. A summary of the strata underlying the application site is outlined below.

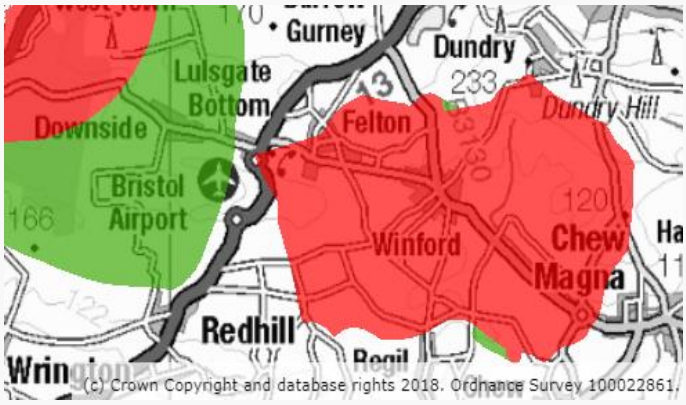
Strata	Brief description of typical constituents	Average depth to upper surface (m bgl) or thickness (m)	Aquifer and approximate water level if known*	Notable features
Made Ground	Variable, associated with existing infrastructure	Typically <1m, up to 2m thickness	N/A	Variable, tarmac, limestone gravel, sand, clay
Drift	Clay	Typical thickness of 2 to 5m, maximum up to 8m	Unproductive	Firm to stiff red-brown clay with limestone gravel and cobbles
Black Rock, Brockley Down, Westbury, Cotham formations	Limestone	At least 150m	The majority of the application site is located on a Principal Aquifer, with the exception of small areas in the south and north-west which are located on Secondary A aquifer.	Voids noted at ~40m below ground level (bgl)[3]. A fault (with associated old lead workings) crossing the southern part of the site may affect the proposed Silver Zone Extension (Phase 2) Car Park development

Radon

Bedrock geology is a source of naturally occurring radon (radioactive gas). The Envirocheck report (presented in **Appendix B**) reports that the BGS has designated the area of the application site as a higher probability radon area, with 10-30% of homes above the action level.

Hydrogeological sensitivity

The majority of the application site lies within a Zone 2 Outer Source Protection Zone (SPZ) (shown in green on the map below) associated with the designated outer catchment of Chelvey Well to the north-west of Broadfield Down (located approximately 3.5km north west of the application site). There is also a Zone 1 Inner SPZ immediately to the east of the A38 and farther away to the north-west (shown in red on the map below).



[7] British Geological Survey (BGS) (2018). Geology of Britain viewer, Natural Environment Research Council [online]. Available at: http://mapapps.bgs.ac.uk/geologyofbritain/home.html [Checked 04/05/2018].

[8] Magic.gov.uk (2018). Magic interactive website, Defra [online]. Available at: https://magic.defra.gov.uk/home.htm [Checked 04/05/2018].

Groundwater Sensitivity	Groundwater Sensitivity – High This reflects the majority of the application site overlies a Principal Aquifer and lies within in a Zone 2 Outer SPZ. There is also a Zone 1 Inner SPZ immediately to the east of the A38.
Hydrology	There are no surface watercourses present on the application site, within 250m of the application site, or recorded above the 150m contour of Broadfield Down. Below this level, a number of springs are recorded, which are likely to be fed by discharge from the limestone aquifer underlying the application site. Surface water bodies in the vicinity of the application site are also rare. Six ponds have been recorded within 500m of the application site boundary, although many of these are likely to be artificial.
Hydrological sensitivity	Hydrological sensitivity – Low. The hydrological sensitivity is considered to be low due to the distances to the receptors from the Proposed Development.
Ecology	There is a Local Nature Reserve (LNR) (Felton Common) close to the eastern application site boundary. There are no other ecologically sensitive sites that have been reported on or within 1km of the application site.
Ecological sensitivity	Ecological sensitivity – Low The ecological sensitivity is assessed as low, as the LNR is not topographically lower than the application site, hence unlikely to be impacted by groundwater flow.

2.3 Other regulatory information

Only regulatory database information within 250m of the Proposed Development, with the potential to affect it, has been detailed below.

Activity	On-Site	0-250m	Details
Waste management, transfer, treatment facilities or disposal	0	0	Waste management facilities are understood to be operated at the application site, but are not specifically identified within the Envirocheck, report (**Appendix B**) and consequently are not listed here.
Landfill	0	1	The closest landfill site is situated approximately 250m to the north-east of the application site. The facility has a licence for non-hazardous waste disposal. This is within 250m of proposed improvements to the A38 junction and could potentially affect the works.
Sites handling hazardous or explosive substances (including COMAH* or NIHHS) planning hazardous consents**	0	0	None reported within the Envirocheck, report (**Appendix B**)
Mineral extraction activities	Some possible	many	The Entec report[3] identifies that there are numerous possible historic lead mines around the application site, their precise location is unknown.

Notes: * COMAH: Control of Major Accident Hazards
** NIHAS: Notification of Installations Handling Hazardous Substances

Correspondence with NSC, dated 06 September 2018, has confirmed that they hold no additional regulatory information for the application site (and within its vicinity) from that previously reported during consultation in 2011 (as present in the Entecreport[3]). Correspondence records are included in **Appendix D**.

2.4 Application site history

Application site history summary and pertinent features relating to land quality	A summary of the historical development of the application site, based on historical Ordnance Survey (OS) maps, is outlined below. The historical maps are presented within the Entec report[3], which provides more detailed historical information for the application site. Where relevant, interpretation of the maps is supported by knowledge from the discussions with the client and other stakeholders and previous reports for the application site. Prior to 1941, the application site was agricultural land but contained at least one small quarry, Lulsgate Farm Quarry, located to the south of the present terminal building. This was marked "old quarry" on the 1938 mapping. It is likely to have been infilled with unknown materials to enable the Royal Air Force (RAF) airfield construction. The application site was first developed as an airfield in 1941 for use during World War Two (WWII), known as RAF Lulsgate Bottom. The airfield infrastructure included a number of fuel storage installations within the present terminal area that may have left a legacy of ground contamination. After WWII, in 1946, the airfield was abandoned by the RAF. During the next 10 years, the airfield was used by Bristol Gliding Club and motor race meetings were organised by the Bristol Motor Cycle and Light Car Club. The Bristol Corporation (Bristol City Council) acquired the airfield in 1955 and work began on airport terminal facilities. The new aerodrome known as Bristol (Lulsgate) Airport opened in 1957. Extensions were made to the terminal building in 1965 and work to lengthen the main runway to the west was completed in 1963. As part of the development, most of the wartime infrastructure other than the runways was removed. In 1987 Bristol City Council set up a company called Bristol Airport plc. It is understood that the central apron was developed in three phases between 1984 and 1992. In 1997 the City Council sold a majority share in the airport and the name was changed to Bristol International Airport. In 2000 a new terminal building opened, the new control tower was completed and the Category III all-weather landing system (which required diversion of the A38 main road) was installed. It is understood that raising of ground levels occurred during both the runway extension and the construction of the current terminal building.

2.5 Previous works at the application site

A number of previous intrusive ground investigations have been carried out at the application site. Some contamination was found and reportedly remediated; however, no quantitative details have been made available for assessment. The contents of the reports that have been made available for review by BAL are summarised below:

List of previous reports

- A draft briefing note prepared by Cascade Consulting 2014[9], gives a summary of borehole investigations to the east of the terminal building where kerosene contamination has been identified at depths of >5.85m bgl, potentially impacting on groundwater. Groundwater within the area was recorded at a minimum depth of 11.57m bgl. The spatial extent of the contamination appears to have been delineated by a number of boreholes and is indicated to impinge on one of the Proposed Development areas that are the subject of this report, namely the eastern terminal extension. Specific detailed information has not been provided.
- A Ground Investigation Interpretative report by Capita, 2008[10] assesses ground conditions at a proposed hotel site based on nine machine-dug trial pits to a maximum depth of 1.2m bgl. All pits found clayey gravel beneath the existing tarmac surfacing and terminated on limestone bedrock. Contamination test results indicated somewhat elevated concentrations of arsenic and lead, most

[9] Cascade Consulting (2014). Bristol Airport Eastern Terminal Ground Investigations, Briefing Note, Draft - Interim Technical Note for Information Only.

[10] Capita Symonds (2008). Proposed Hotel Site Geoenvironmental Report, Bristol International Airport, Report Reference CS\34238.

likely due to the natural geology beneath the application site. Detailed appendices including trial pit location plans were missing from the report as provided. This report is likely to be generally indicative of ground conditions in the Proposed Development areas north and north-west of the existing terminal building.

- A Ground Investigation Interpretative report by Capita, 2011[11] assesses ground conditions at the proposed western apron extension site based on 31 No. machine-dug trial pits and four window-sample boreholes to a maximum depth of 3.0m bgl. All pits encountered natural or reworked gravelly clay and terminated on limestone bedrock at various depths. Contamination test results indicated elevated concentrations of arsenic and lead. Detailed appendices were missing from the report as provided although in this case exploratory hole location plans were included. This report is likely to be generally indicative of ground conditions in part of the Proposed Development area 4 comprising taxiway widening, lying immediately south of the western apron extension. Details of ground conditions for specific exploratory holes are not available within the report as provided.
- A Ground Investigation Interpretative report by Capita, 2015[12] assesses ground conditions at the existing Silver Zone Car Park in the southern part of the application site, based on 13 machine-dug trial pits to a maximum depth of 3.2m bgl. This report covers a site close to the east of the Silver Zone Extension part of the Proposed Development (Area 7, Phase 2 Car Park). The report includes a site specific BGS Radon Report which states that the property in a radon affected area with an estimated probability of 10-30% (higher probability) of the property being above the Action Level for radon. The BGS Radon Report states that full radon protective measures are required for any new buildings with the area.
- A Ground Investigation Interpretative report by Capita, 2016[13] assesses ground conditions at the proposed Cogloop Site (referred to in this ES as the Silver Zone Car Park Extension (Phase 2) site) prior to its construction, based on 23 No. machine-dug trial pits to a maximum depth of 2.0m bgl. All pits encountered natural sand and gravel and terminated on limestone bedrock at various depths. Two pits encountered Made Ground. Contamination test results indicated slightly elevated concentrations of arsenic and lead, most likely due to the natural geology beneath the application site. In one location, asbestos (chrysotile) was observed in the form of loose fibres in a topsoil sample, which subsequent laboratory quantification testing reported a concentration below the method detection limit of <0.001% weight by weight (w/w). Location plans and detailed appendices were included in this report. This report covers a site immediately north of the proposed Silver Zone Car Park Extension (Phase 2) site.
- A Ground Investigation Interpretative report by Capita, 2017[14] assesses ground conditions at the proposed Stand 7N site (the proposed Eastern Apron extension to the east of the East Terminal Building) based on four machine-dug trial pits to a maximum depth of 1.0m bgl. All pits encountered firm to stiff silty gravelly clay beneath the existing tarmac surfacing and terminated in that material. Contamination test results indicated elevated concentrations of arsenic and lead, most likely due to the natural geology beneath the application site. Slightly elevated concentrations of organic contaminants were also detected, possibly due to the existing tarmac surfacing and/or fuel spillages. Detailed appendices including trial pit location plans were included in the report. This report is likely to be generally indicative of ground conditions in the Proposed Development areas east and north-east of the existing terminal building.

[11] Capita Symonds (2011). Ground Investigation Report Western Apron, Bristol Airport, Report Reference CS\47683.

[12] Capita Symonds (2015). Bristol Airport Silver Zone Car Park Reception Geo-environmental Report, Reference CS\080696.

[13] Capita Symonds (2016). Bristol Airport Cogloop Car Park Geo-environmental Report, Reference CS\086676.

[14] Capita Symonds (2017). Bristol Airport Stand 7N Extension Geo-environmental Report, Reference CS/093133.

Summary of ground conditions

The six reports that have been provided by BAL investigate and report ground conditions outside of the Proposed Development areas and no reports have been provided that detail intrusive work to investigate the ground conditions within the Proposed Development.

The previous reports indicate that shallow ground conditions in the areas of the application site that were investigated are not significantly affected by contamination, although concentrations of arsenic and lead are higher than would be expected of a typical natural soil and asbestos fibres have been identified within topsoil in one location. The reports indicate that localised elevated metal concentrations reflect the underlying bedrock mineralogy.

Shallow bedrock was encountered in many areas and this is likely to be typical of most parts of the Proposed Development, although there will be local variations.

Deeper borehole investigations have identified an area of hydrocarbon contamination east of the terminal building. It is understood that groundwater monitoring is on-going, but no further details have been made available.

2.6 UXO desk study and risk assessment

A UXO Desk Study and Risk Assessment of the application site was completed by Zetica Ltd in September 2018[6] (presented in **Appendix C**). This assessment concluded that UXO risk to the application site, is low and recommended that construction workers should be made aware of potential UXO risks during ground disturbance works.

Consultation with NSC (presented in **Appendix D**) confirms that they hold no records of the presence of UXO contamination at the application site, or within its vicinity.

3. Generic quantitative risk assessment

3.1 Conceptual model

The Conceptual Model (CM) and plausible contaminant linkages are defined below based on the desk study review of previous reports and publicly available information, as summarised in the previous sections. The CM is carried out in line with *Contaminated Land Report 11*[15] (CLR11) and is based on the proposed commercial land use. The CM provides an assessment of the application site's potential contamination status and identifies the presence of potentially significant contaminant linkages that require further consideration. A schematic drawing representing the conceptual model is presented in **Figure 3** (**Appendix A**).

The Entec report[3] gives a comprehensive listing of potential contamination sources over the whole of the application site (summarised in Table 4.1 of the Entec report[3]). The majority of these sources are outside the present areas of interest and are therefore not considered further in any detail, other than where they could affect the Proposed Development. The following assessment covers only the areas associated with the Proposed Development for the 12 mppa application.

Potential contamination (sources)

A review of the history and environmental setting of the application site has identified potential contaminant sources on the application site and the surrounding area, as summarised below in **Table 3.1**, based on a continued commercial site-use.

Table 3.1 Current and historical potential contaminant sources

Development component	Area reference	Details*	Potential contamination sources
West terminal extension (Phase 2a)	1	Four storey extension to the existing terminal building on the western side (total floorspace of 10,385m^2). This is an amendment to the second phase of the western terminal extension granted consent under the 10 mppa permission.	• Former WWII bulk oil compound and aviation petrol installation, approximately 50m to the west; • Former substation and former WWII fuel compound approximately 50m to the east; • Former Lulsgate Farm Quarry, approximately. 100m to the south; • Collapse or void feature noted adjacent to the south; and • Current fuel farm to the south.
South terminal extension including new arrivals vertical circulation cores	1	Two storey extension to the southern side of the existing terminal building (total floorspace 4,600m^2). New arrivals area with vertical circulation core for airside buses to be located to the south of the terminal.	• Former WWII bulk oil compound and aviation petrol installation, approximately 50m to the west; • Former substation and former WWII fuel compound, approximately 50m to the east; • Former Lulsgate Farm Quarry approximately 100m to the south; • Collapse or void feature noted adjacent to the south; and

[15] Environment Agency (2004). Model Procedures for the Management of Land Contamination – Contaminated Land Report 11.

Development component	Area reference	Details*	Potential contamination sources
			• Current fuel farm to the south.
East terminal extension (Phase 2)	1	Optional extension to the east of the terminal building (incorporating phase 2 of the east terminal extension permitted under the 10 mppa but with an amended design). This would be brought forward instead of the south terminal extension.	• Collapse or void feature noted within part of the footprint. Further collapse or void features within approx. 150m to the east, west and south-west; • Former substation and former WWII fuel compound within approx. 150m to the west; and • Former Lulsgate Farm Quarry with approx. 250m to the south-west.
Canopy	10	New canopy over the forecourt of the main terminal building.	• Collapse or void feature noted within part of the footprint.
Multi-storey carpark (MSCP)	3	New MSCP to be constructed in the northern area of the application site adjacent to the existing MSCP (currently under construction). To provide approximately 2,150 spaces over five levels (total footprint of 11,200m^2).	• Old lead working adjacent to the north-east.
Gyratory road	8	New, two lane (one way) gyratory within the northern area of the application site.	• Approximate location of former sewage farm within central area surrounded by proposed gyratory road.
Highway improvements	9	The design of the Proposed Development is currently subject to further work but is likely to comprise: • Removal of pedestrian crossing from the Downside Road junction adjacent to the Airport Tavern; • Addition of a dedicated right turn from the A38 northbound at the junction with West Lane; • Signalised left turn from the West Lane junction onto the A38; • Widening of the A38 to create an additional lane northbound; and • Footways or cycle links and speed limit reduction to 30mph.	• Within area of former Felton Hill Quarry; • Former area of landfill noted adjacent to the northeast of the A38 at the north-eastern most part of the area; and • Felton Common Local Nature Reserve adjacent to the east of the A38 at the north-east of the area.
Stands 37 and 38	12	Change to the operation of Stands 37 and 38. Application will seek the use of mobile diesel power generators and aircraft auxiliary power units (proposed power units to be restricted between 23:00 and 06:00) and enable the use of aircraft engines for taxiing (as opposed to towing). This would be consistent with current restrictions on Stands 33 to 36.	• N/A No new Proposed Development; and • Proposed introduction of mobile diesel power generators and aircraft auxiliary power units noted.
Existing extension to the Silver Zone Car Park (Phase 1)	6	Removal of restrictions pertaining to the use of the Silver Zone Car Park extension (Phase 1) outside the period 1 May to 31 October. This will require the provision of permanent (fixed) lighting.	• N/A No new Proposed Development other than fixed lighting; and • See notes below for the extension to the Silver Zone Car Park (Phase 2).

Development component	Area reference	Details*	Potential contamination sources
Extension to the Silver Zone Car Park (Phase 2)	7	Extension to the existing Silver Zone Car Park to accommodate 2,700 spaces. To be located immediately south of the existing car parking area on land known as 'Cogloop'.	• Old lead workings within the south of this area and adjacent to the southeast; • Former WWII machine-gun and cannon range approximately 100m to the northeast; • Former Broadfield Down Quarry approximately 100m to the north; and • Former landfill, approximately 100m to the northeast.
New Service Yard	11	A new service yard, north of the western walkway and east of the current airside access security.	• Former WWII bulk oil compound within footprint of the area; • Former aviation petrol installation adjacent to the west; • Former substation and former WWII fuel compound, approximately 125m to the east; • Former Lulsgate Farm Quarry, approximately 100m to the southeast; and • Current fuel farm approximately 75m to the southeast.
East pier with VCCs and 5 no. PBZs	2	A new pier connected to the eastern walkway for passenger access to the eastern stands. It will have vertical circulation cores and five pre-board zones. The ground floor footprint is approximately 1,900m^2. The first-floor footprint is approximately 1,900m^2.	• Collapse or void features noted within the area and adjacent to the south and west; • Old lead working noted approximately 50m to the southeast; • Former sewage farm located approx. 50m to the north; and • Storage tank noted adjacent to the north.
New east taxiway	5	A new eastern taxiway link at the far eastern end of the runway to allow improved and efficient access to the runway for aircraft. This will be a continuation of the current surfacing. It should be noted that the proposed taxiway link is not an extension to the existing runway.	• Collapse or void features noted approximately 50m to the west.
Taxiway widening and fillets	4	Taxiway widening to the southern edge of the northern most taxiway (Taxiway GOLF) to provide a parallel taxiway system for improved access and movement of aircraft.	• Old lead working noted within the area; • Approximate location of the former Lulsgate Quarry located within the area; and • Collapse or void features noted within 50m (to the north).

Notes: * Details as outlined within the draft Planning Strategy for the 12 mppa application.

A list of potential contaminants associated with the potential contaminant sources identified in **Table 3.1** and from natural sources are summarised in **Table 3.2**.

Table 3.2 Summary of current and historical potential contamination sources

No.	Source	Potential contaminants	Location	Proposed Development area
1	Made Ground from previous use of the application site (including former sewage works, ground works, level raising).	Metals and metalloids, asbestos, organic and inorganic compounds, polyaromatic hydrocarbons, flammable gas (methane), carbon dioxide, depleted oxygen, volatile vapours.	Site-wide and within specific areas such as the former sewage works.	Site-wide (in particular the gyratory road).
2	Current and former use as an airfield (including former WWII or RAF site uses).	Metals and metalloids, asbestos, organic and inorganic compounds, polyaromatic hydrocarbons, pesticides, herbicides, de-icers (e.g. glycols), fire-fighting foams (e.g. perfluorooctane sulfonate and perfluorooctanoic acid), surfactants, flammable gas (methane), carbon dioxide, depleted oxygen, volatile vapours, radiological contamination, UXO.	Site-wide and within specific areas such as the former machine-gun and cannon range (rifle range).	Site-wide.
3	Current and historical bulk fuel storage and aviation fuel spillage or leakage.	Aviation fuel or petroleum hydrocarbons, volatile vapours.	Former "main site" now terminal area west and east of terminal building.	Terminal extensions and pier or walkway.
4	On-site and adjacent landfilling (excluding possible infilling of former quarries and voids).	Metals and metalloids, asbestos, organic and inorganic compounds, polyaromatic hydrocarbons, flammable gas (methane), carbon dioxide, depleted oxygen, volatile vapours.	On-site at former rifle range and off-site to the northeast.	Silver Zone Car park extension (Phase 2) and A38 improvements.
5	Natural geology or historical mining (including collapse features/voids, mining, quarrying and associated infilling).	Metals, metalloids, organic compounds, inorganic compounds, petroleum hydrocarbons, PAH's, asbestos, flammable gas (methane), carbon dioxide, depleted oxygen.	Site-wide collapse features or voids. Area-specific former quarrying. Historical mining at the north and south of the application site.	Site-wide. Terminal extensions, taxiway widening, Silver Zone Car park extension (Phase 2) and service yard. MSCP and service yard.
6	Natural geology.	Radon gas.	Site-wide.	Terminal extensions, pier or walkway, and any occupied buildings or structures where radon gas could accumulate.

Potential receptors and exposure pathways

The potential receptors and associated pathways that have been identified associated with the proposed future application site use and Proposed Development are summarised in **Table 3.3**.

Table 3.3 Pathways and receptors

Receptors	Potential pathways
Future site users (including during the development or construction phase)	Dermal contact, ingestion (including of contaminated potable water), inhalation of dusts, vapours, fibres and accumulated gases, including radon gas.
Off-site adjacent future site users (including during the development or construction phase)	Dermal contact, ingestion (including of contaminated potable water), inhalation of dusts, vapours, fibres and accumulated gases.
Property: Buildings, structures and services	Direct contact, ingress and accumulation of gases. Damage from collapse and subsidence.
Controlled waters: Principal Aquifer and Secondary A aquifer (bedrock)	Leaching, migration.

3.2 Exclusions from risk assessment

Current site users

Users of the application site in its current configuration are not considered as part of this assessment. They were considered within the risk assessment completed for the Phase 1 Contaminated Land Desk Study, by Entec[3]. This Phase 1 LQA has been written to support the 12 mppa application and the report covers the new Proposed Development construction phase and post-development site users within the specified areas of interest.

Redevelopment workers

The CM does not consider risks to construction or site maintenance workers on the basis that risks to workers will be dealt with under the *Health and Safety at Work Act, 1974 (HWSA)*[16] and regulations made under the Act. Site-specific contamination data obtained from all land quality assessments and site investigations should be included in the pre-construction information. a requirement of *Construction (Design and management) Regulations 2015, CDM2015*[17] for the proposed works, to enable any contractors to address potential risk from contamination as necessary in their risk assessments and method statements. Moreover, as the exact details of the method adopted are not currently known, it is not considered appropriate to provide a wide ranging and speculative risk assessment for redevelopment workers.

[16] Health and Safety at Work Act 1974, [online]. Available at: http://www.legislation.gov.uk/ukpga/1974/37/contents [Checked 01/10/2018].

[17] The Construction (Design & Management) Regulations (2015). [online]. Available at: http://www.legislation.gov.uk/uksi/2015/51/contents/made [Checked 07/09/2018].

Invasive species

Invasive species (such as Japanese knotweed and giant hogweed) are not considered within the risk assessment for contamination.

Radioactive contamination

As noted in the Entec report[3], former RAF bases sometimes have a legacy of radioactive contamination arising from ad hoc disposal of radium luminised cockpit instruments etc. dating from the mid-20th century. Many such items were incinerated on site at a 'burning ground'. The wartime site layout plans identify a "refuse destructor" within the area of the current sewage treatment plant, outside the current application site boundary to the north of Downside Road. It is considered likely that if any luminised cockpit instruments were present and were burnt, it would have been within this area. As such, the likelihood of any radioactive contamination being present within the current application site boundary is low. This assessment should be revised depending on actual ground conditions, such as the presence of artefacts or extensive burnt and ashy material within Made Ground.

Consultation with NSC (presented in **Appendix D**) confirms that they hold no records of the presence of radioactive contamination at the application site, or within its vicinity [the area is not specified by NSC].

3.3 Geotechnical constraints

There may be localised ground stability issues at the application site in general arising from natural solution cavities in the limestone and old lead mine workings. These could potentially affect deep excavations or piled foundations. The features that are identified on **Figure 1** and **Figure 2** are indicative only and the extent and depth of such hazards are unknown.

Shallow rockhead may also be a constraint in terms of difficulty in effecting excavations at depth (should such be required).

3.4 Preliminary risk assessment

Contaminant linkages

In order for land contamination risk to be realised, a 'contaminant linkage' must exist[15]. A contaminant linkage requires the presence of a:

- Source of contamination;
- Receptor capable of being harmed; and
- Pathway capable of exposing a receptor to the contaminant.

Risk assessment

A preliminary risk assessment has been undertaken for these potential contaminant linkages to identify potentially unacceptable risks on a qualitative basis. Risk is therefore based on a consideration of both:

- The likelihood of an event (probability – takes into account both the presence of the hazard and receptor and the integrity of the pathway); and
- The severity of the potential consequence (takes into account both the potential severity of the hazard and the sensitivity of the receptor).

Further information on the risk assessment methodology used is given in **Appendix E**. The method of dealing with identified risks and the level of significance of those risks will be a function of site use. The risk assessment is based on the Proposed Development and the future proposed land use and assumes no control measures to manage the risk (e.g. source removal or capping) have been incorporated in the Proposed Development.

The preliminary risk assessment is based on the information that has been made available. The risk assessment should be revised as more information becomes available. Where a Moderate or greater risk has been identified, further investigation is normally required to clarify the risk and to determine the potential liability. Remediation work may be required and there may be a requirement for mitigation measures to be employed.

The preliminary risk assessment is presented in **Table 3.4**.

Summary of risk assessment

Given the history of the site, Made Ground is considered likely to be present throughout, and no specific investigation information is available to identify or quantify potential contaminants within the Proposed Development areas. The preliminary risk assessment has identified risks to future site users associated with Made Ground from previous site uses as **Moderate**.

A draft briefing note prepared by Cascade Consulting[9] gives a summary of investigations to the east of the terminal building where kerosene contamination has been identified. Specific detailed information has not been provided; however, the note states that "*steps are necessary to determine the scope of the remedial options if that is required*". It is not known whether any further measures have been implemented, and in the absence of any such information, risks to future site users and groundwater have been assessed as **Moderate**.

The presence of collapse features and voids has been noted at the application site. It is not known whether any investigation of potential voids and collapse features has been carried out within the Proposed Development, and in the absence of such information the risk to property has been assessed as **Moderate**.

The Envirocheck report (**Appendix B**) identifies that the BGS reports the application site to be within a higher probability radon area, such that 10 to 30% of homes are above the Action Level. In the absence of any site-specific information to indicate otherwise, the risk to future site users has been assessed as **Moderate**.

All other potential risk at the application site have currently been assessed as either **Low**, or **Low to Moderate**. The risk assessment should be revised as more information becomes available.

It should be noted that risks to current site users and redevelopment workers has been excluded from this assessment for the reasons outlined in **Section 3.2**.

Table 3.4 Preliminary risk assessment – risks to future site users, property and environment

Potential source	Potential contaminants	Potential receptors	Proposed Development area	Potential pathways to receptors	Associated hazard (severity)	Likelihood of occurrence	Risk/significance
Made Ground from previous use of the application site (including former sewage works, ground works and level raising).	Metals and metalloids, asbestos, organic and inorganic compounds, polyaromatic hydrocarbons, flammable gas (methane), carbon dioxide, depleted oxygen, volatile vapours.	Future site users (including during the development or construction phase)	Site-wide (in particular the gyratory road)	Dermal contact, ingestion (including of contaminated potable water), inhalation of dusts, vapours, fibres and accumulated gases.	Health Hazard (Severe)	Low	Moderate (Made Ground is likely to be present. No investigation information is available and potential contaminants within Proposed Development areas is unknown)
		Off-Site adjacent future site users (including during the development or construction phase)	N/A	Inhalation of dusts, vapours, fibres and accumulated gases. Ingestion, including of contaminated potable water,	Health hazard (Medium)	Unlikely	Low
		Property: Buildings, structures and services	Site-wide (in particular the gyratory road)	Direct contact, ingress and accumulation of gases. Damage from collapse and subsidence.	Damage to property (Medium)	Low	Low to Moderate
		Controlled waters: Principal Aquifer, Secondary A aquifer (bedrock) and SPZs.	Site-wide	Leaching, migration.	Pollution of Controlled Waters (Mild)	Low	Low

Potential source	Potential contaminants	Potential receptors	Proposed Development area	Potential pathways to receptors	Associated hazard (severity)	Likelihood of occurrence	Risk/significance
Current and former use as an airfield (including former WWII or RAF site uses).	Metals and metalloids, asbestos, organic and inorganic compounds, polyaromatic hydrocarbons, pesticides, herbicides, de-icers (e.g. glycols), fire-fighting foams (e.g. perfluorooctane sulfonate and perfluorooctanoic acid), surfactants, flammable gas (methane), carbon dioxide, depleted oxygen, volatile vapours.	Future site users (including during the development or construction phase)	Site-wide	Dermal contact, ingestion (including of contaminated potable water), inhalation of dusts, vapours, fibres and accumulated gases.	Health hazard (Severe)	Unlikely	Low to Moderate
		Off-site adjacent future site users (including during the development or construction phase)	N/A	Inhalation of dusts, vapours, fibres and accumulated gases. Ingestion, including of contaminated potable water,	Health hazard (Medium)	Unlikely	Low
		Property: Buildings, structures and services	Site-wide	Direct contact, ingress and accumulation of gases. Damage from collapse and subsidence.	Damage to property (Medium)	Low	Low to Moderate
		Controlled waters: Principal Aquifer, Secondary A Aquifer (bedrock) and SPZs.	Site-wide	Leaching, migration.	Pollution of Controlled Waters (Mild)	Low	Low
Current and historical bulk fuel storage and fuel spillage or leakage.	Aviation fuel or petroleum hydrocarbons, volatile vapours.	Future site users (including during the development or construction phase)	Terminal extensions and pier or walkway.	Dermal contact, ingestion (including of contaminated potable water), inhalation of vapours, and accumulated vapours.	Health hazard (Severe)	Low	Moderate (Evidence of kerosene in groundwater)
		Off-site adjacent future site users (including during the development or construction phase)	N/A	Inhalation of vapours. Accumulated vapours. Ingestion of contaminated potable water,	Health hazard (Severe)	Unlikely	Low to Moderate

Potential source	Potential contaminants	Potential receptors	Proposed Development area	Potential pathways to receptors	Associated hazard (severity)	Likelihood of occurrence	Risk/significance
		Property: Buildings, structures and services	Terminal extensions and pier or walkway.	Direct contact, ingress and accumulation of vapours.	Damage to property (Medium)	Low	Low to Moderate
		Controlled waters: Principal Aquifer, Secondary A Aquifer (bedrock) and SPZs.	Site-wide	Leaching, migration.	Pollution of Controlled Waters (Medium)	Likely	Moderate (Evidence of kerosene in groundwater[9])
On-site and adjacent landfilling (excluding possible infilling of former quarries and voids – assessed below).	Metals and metalloids, asbestos, organic and inorganic compounds, polyaromatic hydrocarbons, flammable gas (methane), carbon dioxide, depleted oxygen, volatile vapours.	Future site users (including during the development or construction phase)	Silver Zone Car Park extension (Phase 2) and highway improvements	Dermal contact, ingestion (including of contaminated potable water), inhalation of dusts, vapours, fibres and accumulated gases.	Health hazard (Severe)	Unlikely	Low to Moderate
		Off-site adjacent future site users (including during the development or construction phase)	N/A	Inhalation of dusts, vapours, fibres and accumulated gases. Ingestion, including of contaminated potable water,	Health hazard (Medium)	Unlikely	Low
		Property: Buildings, structures and services	Silver Zone Car Park extension (Phase 2) and highway improvements	Direct contact, ingress and accumulation of gases. Damage from collapse and subsidence.	Damage to property (Medium)	Unlikely	Low
		Controlled waters: Principal Aquifer, Secondary A Aquifer (bedrock) and SPZs.	Site-wide	Leaching, migration.	Pollution of Controlled Waters (Mild)	Low	Low

Potential source	Potential contaminants	Potential receptors	Proposed Development area	Potential pathways to receptors	Associated hazard (severity)	Likelihood of occurrence	Risk/significance
Natural geology or historical mining (including collapse features or voids, mining, quarrying and associated infilling).	Metals, metalloids, organic compounds, inorganic compounds, petroleum hydrocarbons, polyaromatic hydrocarbons, asbestos, flammable gas (methane), carbon dioxide, depleted oxygen.	Future site users (including during the development or construction phase)	Site-wide (collapse features or voids); Terminal extensions, taxiway widening, Silver Zone Car Park extension (Phase 2) and service yard (area-specific former quarrying); and MSCP and Silver Zone Car Park extension (Phase 2) (historical mining at the north and south of the application site).	Dermal contact, ingestion (including of contaminated potable water), inhalation of dusts, vapours, fibres and accumulated gases.	Health hazard (Severe)	Unlikely	Low to Moderate
		Off-site adjacent future site users (including during the development or construction phase)	N/A	Inhalation of dusts, vapours, fibres and accumulated gases. Ingestion, including of contaminated potable water,	Health hazard (Medium)	Unlikely	Low
		Property: Buildings, Structures and Services	Site-wide (collapse features or voids); Terminal extensions, taxiway widening, Cogloop and service yard (area-specific former quarrying); and MSCP and Silver Zone Car Park extension (Phase 2) (historical mining at the north and south of the application site).	Direct contact, ingress and accumulation of gases. Damage from collapse and subsidence.	Damage to Property (Severe)	Low	Moderate (Collapse features and voids associated with natural geology have been reported at the application site. no investigation information is available and potential voids may exist within Proposed Development areas)
		Controlled Waters: Principal Aquifer,	Site-wide	Leaching, migration.	Pollution of Controlled Waters (Mild)	Low	Low

Potential source	Potential contaminants	Potential receptors	Proposed Development area	Potential pathways to receptors	Associated hazard (severity)	Likelihood of occurrence	Risk/significance
		Secondary A Aquifer (bedrock) and SPZs.					
Natural geology	Radon gas.	Future site users (including during the development or construction phase)	Terminal extensions and pier or walkway, and any occupied buildings or structures where radon gas could accumulate.	Accumulation and inhalation of naturally occurring radon gas.	Health hazard (Severe)	Low	Moderate (The BGS reports that the area of the application site is within a higher probability radon area and that 10 to 30% of homes are above the Action Level)

4. Conclusions and recommendations

4.1 Conclusions

Ground investigations have not been completed within the Proposed Development areas of the application site and uncertainty remains with respect to the ground conditions and the potential for contamination to be present.

Where Moderate or greater risks are identified, further investigation is normally required to clarify the risk and to determine the potential liability. The preliminary risk assessment has identified Moderate risks to future site users within the Proposed Development associated with Made Ground from previous site uses; spillage or leakage associated with bulk fuel storage and use; and radon gas from the natural geology underlying the application site. In addition, the presence of collapse features and voids has been documented at the application site and a Moderate risk has been assessed to property. All other potential risks at the application site have currently been assessed as either Low or Low to Moderate.

Following construction, it is anticipated that the majority of the Proposed Development will be occupied by either buildings or hard surfacing, which will effectively break potential contaminant pathways to human receptors, such as dermal contact and ingestion pathways and will limit infiltration to underlying ground.

It should be noted that risks to current site users and redevelopment workers have been excluded from this assessment for the reasons outlined in **Section 3.2**. This does not mean that associate risks are not present and potential risks should be addressed accordingly.

Should further information become available, or further investigation be completed to clarify risks and potential liabilities, the risk assessment should be revised. This may decrease or increase the assessed risk depending on the information.

4.2 Recommendations

The following specific actions are recommended to permit refinement of the risk assessment and Conceptual Model, and to determine whether or not any remedial action is required in advance of the construction phase:

- Confirm whether any further information is held by BAL that has not previously been made available for this report. In particular, this includes any further information regarding the reported kerosene contamination in the vicinity of the eastern terminal extension;
- Acquire further information regarding potentially contaminated ground conditions within and adjacent to the footprint of the Proposed Development. This may include ground investigations where information is unavailable;
- Acquire further information regarding possible voids, collapse features, infilled solution cavities, and historical limestone quarrying and lead workings within the footprint of the Proposed Development. This may include geophysics and/or targeted ground investigation where supplementary information is unavailable; and

- Consideration should be given to commissioning a site-specific radon assessment report. Where required, radon protection measures should be installed in accordance within *The Building Regulations 2010 England*[18].

The following recommendations pertain to the construction phase of the Proposed Development:

- The preliminary risk assessment does not consider risks to construction or site maintenance workers on the assumption that workers' health and safety will be covered by regulations under the *Health and Safety at Work Act 1974*[16]. Site-specific contamination data obtained from all land quality assessments and site investigations pertinent to the Proposed Development areas should be included in the pre-construction information (a requirement of *Construction Design and Management Regulations 2015*[17]) to enable any contractors to address as necessary in their risk assessments and method statements, and prepare a Construction Phase Plan for the Proposed Development;
- A number of interceptors and soakaways are present within the northern area of application site, associated with surface water drainage within this area. During the construction phase it is important that the integrity of this system is maintained as it represents a potential pathway for pollutants to enter groundwater;
- Earthworks should be managed appropriately to avoid exacerbating risks associated with any contaminated soils or liquids encountered, including potentially increased risk from mobilisation of contamination as windblown dust, run off to surface water and leaching to groundwater; and
- The Construction Phase Health and Safety Plan should include provision for dealing with any unforeseen contamination that may be encountered during site works.

It is recommended that the risk assessment should be reviewed and revised should any further information become available, or further investigation be completed to clarify risks and potential liabilities.

[18] Ministry of Housing, Communities and Local Government (2013). The Building Regulations 2010 England. Approved Document C. *Site preparation and resistance to contaminants and moisture.* (2004 edition incorporating 2010 and 2013 amendments) London.

Appendix A
Figures

350500
351000
351500
166000
165500
165000

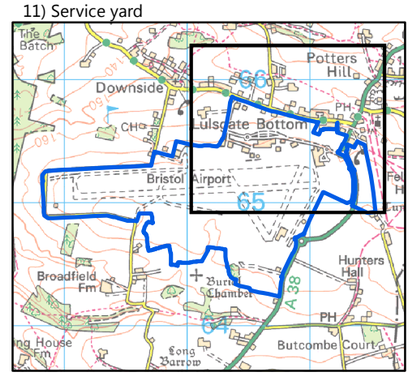
Approximate location of WWII M.T. Garage
Garage and car valeting
Approximate location of WWII aviation petrol installations (1,000 gal)
Approximate location of WWII bulk oil compound
Approximate location of WWII lubricants and inflammables store
Approximate location of WWII fuel compound
Approximate location of former sewage farm, demolished by 1964
Approximate location of former Felton Hill Quarry
Approximate location of WWII armoury
Current fuel farm
1 (East)
1 (West)
1 (South)
Approximate location of former Lulsgate Quarry
Approximate location of WWII field compound
Approximate location of quarry
Approximate location of demolished sub-station
3
4
5
8
9
10
11
2

Key

- Bristol Airport Ownership Boundary
- Former landfill
- Potentially contaminative land uses outside of existing airport boundary
- Possible areas of Made Ground
- Storage tank
- Approximate location of former substation / transformer
- Collapse features and voids
- Old lead workings (dots indicative not accurate)
- Areas subject to planning permission
- Proposed development areas 250m Buffer
- Possible extent of kerosene contamination as per Cascade briefing note December 2014

Proposed Development Layout:

1) Terminal extentions (east, south, west)
2) Pier and walkway
3) New multi-storey car park
4) Taxiway widening (and fillets)
5) Eastern taxiway link
8) Gyratory road
9) Highway improvements
10) New canpoy over plaza
11) Service yard



0 100 200 300 m

Scale at A3: 1:5,000

Client

Bristol Airport
Amazing journeys start here

Preliminary Phase 1 Land Quality Assessmnet

Figure 1
Potential Contaminative Land Uses and Constraints - Northern Area

May 2018

wood.

G:\MODEL\PROJECTS\HM-250\40506 Bristol Airport\GIS\MXD\40506-Bri10b.mxd Originator: Simon.Green2

349800
350000
350200
164800
164600
164400

New fire station - under construction

Fire training ground

Kerosene Interceptor Tank (underground)

Former landfill - various wastes (1950s to mid-1980's)

Approximate location of WWII machine-gun and cannon range (rifle range)

Approximate location of former Broadfield Down quarry (point identified by BGS)

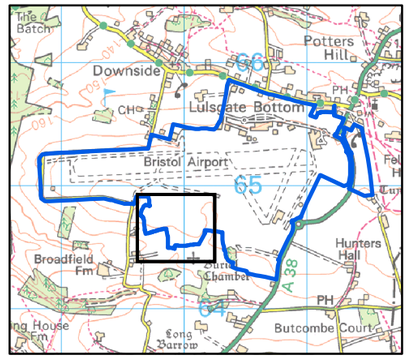
7

Key

- Bristol Airport Ownership Boundary
- Former landfill
- Possible areas of Made Ground
- Areas subject to planning permission
- Proposed development areas 250m Buffer
- Approximate location of former substation / transformer
- Old lead workings (dots indicative not accurate)

Proposed Development Layout:

7) Extension to the Silver Zone Car Park (Cogloop)



0 20 40 60 80 100 120 m

Scale at A3: 1:2,000

Client

Bristol Airport
Amazing journeys start here

Preliminary Phase 1 Land Quality Assessment

Figure 2
Potential Contaminative Land Uses and Constraints - Southern Area

May 2018

wood.

G:\MODEL\PROJECTS\HM-250\40506 Bristol Airport\GIS\MXD\40506-Br111b.mxd Originator: Simon.Green2

SOUTH

NORTH

Off site

On site

Off site

Southern Fields

Silver Zone Car Park

Runway & Taxiways

Apron

Tank Farm

Car Parking

Former mining in areas of Mineralisation along line of fault

Landfill at former rifle range

Aviation fuel below ground tank & filling area

Aviation fuel above ground tanks

Red Diesel above ground tank

Possible relict former RAF fuel tanks

Possible kerosene spillage/leakage

Substation

Residential Housing

Infilled former quarry

Terminal

Vapour migration

3 Predominant groundwater flow to northwest

Known kerosene contamination in Groundwater

Key

- Hardstanding/compacted gravel
- Made Ground/waste
- Drift deposits
- Black Rock Limestone
- Brockley Down Limestone
- Services/utilities
- Groundwater level

Potential Sources

- A Variable Made Ground/Fill/waste
- B Natural mineralisation, former quarrying & mining
- C Leaks & spills from recent & former liquid storage tanks
- D Leaks & spills from transformer substations
- E Residue from recent & former maintenance servicing & storage of aircraft & motor transport & de-icing & fire-fighting

Potential Pathways

- Leaching of contaminants
- Migration in Aquifer/ Groundwater
- Gas migration
- Plant uptake
- Dermal contact/ingestion/ inhalation
- Radon gas migration
- Vapour migration

Potential Receptors

1. Site users
2. Adjacent site users
3. Groundwater
4. Services/utilities
5. Vegetation
6. Property

Not to scale

Client

Bristol Airport
Amazing journeys start here

Preliminary Phase 1 Land Quality Assessment

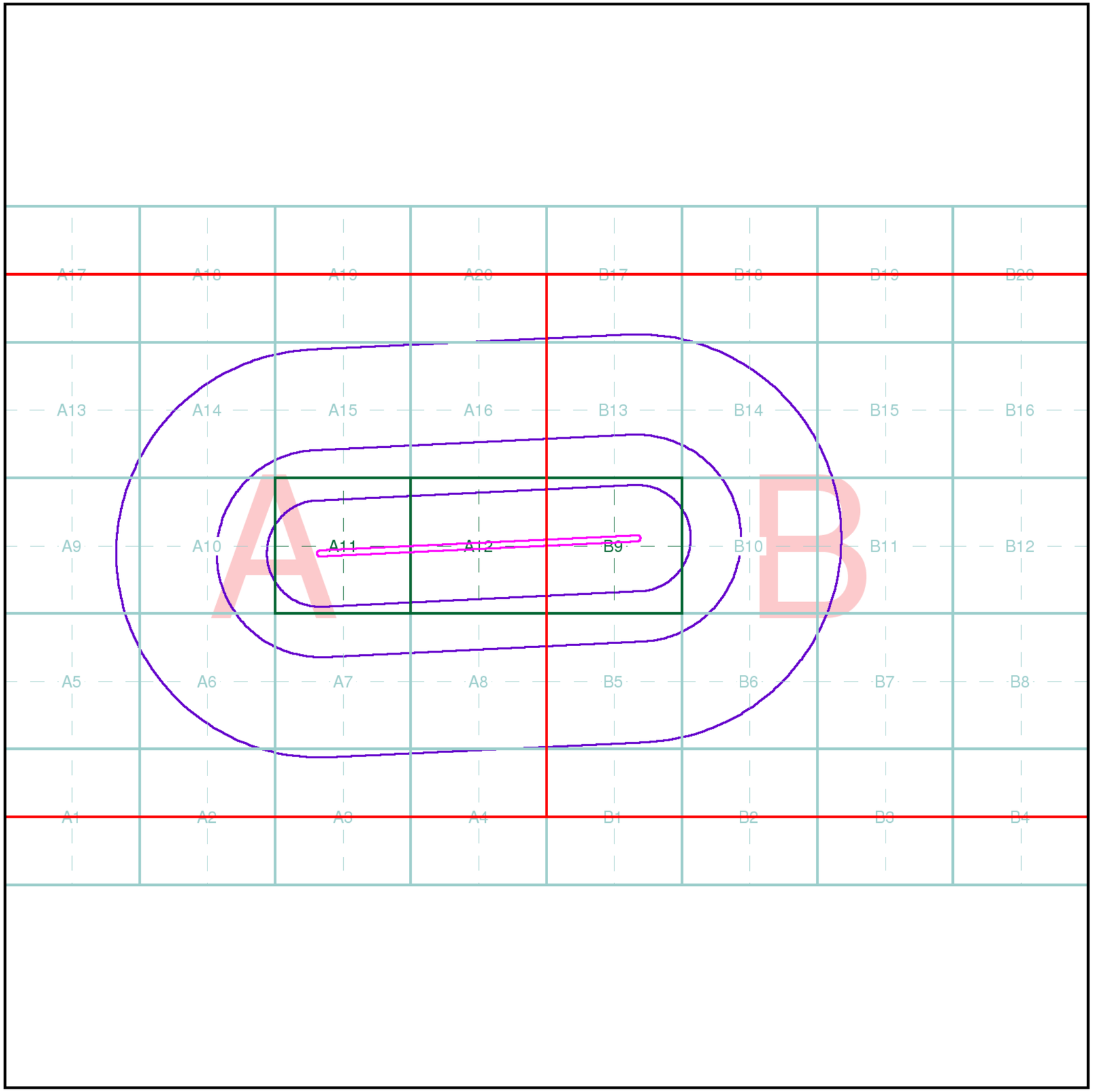
Figure 3
Schematic conceptual model

September 2018

wood.

R:\Projects\40506 Bristol Airport Interim Planning and EIA support\Drawings\ai\40506-Br032.ai 05/2018 Originator: BETTINA BERNARD

Appendix B
Envirocheck Report



Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice
Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment
A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant
A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:

Map data

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

NATURAL ENGLAND

Envirocheck reports are compiled from 136 different sources of data.

Client Details

Mr E Gilligan, Amec Foster Wheeler E & I UK Ltd, Floor 12, 25 Canada Square, Canary Wharf, London, E14 5LQ

Order Details

Order Number:	128842570_1_1
Customer Ref:	38970
National Grid Reference:	350020, 165090
Site Area (Ha):	4.82
Search Buffer (m):	1000

Site Details

Bristol International Airport, North Side Road, FELTON, BS48 3DY

Full Terms and Conditions can be found on the following link:
http://www.landmarkinfo.co.uk/Terms/Show/515

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

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
128842570_1_1

Customer Reference:
38970

National Grid Reference:
349380, 165060

Slice:
A

Site Area (Ha):
4.82

Search Buffer (m):
1000

Site Details:

Bristol International Airport
North Side Road
FELTON
BS48 3DY

Client Details:

Mr E Gilligan
Amec Foster Wheeler E & I UK Ltd
Floor 12
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Canary Wharf
London
E14 5LQ

Contents

Report Section	Page Number
Summary	-
Agency & Hydrological	1
Waste	5
Hazardous Substances	-
Geological	6
Industrial Land Use	12
Sensitive Land Use	13
Data Currency	14
Data Suppliers	19
Useful Contacts	20

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

Report Version v53.0

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes		n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 1			7	4
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls					
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 3			Yes	
Pollution Incidents to Controlled Waters					
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality					
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions					
Water Industry Act Referrals					
Groundwater Vulnerability	pg 4	Yes	n/a	n/a	n/a
Drift Deposits			n/a	n/a	n/a
Bedrock Aquifer Designations	pg 4	Yes	n/a	n/a	n/a
Superficial Aquifer Designations			n/a	n/a	n/a
Source Protection Zones	pg 4	2			1
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
OS Water Network Lines	pg 4				1

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites	pg 5				1
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Landfill Coverage	pg 5	1	n/a	n/a	n/a
Local Authority Recorded Landfill Sites					
Potentially Infilled Land (Non-Water)	pg 5		1	1	1
Potentially Infilled Land (Water)					
Registered Landfill Sites	pg 5				1
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Geological					
BGS 1:625,000 Solid Geology	pg 6	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 6	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites	pg 8		1	3	1
BGS Urban Soil Chemistry					
BGS Urban Soil Chemistry Averages					
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability	pg 9	Yes	n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities	pg 9		2	1	
Non Coal Mining Areas of Great Britain	pg 9	Yes	Yes	n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 10	Yes	Yes	n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 10		Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards	pg 10	Yes	Yes	n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 10	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 10		Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards				n/a	n/a
Radon Potential - Radon Affected Areas	pg 11	Yes	n/a	n/a	n/a
Radon Potential - Radon Protection Measures	pg 11	Yes	n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 12			1	2
Fuel Station Entries					
Points of Interest - Commercial Services					
Points of Interest - Education and Health					
Points of Interest - Manufacturing and Production	pg 12			1	2
Points of Interest - Public Infrastructure	pg 12				1
Points of Interest - Recreational and Environmental					
Gas Pipelines					
Underground Electrical Cables					

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Ancient Woodland	pg 13				1
Areas of Adopted Green Belt	pg 13	1			
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones					
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12SW (E)	0	1	350000 165065
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A11SE (SW)	0	1	349377 165065
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A11SE (S)	35	1	349377 165000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12SW (E)	72	1	350000 165000
1	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Western Apron Aircraft Parking Area Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Land Yeo/Kenn/Blind Yeo Reference: 103554 Permit Version: 2 Effective Date: 17th December 2012 Issued Date: 17th December 2012 Revocation Date: 26th February 2015 Discharge Type: Trade Effluent Discharge-Site Drainage Discharge Environment: Land/Soakaway Receiving Water: Soakaway **Status: Surrendered under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A12NW (NE)	252	2	349730 165340
1	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Western Apron Aircraft Parking Area Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Land Yeo/Kenn/Blind Yeo Reference: 103554 Permit Version: 1 Effective Date: 10th October 2007 Issued Date: 1st February 2007 Revocation Date: 16th December 2012 Discharge Type: Trade Effluent Discharge-Site Drainage Discharge Environment: Land/Soakaway Receiving Water: Soakaway **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A12NW (NE)	252	2	349730 165340
2	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: River Congresbury Yeo Reference: 101449 Permit Version: 1 Effective Date: 20th March 2001 Issued Date: 23rd March 2001 Revocation Date: 1st April 2007 Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Soakaway **Status: Revoked (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 100m	A12NW (NE)	299	2	350000 165400

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
3	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896rk Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A12NW (NE)	310	2	349739 165399
4	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896rk Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A16SE (NE)	364	2	350026 165466
4	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Chew Reference: 103335 Permit Version: 2 Effective Date: 17th December 2012 Issued Date: 17th December 2012 Revocation Date: 26th February 2015 Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Soakaway **Status: Surrendered under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A16SE (NE)	368	2	350020 165470
4	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Chew Reference: 103335 Permit Version: 1 Effective Date: 3rd March 2006 Issued Date: 3rd March 2006 Revocation Date: 16th December 2012 Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Soakaway **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A16SE (NE)	368	2	350020 165470

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
5	**Discharge Consents** Operator: Mr Ashman Property Type: DOMESTIC PROPERTY (SINGLE) (INCL FARM HOUSE) Location: The Cart House Goblin Combe, Redhill, Wrington, Bristol, Bs18 7sw Authority: Environment Agency, South West Region Catchment Area: Land Yeo/Kenn/Blind Yeo Reference: 013501 Permit Version: 1 Effective Date: 9th May 1997 Issued Date: 3rd June 1997 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Land/Soakaway Receiving Water: Land - Soakaway **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 100m	A8SW (SE)	677	2	349710 164380
6	**Discharge Consents** Operator: Ms Hazel Johns Property Type: DOMESTIC PROPERTY (SINGLE) (INCL FARM HOUSE) Location: Corner Cottage The Batch, Downside, Backwell, Bristol, Bs48 3dl Authority: Environment Agency, South West Region Catchment Area: Yeo Reference: 103579 Permit Version: 1 Effective Date: 2nd October 2006 Issued Date: 2nd October 2006 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Land/Soakaway Receiving Water: Groundwater Via Soakaway **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A16NE (NE)	862	2	350021 165965
7	**Discharge Consents** Operator: Wessex Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Lulsgate Downside Wwtw, Downside Road, Backwell, Bristol, Bs48 3dn Authority: Environment Agency, South West Region Catchment Area: River Congresbury Yeo Reference: 100936 Permit Version: 2 Effective Date: 6th April 2016 Issued Date: 6th April 2016 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge Environment: Into Land Receiving Water: Groundwater Via Infilt System **Status: Varied under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A16NE (NE)	872	2	350178 165982
8	**Discharge Consents** Operator: Wessex Water Services Ltd Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Lulsgate Downside Wwtw, Downside Road, Backwell, Bristol, Bs48 3dn Authority: Environment Agency, South West Region Catchment Area: River Congresbury Yeo Reference: 100936 Permit Version: 1 Effective Date: 4th April 2001 Issued Date: 20th April 2001 Revocation Date: 5th April 2016 Discharge Type: Sewage Discharges - Final/Treated Effluent - Water Company Discharge Environment: Land/Soakaway Receiving Water: Soakaway(G) **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A16NE (NE)	951	2	350136 166059
	Nearest Surface Water Feature	A11SE (SE)	299	-	349569 164752

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (H1) - Soils which readily transmit liquid discharges because they are either shallow, or susceptible to rapid by-pass flow directly to rock, gravel or groundwater Map Sheet: Sheet 36 Mid Glamorgan Scale: 1:100,000	A11SE (SW)	0	2	349377 165065
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (H1) - Soils which readily transmit liquid discharges because they are either shallow, or susceptible to rapid by-pass flow directly to rock, gravel or groundwater Map Sheet: Sheet 37 Southern Cotswolds Scale: 1:100,000	A12SW (E)	0	2	350000 165065
	Drift Deposits None				
	Bedrock Aquifer Designations Aquifer Designation: Principal Aquifer	A11SE (SW)	0	1	349377 165065
	Bedrock Aquifer Designations Aquifer Designation: Principal Aquifer	A12SW (E)	0	1	350000 165065
	Superficial Aquifer Designations No Data Available				
9	**Source Protection Zones** Name: Not Supplied Source: Environment Agency, Head Office Reference: Not Supplied Type: Zone II (Outer Protection Zone): Either 25% of the source area or a 400 day travel time whichever is greater.	A11SE (SW)	0	2	349377 165065
10	**Source Protection Zones** Name: Not Supplied Source: Environment Agency, Head Office Reference: Not Supplied Type: Zone III (Total Catchment): The total area needed to support the discharge from the protected groundwater source.	A11SE (SW)	0	2	349377 165065
11	**Source Protection Zones** Name: Chelvey Well Source: Environment Agency, Head Office Reference: Sw044 Type: Zone IIc (Outer Protection Zone): Either 25% of the source area or a 400 day travel time whichever is greater - subsurface activity only.	A14SE (NW)	648	2	348934 165652
	Extreme Flooding from Rivers or Sea without Defences None				
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
12	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 61.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Somerset Streams North Primacy: 1	A15SW (NW)	561	3	349031 165591

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
13	**Historical Landfill Sites** Licence Holder: Ashman and Ashman Location: Goblin Combe Farm, Winters Lane, Redhill, Bristol Name: Part Plot 8429 Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD09090 First Input Date: 20th March 1979 Last Input Date: 31st December 1987 Specified Waste Type: Deposited Waste included Inert and Industrial Waste EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 0100/0049 BGS Ref: Not Supplied Other Ref: L/WG/T/49A	A8SW (SE)	769	2	349838 164293
	Local Authority Landfill Coverage Name: North Somerset Unitary Council - Has supplied landfill data		0	4	349377 165065
14	**Potentially Infilled Land (Non-Water)** Bearing Ref: W Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A10SE (W)	225	-	348987 165020
15	**Potentially Infilled Land (Non-Water)** Bearing Ref: NE Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A11NE (NE)	316	-	349661 165400
16	**Potentially Infilled Land (Non-Water)** Bearing Ref: SE Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A8SW (SE)	733	-	349917 164334
17	**Registered Landfill Sites** Licence Holder: M J & S G Ashman Licence Reference: L/WG/T/ 49A Site Location: Goblin Combe Farm, Winters Lane, Wrington, Bristol, Avon Licence Easting: 349820 Licence Northing: 164260 Operator Location: As Site Address Authority: Environment Agency - South West Region, North Wessex Area Site Category: Landfill Max Input Rate: Undefined Waste Source Restrictions: No known restriction on source of waste Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 26th February 1979 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Not Applicable Authorised Waste: Constr'N/Demol. Inert/Non-Haz/Non-Tox Excavated Natural Materials $ Glass/Cullet Sawdust/Bark Prohibited Waste: Liquid Wastes Environment Agency must give specific authorisation for this waste to be acceptedWaste requires prior approval: Inert Waste	A8SW (SE)	802	2	349820 164260

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Dinantian Rocks (Undifferentiated)	A11SE (SW)	0	1	349377 165065
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 15 - 30 mg/kg	A15SE (N)	0	1	349377 165500
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 200 - 300 mg/kg Nickel Concentration: 15 - 30 mg/kg	A11SE (SW)	0	1	349377 165065
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 300 - 600 mg/kg Nickel Concentration: 15 - 30 mg/kg	A10SE (W)	216	1	349000 165000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 35 - 45 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: 200 - 300 mg/kg Nickel Concentration: 30 - 45 mg/kg	A7NE (S)	348	1	349523 164446
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 35 - 45 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 30 - 45 mg/kg	A15SW (NW)	491	1	349171 165555
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 35 - 45 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: 300 - 600 mg/kg Nickel Concentration: 30 - 45 mg/kg	A7NE (S)	576	1	349381 164465

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 25 - 35 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 30 - 45 mg/kg	A14SE (NW)	720	1	348999 165755
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 200 - 300 mg/kg Nickel Concentration: 15 - 30 mg/kg	A7SE (S)	739	1	349500 164289
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 35 - 45 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 30 - 45 mg/kg	A14NE (NW)	758	1	348958 165778
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 35 - 45 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 30 - 45 mg/kg	A16NW (NE)	775	1	350014 165940
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 200 - 300 mg/kg Nickel Concentration: 15 - 30 mg/kg	A8SW (SE)	802	1	350000 164269
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 15 - 30 mg/kg	A4NW (SE)	819	1	350000 164000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 35 - 45 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: 200 - 300 mg/kg Nickel Concentration: 30 - 45 mg/kg	A16NW (NE)	861	1	350000 166000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 200 - 300 mg/kg Nickel Concentration: 15 - 30 mg/kg	A16NE (NE)	866	1	350189 166068
18	**BGS Recorded Mineral Sites** Site Name: Abspit Pond Quarry Location: , Lulsgate Bottom, Bristol, Avon Source: British Geological Survey, National Geoscience Information Service Reference: 67376 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Black Rock Limestone Subgroup Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A10SE (W)	228	1	348983 165028
19	**BGS Recorded Mineral Sites** Site Name: Broadfield Down Location: , Lulsgate, Bristol, Avon Source: British Geological Survey, National Geoscience Information Service Reference: 8098 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Black Rock Limestone Subgroup Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A12SW (SE)	278	1	349820 164785
20	**BGS Recorded Mineral Sites** Site Name: Cooks Farm Quarry Location: , Lulsgate Bottom, Bristol, Avon Source: British Geological Survey, National Geoscience Information Service Reference: 67385 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Black Rock Limestone Subgroup Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A11NE (NE)	322	1	349662 165407
21	**BGS Recorded Mineral Sites** Site Name: Cooks Farm Quarry Location: , Lulsgate Bottom, Bristol, Avon Source: British Geological Survey, National Geoscience Information Service Reference: 67386 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Black Rock Limestone Subgroup Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A16SW (NE)	339	1	349891 165435

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
22	**BGS Recorded Mineral Sites** Site Name: Goblincombe Farm Quarry Location: , Redhill, Bristol, Avon Source: British Geological Survey, National Geoscience Information Service Reference: 67393 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Triassic Geology: Brockley Down Limestone Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A8SW (SE)	726	1	349918 164341
	BGS Measured Urban Soil Chemistry No data available				
	BGS Urban Soil Chemistry Averages No data available				
	Coal Mining Affected Areas In an area that might not be affected by coal mining				
	Mining Instability Mining Evidence: Inconclusive Metaliferous Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	A11SE (SW)	0	-	349377 165065
	Natural Cavities Easting: 349500 Northing: 165190 Distance: 113 Quadrant Reference: A11 Quadrant Reference: NE Bearing Ref: NE Cavity Type: Sinkhole x 1 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	A11NE (NE)	113	5	349500 165190
	Natural Cavities Easting: 350050 Northing: 165350 Distance: 247 Quadrant Reference: A12 Quadrant Reference: NE Bearing Ref: NE Cavity Type: Sinkhole x 1 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	A12NE (NE)	247	5	350050 165350
	Natural Cavities Easting: 350330 Northing: 165500 Distance: 383 Quadrant Reference: A16 Quadrant Reference: SE Bearing Ref: NE Cavity Type: Sinkhole x 2 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	A16SE (NE)	383	5	350330 165500
	Non Coal Mining Areas of Great Britain Risk: Highly Unlikely Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	0	1	350000 165065
	Non Coal Mining Areas of Great Britain Risk: Highly Unlikely Source: British Geological Survey, National Geoscience Information Service	A11SE (SW)	0	1	349377 165065
	Non Coal Mining Areas of Great Britain Risk: Highly Unlikely Source: British Geological Survey, National Geoscience Information Service	A11SE (S)	35	1	349377 165000
	Non Coal Mining Areas of Great Britain Risk: Highly Unlikely Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	72	1	350000 165000
	Non Coal Mining Areas of Great Britain Risk: Likely Source: British Geological Survey, National Geoscience Information Service	A11NE (NE)	140	1	349523 165312

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Non Coal Mining Areas of Great Britain Risk: Highly Likely Source: British Geological Survey, National Geoscience Information Service	A11NE (NE)	240	1	349574 165398
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11SE (SW)	0	1	349377 165065
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	0	1	350000 165065
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11SE (S)	35	1	349377 165000
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	72	1	350000 165000
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11SE (SW)	0	1	349377 165065
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	0	1	350000 165065
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11SE (S)	35	1	349377 165000
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	58	1	349725 165000
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	72	1	350000 165000
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11SE (SW)	0	1	349377 165065
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	0	1	350000 165065
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A11SE (S)	35	1	349377 165000
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	72	1	350000 165000
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11SE (SW)	0	1	349377 165065
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	0	1	350000 165065
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A11SE (S)	35	1	349377 165000
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	72	1	350000 165000
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11SE (SW)	0	1	349377 165065
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	0	1	350000 165065
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11SE (S)	35	1	349377 165000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	58	1	349725 165000
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	72	1	350000 165000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11SE (SW)	0	1	349377 165065
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	0	1	350000 165065
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A11SE (S)	35	1	349377 165000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	72	1	350000 165000
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Higher probability radon area (10 to 30% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A11SE (SW)	0	1	349377 165065
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Higher probability radon area (10 to 30% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	0	1	349999 165065
	Radon Potential - Radon Protection Measures Protection Measure: Full radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A11SE (SW)	0	1	349377 165065
	Radon Potential - Radon Protection Measures Protection Measure: Full radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A12SW (E)	0	1	349999 165065

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
23	**Contemporary Trade Directory Entries** Name: Virtual Reality Ltd Location: The Hangars, Bristol International Airport, Bristol, BS48 3EP Classification: Computer Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned in the proximity of the address	A12NW (NE)	285	-	349895 165381
24	**Contemporary Trade Directory Entries** Name: Goblin Parking Location: Goblin Combe Farm, Winters Lane, Redhill, Bristol, BS40 5SW Classification: Car Painters & Sprayers **Status: Active** Positional Accuracy: Automatically positioned to the address	A7SE (S)	671	-	349633 164382
25	**Contemporary Trade Directory Entries** Name: Broadfield Park & Fly Location: Broadfield Farm, Winters Lane, Redhill, Bristol, BS40 5SW Classification: Car Painters & Sprayers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A7SE (S)	770	-	349366 164271
26	**Points of Interest - Manufacturing and Production** Name: Tank Location: BS40 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A10NE (W)	367	6	348865 165176
27	**Points of Interest - Manufacturing and Production** Name: John Marshall Location: Downside Road, Backwell, Bristol, BS48 3DN Category: Farming Class Code: Livestock Farming Positional Accuracy: Positioned to address or location	A16SE (NE)	629	6	350115 165736
28	**Points of Interest - Manufacturing and Production** Name: Tank Location: BS40 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A7SW (S)	716	6	349285 164321
29	**Points of Interest - Public Infrastructure** Name: Sewage Works Location: BS48 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to address or location	A16NE (NE)	952	6	350139 166061

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
30	**Ancient Woodland** Name: Not Supplied Reference: 1418505 Area(m²): 18241.71 Type: Ancient and Semi-Natural Woodland	A8SW (SE)	915	7	349992 164155
31	**Areas of Adopted Green Belt** Authority: North Somerset Council Plan Name: North Somerset Replacement Local Plan **Status: Adopted** Plan Date: 30th March 2007	A11SE (SW)	0	4	349377 165065

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices North Somerset Council - Environmental Health Department	September 2014	Annual Rolling Update
Discharge Consents Environment Agency - South West Region	April 2017	Quarterly
Enforcement and Prohibition Notices Environment Agency - South West Region	March 2013	As notified
Integrated Pollution Controls Environment Agency - South West Region	October 2008	Not Applicable
Integrated Pollution Prevention And Control Environment Agency - South West Region	April 2017	Quarterly
Local Authority Integrated Pollution Prevention And Control North Somerset Council - Environmental Health Department	September 2013	Annual Rolling Update
Local Authority Pollution Prevention and Controls North Somerset Council - Environmental Health Department	March 2015	Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements North Somerset Council - Environmental Health Department	September 2013	Annual Rolling Update
Nearest Surface Water Feature Ordnance Survey	March 2017	
Pollution Incidents to Controlled Waters Environment Agency - South West Region	September 1999	Not Applicable
Prosecutions Relating to Authorised Processes Environment Agency - South West Region	March 2013	As notified
Prosecutions Relating to Controlled Waters Environment Agency - South West Region	March 2013	As notified
Registered Radioactive Substances Environment Agency - South West Region	January 2015	
River Quality Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points Environment Agency - Head Office	July 2012	Annually
Substantiated Pollution Incident Register Environment Agency - South West Region - North Wessex Area Environment Agency - South West Region - Wessex Area	April 2017 April 2017	Quarterly Quarterly
Water Abstractions Environment Agency - South West Region	October 2016	Quarterly
Water Industry Act Referrals Environment Agency - South West Region	April 2017	Quarterly
Groundwater Vulnerability Environment Agency - Head Office	April 2015	Not Applicable
Drift Deposits Environment Agency - Head Office	January 1999	Not Applicable
Bedrock Aquifer Designations British Geological Survey - National Geoscience Information Service	August 2015	As notified
Superficial Aquifer Designations British Geological Survey - National Geoscience Information Service	August 2015	As notified
Source Protection Zones Environment Agency - Head Office	April 2017	Quarterly
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	May 2017	Quarterly

Agency & Hydrological	Version	Update Cycle
Flooding from Rivers or Sea without Defences		
Environment Agency - Head Office	May 2017	Quarterly
Areas Benefiting from Flood Defences		
Environment Agency - Head Office	May 2017	Quarterly
Flood Water Storage Areas		
Environment Agency - Head Office	May 2017	Quarterly
Flood Defences		
Environment Agency - Head Office	May 2017	Quarterly
OS Water Network Lines		
Ordnance Survey	April 2017	6 Weekly
Surface Water 1 in 30 year Flood Extent		
Environment Agency - Head Office	October 2013	As notified
Surface Water 1 in 100 year Flood Extent		
Environment Agency - Head Office	October 2013	As notified
Surface Water 1 in 1000 year Flood Extent		
Environment Agency - Head Office	October 2013	As notified
Surface Water Suitability		
Environment Agency - Head Office	October 2013	As notified
BGS Groundwater Flooding Susceptibility		
British Geological Survey - National Geoscience Information Service	May 2013	Annually
Waste	**Version**	**Update Cycle**
BGS Recorded Landfill Sites		
British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Historical Landfill Sites		
Environment Agency - Head Office	May 2017	Quarterly
Integrated Pollution Control Registered Waste Sites		
Environment Agency - South West Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries)		
Environment Agency - South West Region - North Wessex Area	May 2017	Quarterly
Environment Agency - South West Region - Wessex Area	May 2017	Quarterly
Licensed Waste Management Facilities (Locations)		
Environment Agency - South West Region - North Wessex Area	May 2017	Quarterly
Environment Agency - South West Region - Wessex Area	May 2017	Quarterly
Local Authority Landfill Coverage		
North Somerset Council	May 2000	Not Applicable
Local Authority Recorded Landfill Sites		
North Somerset Council	May 2000	Not Applicable
Potentially Infilled Land (Non-Water)		
Landmark Information Group Limited	December 1999	Not Applicable
Potentially Infilled Land (Water)		
Landmark Information Group Limited	December 1999	Not Applicable
Registered Landfill Sites		
Environment Agency - South West Region - North Wessex Area	March 2003	Not Applicable
Registered Waste Transfer Sites		
Environment Agency - South West Region - North Wessex Area	March 2003	Not Applicable
Registered Waste Treatment or Disposal Sites		
Environment Agency - South West Region - North Wessex Area	March 2003	Not Applicable

Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH) Health and Safety Executive	March 2017	Bi-Annually
Explosive Sites Health and Safety Executive	March 2017	Bi-Annually
Notification of Installations Handling Hazardous Substances (NIHHS) Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements North Somerset Council	February 2016	Annual Rolling Update
Planning Hazardous Substance Consents North Somerset Council	February 2016	Annual Rolling Update
Geological	**Version**	**Update Cycle**
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	January 2009	Not Applicable
BGS Estimated Soil Chemistry British Geological Survey - National Geoscience Information Service	October 2015	As notified
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	April 2017	Bi-Annually
CBSCB Compensation District Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	As notified
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	As notified
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	As notified

Industrial Land Use	Version	Update Cycle
Contemporary Trade Directory Entries Thomson Directories	March 2017	Quarterly
Fuel Station Entries Catalist Ltd - Experian	May 2017	Quarterly
Gas Pipelines National Grid	July 2014	Quarterly
Points of Interest - Commercial Services PointX	December 2016	Quarterly
Points of Interest - Education and Health PointX	December 2016	Quarterly
Points of Interest - Manufacturing and Production PointX	December 2016	Quarterly
Points of Interest - Public Infrastructure PointX	December 2016	Quarterly
Points of Interest - Recreational and Environmental PointX	December 2016	Quarterly
Underground Electrical Cables National Grid	December 2015	Bi-Annually

Sensitive Land Use	Version	Update Cycle
Ancient Woodland Natural England	May 2017	Bi-Annually
Areas of Adopted Green Belt North Somerset Council	May 2017	As notified
Areas of Unadopted Green Belt North Somerset Council	May 2017	As notified
Areas of Outstanding Natural Beauty Natural England	January 2017	Bi-Annually
Environmentally Sensitive Areas Natural England	January 2017	Annually
Forest Parks Forestry Commission	April 1997	Not Applicable
Local Nature Reserves Natural England	January 2017	Bi-Annually
Marine Nature Reserves Natural England	January 2017	Bi-Annually
National Nature Reserves Natural England	January 2017	Bi-Annually
National Parks Natural England	February 2017	Bi-Annually
Nitrate Vulnerable Zones Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	October 2015	Annually
Ramsar Sites Natural England	January 2017	Bi-Annually
Sites of Special Scientific Interest Natural England	January 2017	Bi-Annually
Special Areas of Conservation Natural England	January 2017	Bi-Annually
Special Protection Areas Natural England	January 2017	Bi-Annually
World Heritage Sites English Heritage - National Monument Record Centre	May 2017	Bi-Annually

Data Suppliers

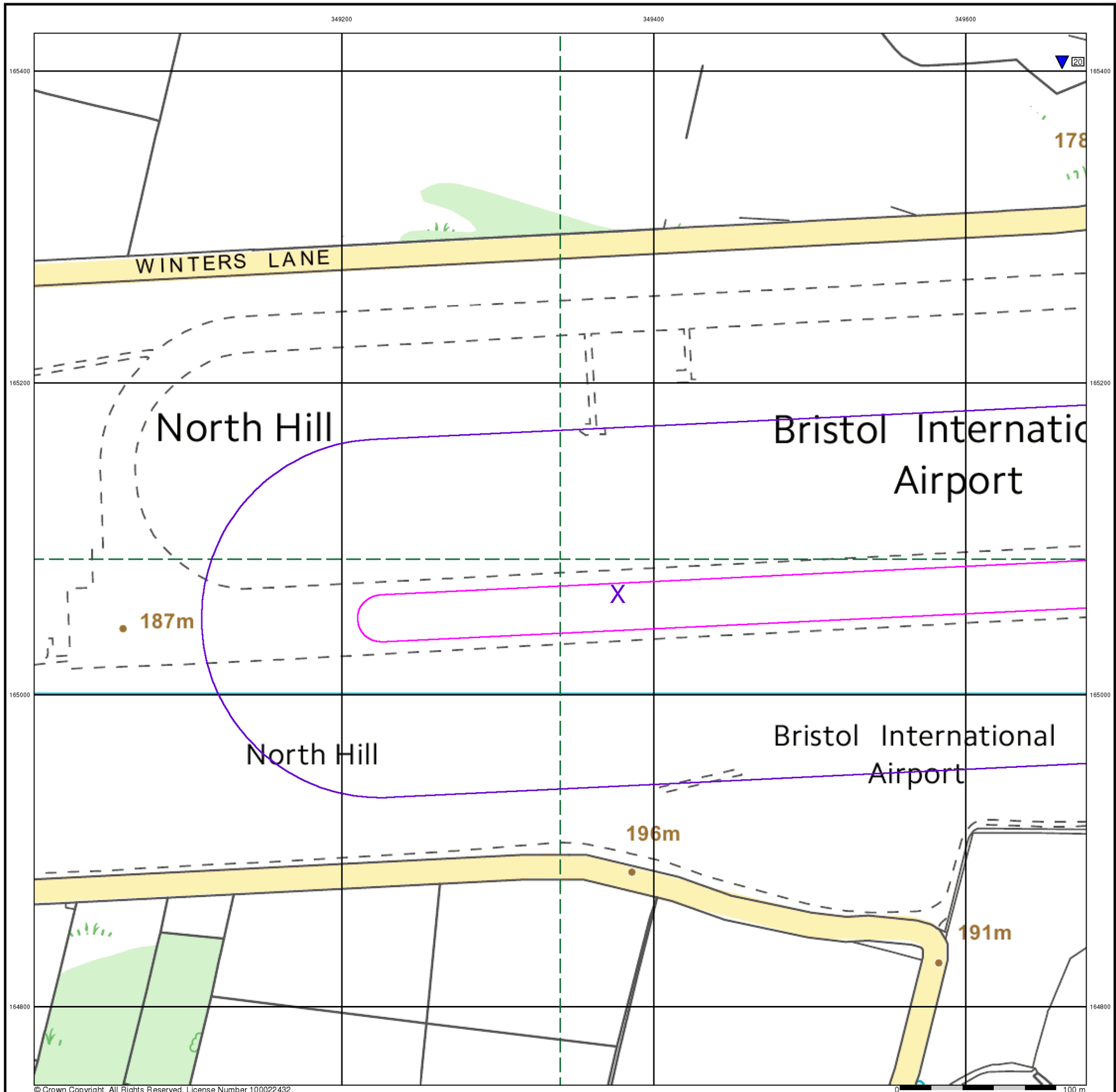
A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	
Centre for Ecology and Hydrology	
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Peter Brett Associates	

Useful Contacts

Contact	Name and Address	Contact Details
1	**British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 03708 506 506 Email: enquiries@environment-agency.gov.uk
3	**Ordnance Survey** Adanac Drive, Southampton, Hampshire, SO16 0AS	Telephone: 023 8079 2000 Email: customerservices@ordnancesurvey.co.uk Website: www.ordnancesurvey.gov.uk
4	**North Somerset Council** PO Box 140, Town Hall, Weston-super-Mare, Avon, BS23 1UJ	Telephone: 01934 888888 Fax: 01934 888822 Website: www.n-somerset.gov.uk
5	**Peter Brett Associates** Caversham Bridge House, Waterman Place, Reading, Berkshire, RG1 8DN	Telephone: 0118 950 0761 Fax: 0118 959 7498 Email: reading@pba.co.uk Website: www.pba.co.uk
6	**PointX** 7 Abbey Court, Eagle Way, Sowton, Exeter, Devon, EX2 7HY	Website: www.pointx.co.uk
7	**Natural England** County Hall, Spetchley Road, Worcester, WR5 2NP	Telephone: 0300 060 3900 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
8	**Environment Agency - Head Office** Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD	Telephone: 01454 624400 Fax: 01454 624409
-	**Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.



General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Map ID
Several of Type at Location

Agency and Hydrological

Contaminated Land Register Entry or Notice (Location)
Contaminated Land Register Entry or Notice
Discharge Consent
Enforcement or Prohibition Notice
Integrated Pollution Control
Integrated Pollution Prevention Control
Local Authority Integrated Pollution Prevention and Control
Local Authority Pollution Prevention and Control
Local Authority Pollution Prevention and Control Enforcement
Pollution Incident to Controlled Waters
Prosecution Relating to Authorised Processes
Prosecution Relating to Controlled Waters
Registered Radioactive Substance
River Network or Water Feature
River Quality Sampling Point
Substantiated Pollution Incident Register
Water Abstraction
Water Industry Act Referral

Geological

BGS Recorded Mineral Site

Industrial Land Use

Contemporary Trade Directory Entry
Fuel Station Entry

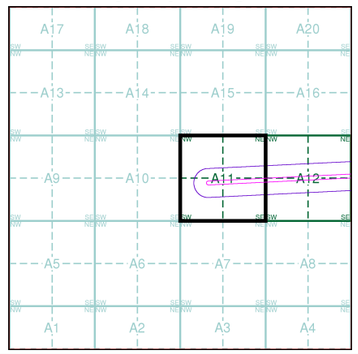
Waste

BGS Recorded Landfill Site (Location)
BGS Recorded Landfill Site
EA Historic Landfill (Buffered Point)
EA Historic Landfill (Polygon)
Integrated Pollution Control Registered Waste Site
Licensed Waste Management Facility (Landfill Boundary)
Licensed Waste Management Facility (Location)
Local Authority Recorded Landfill Site (Location)
Local Authority Recorded Landfill Site
Registered Landfill Site
Registered Landfill Site (Location)
Registered Landfill Site (Point Buffered to 100m)
Registered Landfill Site (Point Buffered to 250m)
Registered Waste Transfer Site (Location)
Registered Waste Transfer Site
Registered Waste Treatment or Disposal Site (Location)
Registered Waste Treatment or Disposal Site

Hazardous Substances

COMAH Site
Explosive Site
NIHHS Site
Planning Hazardous Substance Consent
Planning Hazardous Substance Enforcement

Site Sensitivity Map - Segment A11



Order Details

Order Number:	128842570_1_1
Customer Ref:	38970
National Grid Reference:	349380, 165060
Slice:	A
Site Area (Ha):	4.82

Site Details

Bristol International Airport, North Side Road, FELTON, BS48 3DY

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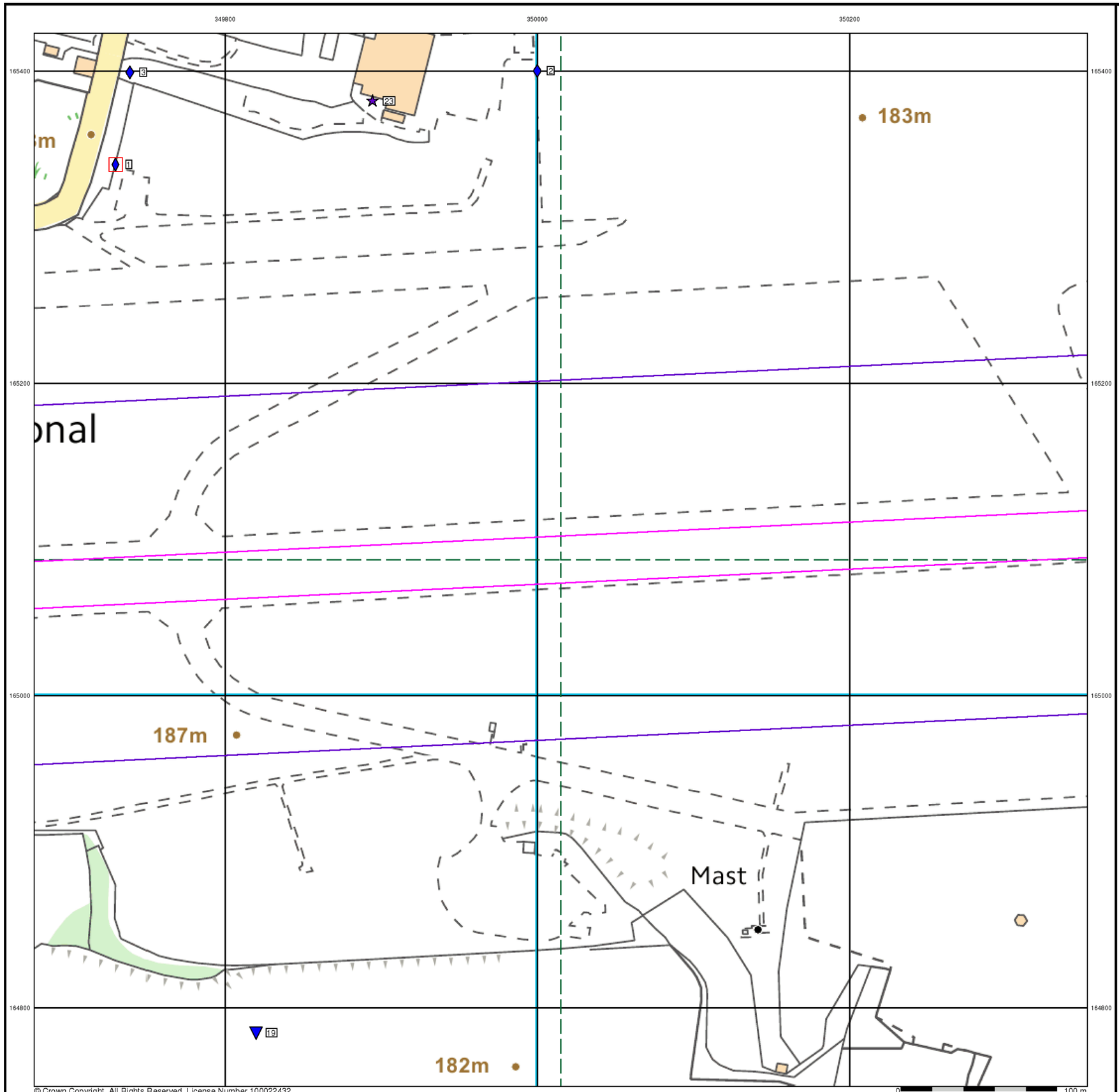
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

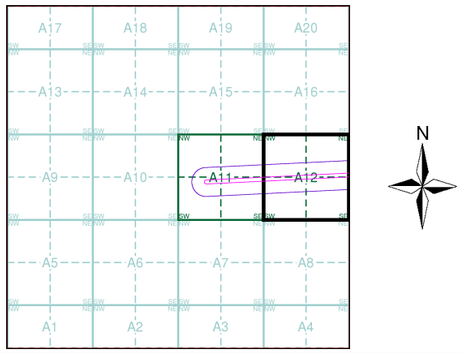
Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Site Sensitivity Map - Segment A12



Order Details

Order Number:	128842570_1_1
Customer Ref:	38970
National Grid Reference:	349380, 165060
Slice:	A
Site Area (Ha):	4.82

Site Details

Bristol International Airport, North Side Road, FELTON, BS48 3DY

Landmark INFORMATION GROUP
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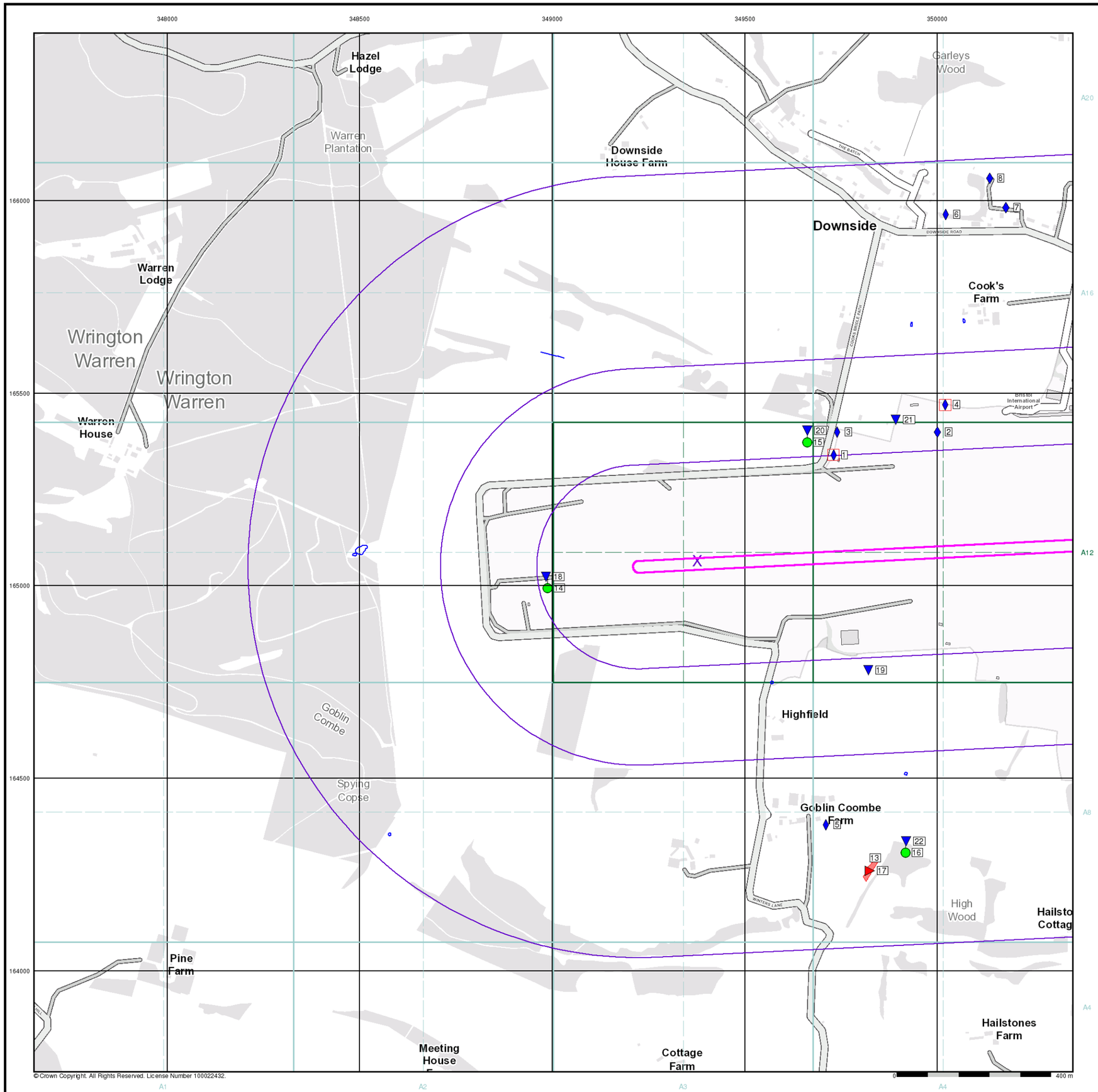


amec

General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Map ID
Several of Type at Location

Agency and Hydrological

Contaminated Land Register Entry or Notice (Location)
Contaminated Land Register Entry or Notice
Discharge Consent
Enforcement or Prohibition Notice
Integrated Pollution Control
Integrated Pollution Prevention Control
Local Authority Integrated Pollution Prevention and Control
Local Authority Pollution Prevention and Control
Local Authority Pollution Prevention and Control Enforcement
Pollution Incident to Controlled Waters
Prosecution Relating to Authorised Processes
Prosecution Relating to Controlled Waters
Registered Radioactive Substance
River Network or Water Feature
River Quality Sampling Point
Substantiated Pollution Incident Register
Water Abstraction
Water Industry Act Referral

Hazardous Substances

COMAH Site
Explosive Site
NIHHS Site
Planning Hazardous Substance Consent
Planning Hazardous Substance Enforcement

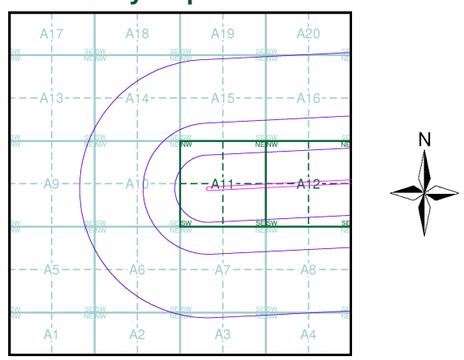
Geological

BGS Recorded Mineral Site

Waste

BGS Recorded Landfill Site (Location)
BGS Recorded Landfill Site
EA Historic Landfill (Buffered Point)
EA Historic Landfill (Polygon)
Integrated Pollution Control Registered Waste Site
Licensed Waste Management Facility (Landfill Boundary)
Licensed Waste Management Facility (Location)
Local Authority Recorded Landfill Site (Location)
Local Authority Recorded Landfill Site
Potentially Infilled Land (Non-water)
Potentially Infilled Land (Non-water)
Potentially Infilled Land (Non-water)
Potentially Infilled Land (Water)
Potentially Infilled Land (Water)
Potentially Infilled Land (Water)
Registered Landfill Site
Registered Landfill Site (Location)
Registered Landfill Site (Point Buffered to 100m)
Registered Landfill Site (Point Buffered to 250m)
Registered Waste Transfer Site (Location)
Registered Waste Transfer Site
Registered Waste Treatment or Disposal Site (Location)
Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Slice A



Order Details

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National Grid Reference:	349380, 165060
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Site Area (Ha):	4.82
Search Buffer (m):	1000

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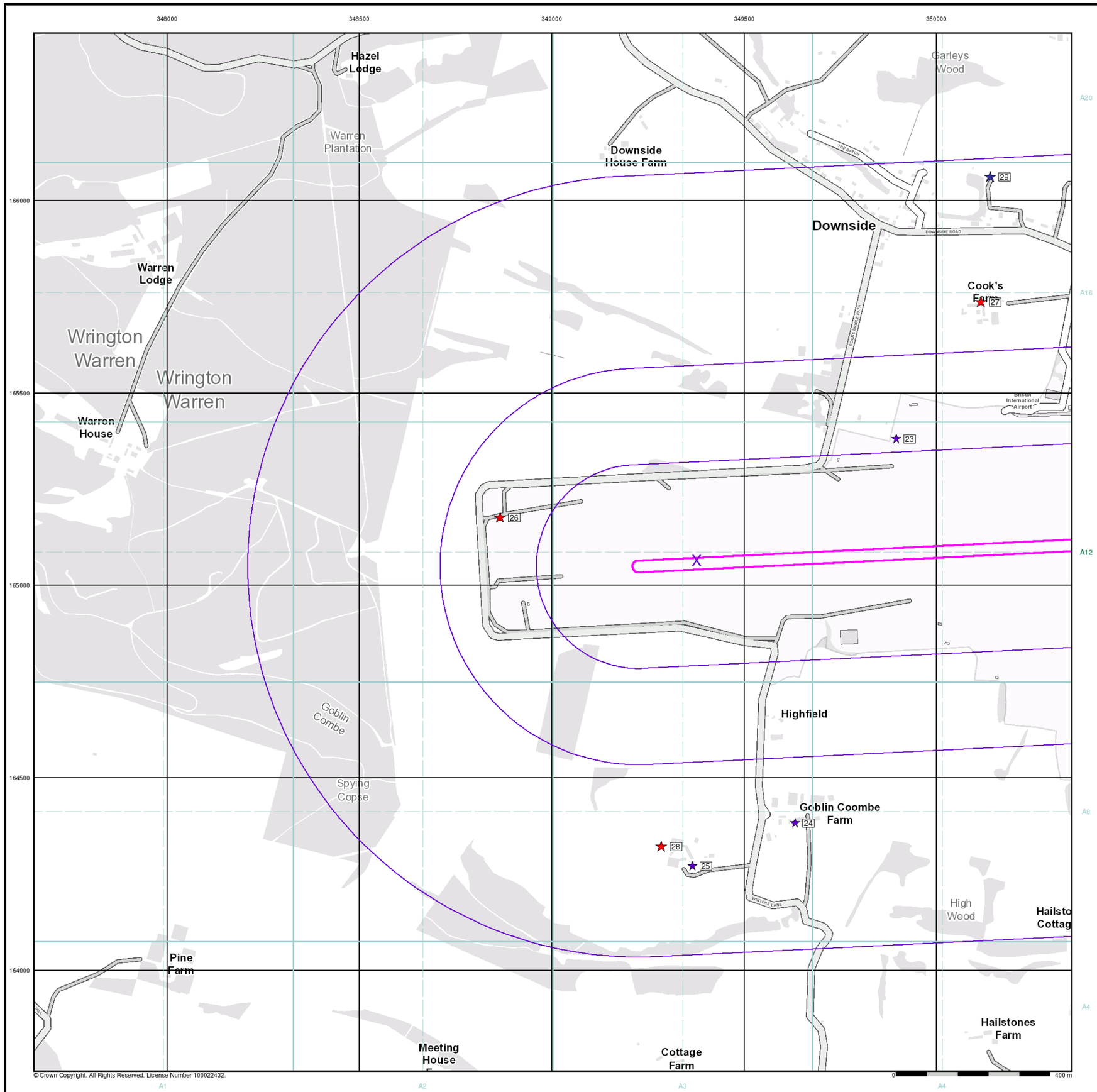


Industrial Land Use Map

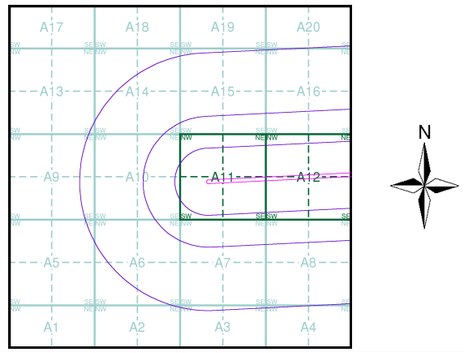
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry
- Gas Pipeline
- Points of Interest - Commercial Services
- Points of Interest - Education and Health
- Points of Interest - Manufacturing and Production
- Points of Interest - Public Infrastructure
- Points of Interest - Recreational and Environmental
- Underground Electrical Cables

Industrial Land Use Map - Slice A



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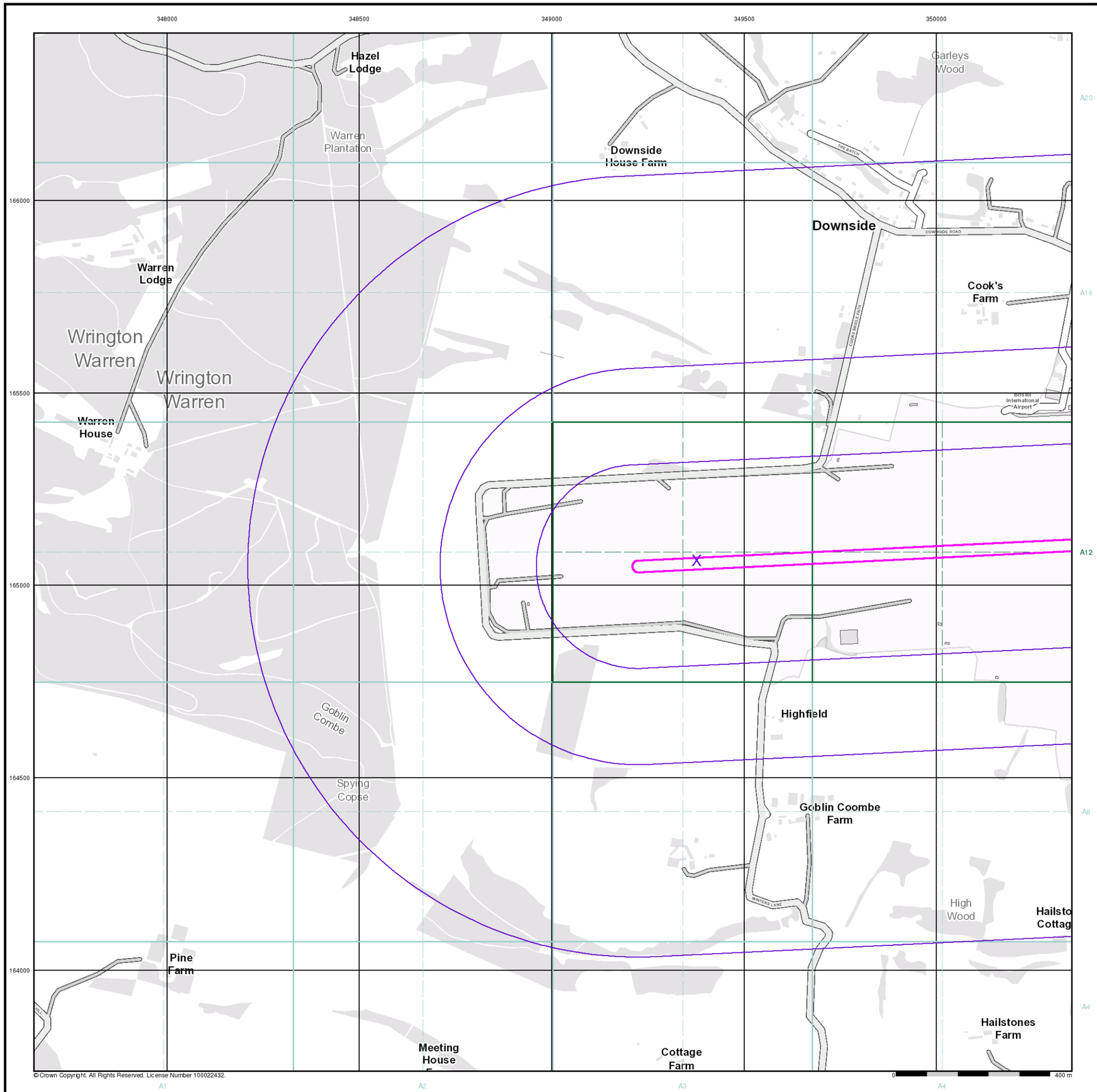


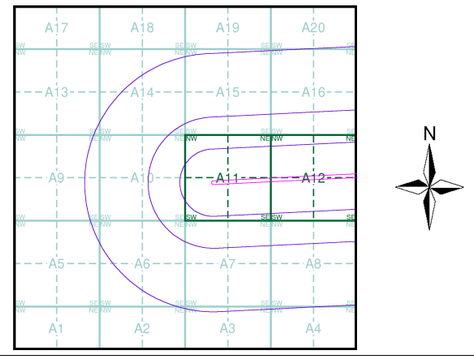
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



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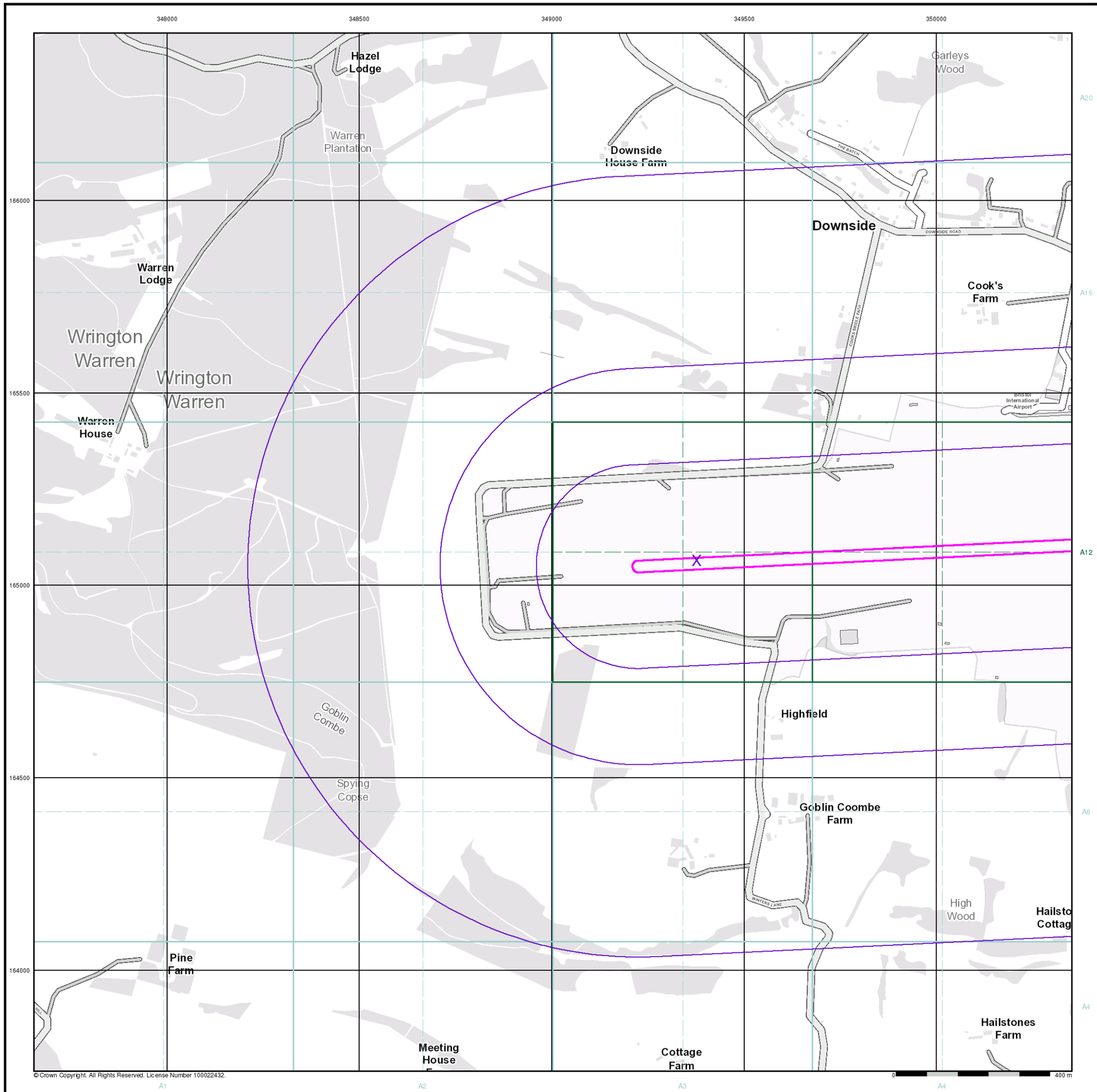


General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

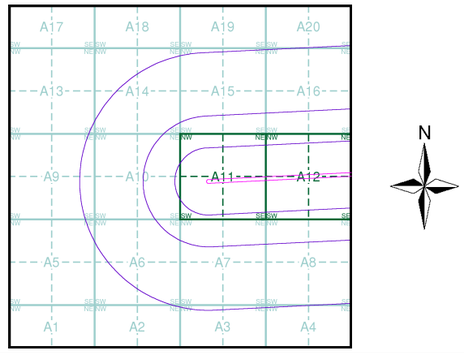
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



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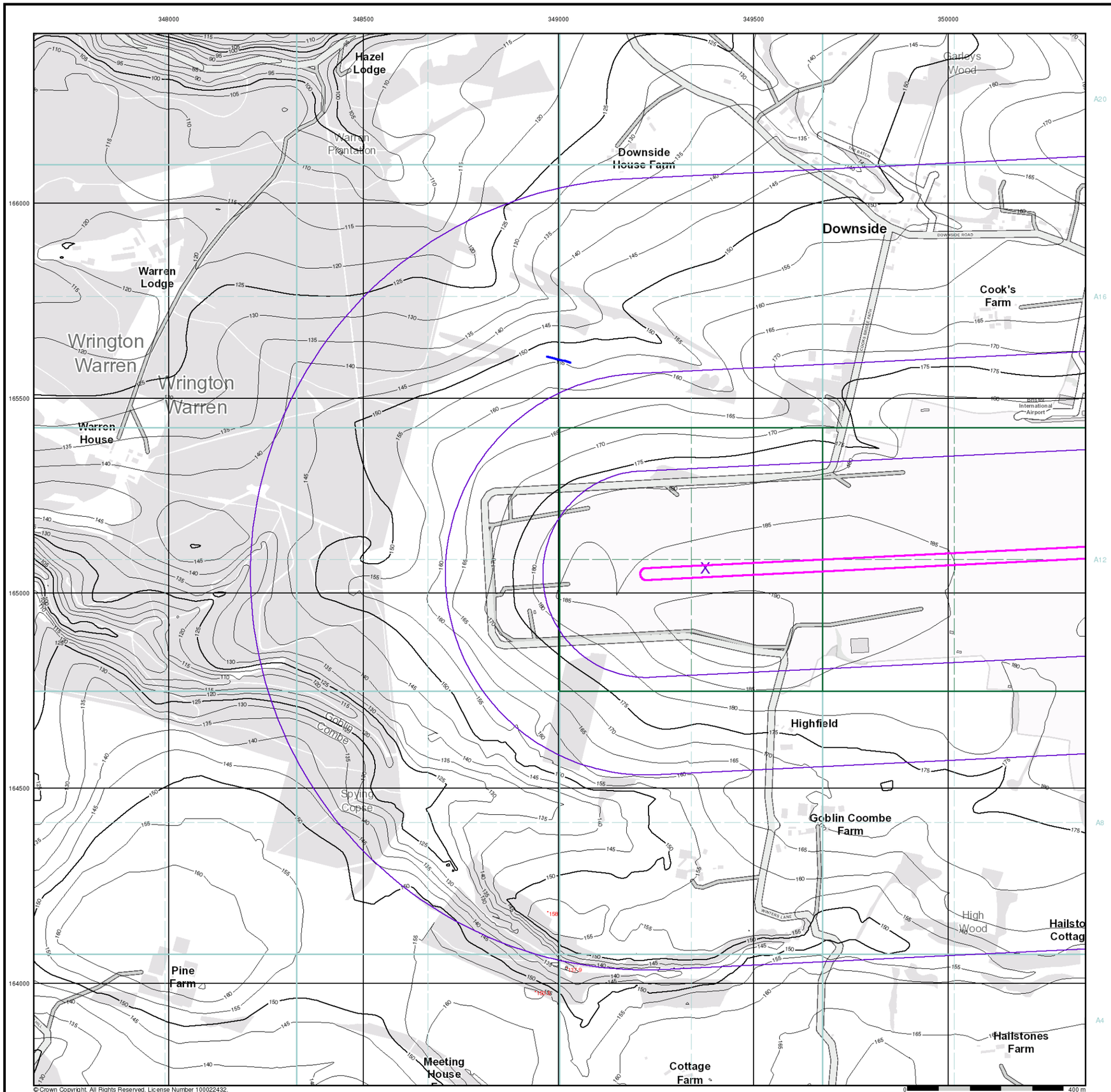


amec

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

OS Water Network Data

- Canal
- Reservoir
- Foreshore
- Marsh
- Tidal River
- Inland River
- Drain
- Other
- Lake
- Transfer
- Lock Or Flight Of Locks
- Sea

Contours (height in meters)

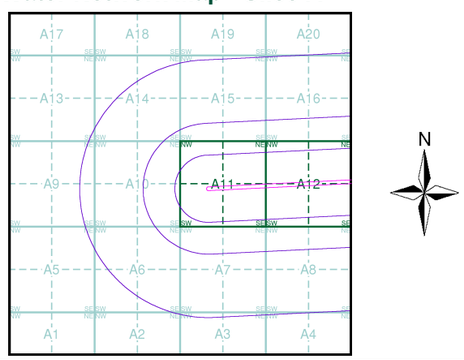
Standard Contour 105 100 95

Master Contour

Spot Height 167.3

- MLW Mean Low Water
- MHW Mean High Water

OS Water Network Map - Slice A



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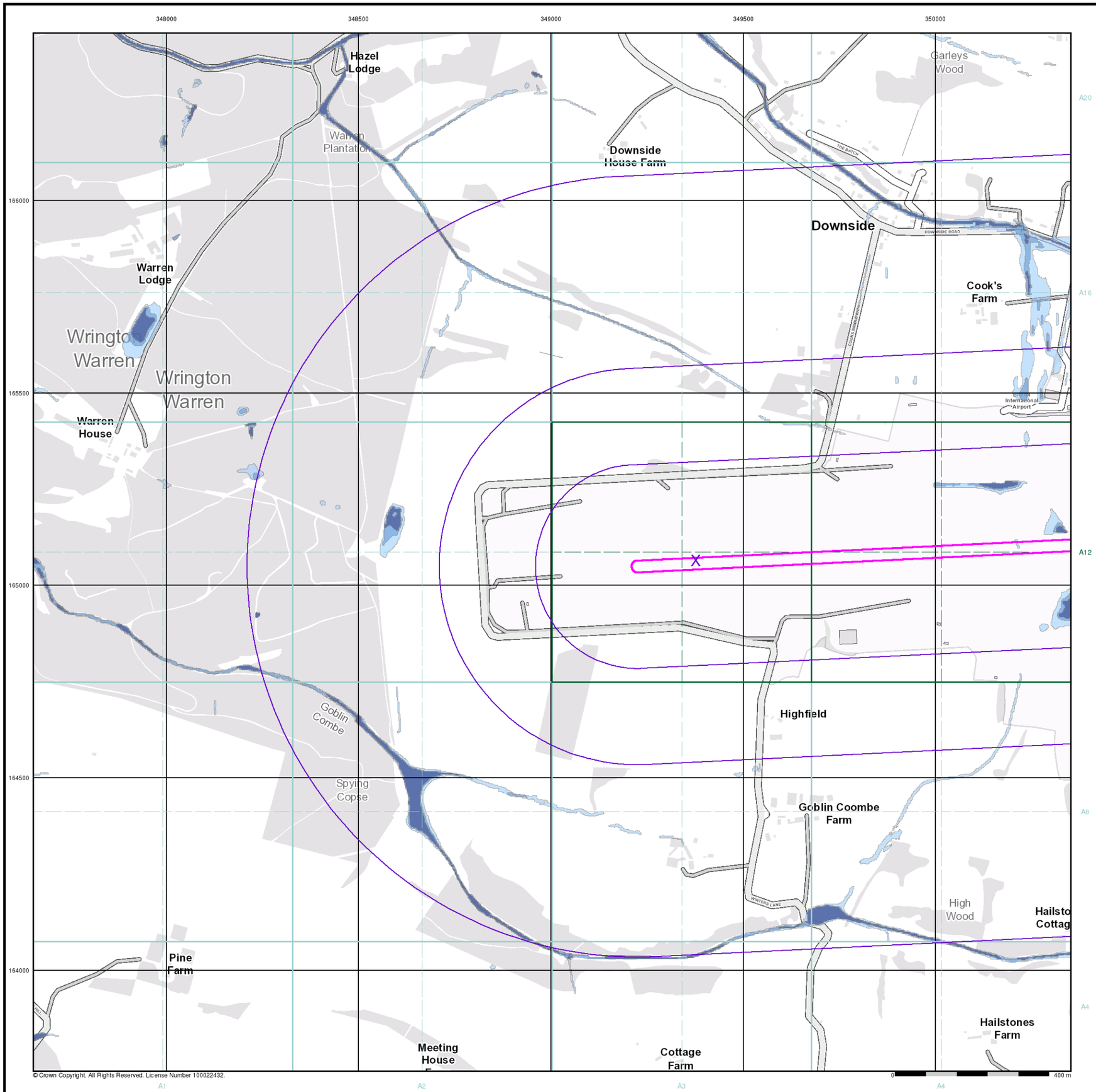


General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Risk of Flooding from Surface Water

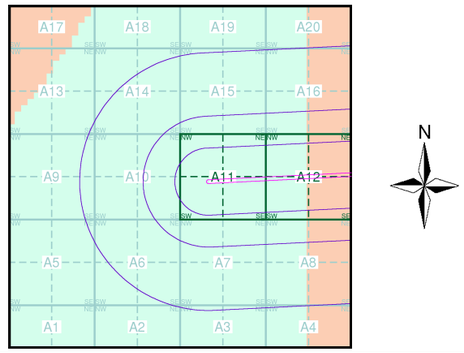
- High - 30 Year Return
- Medium - 100 Year Return
- Low - 1000 Year Return

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A



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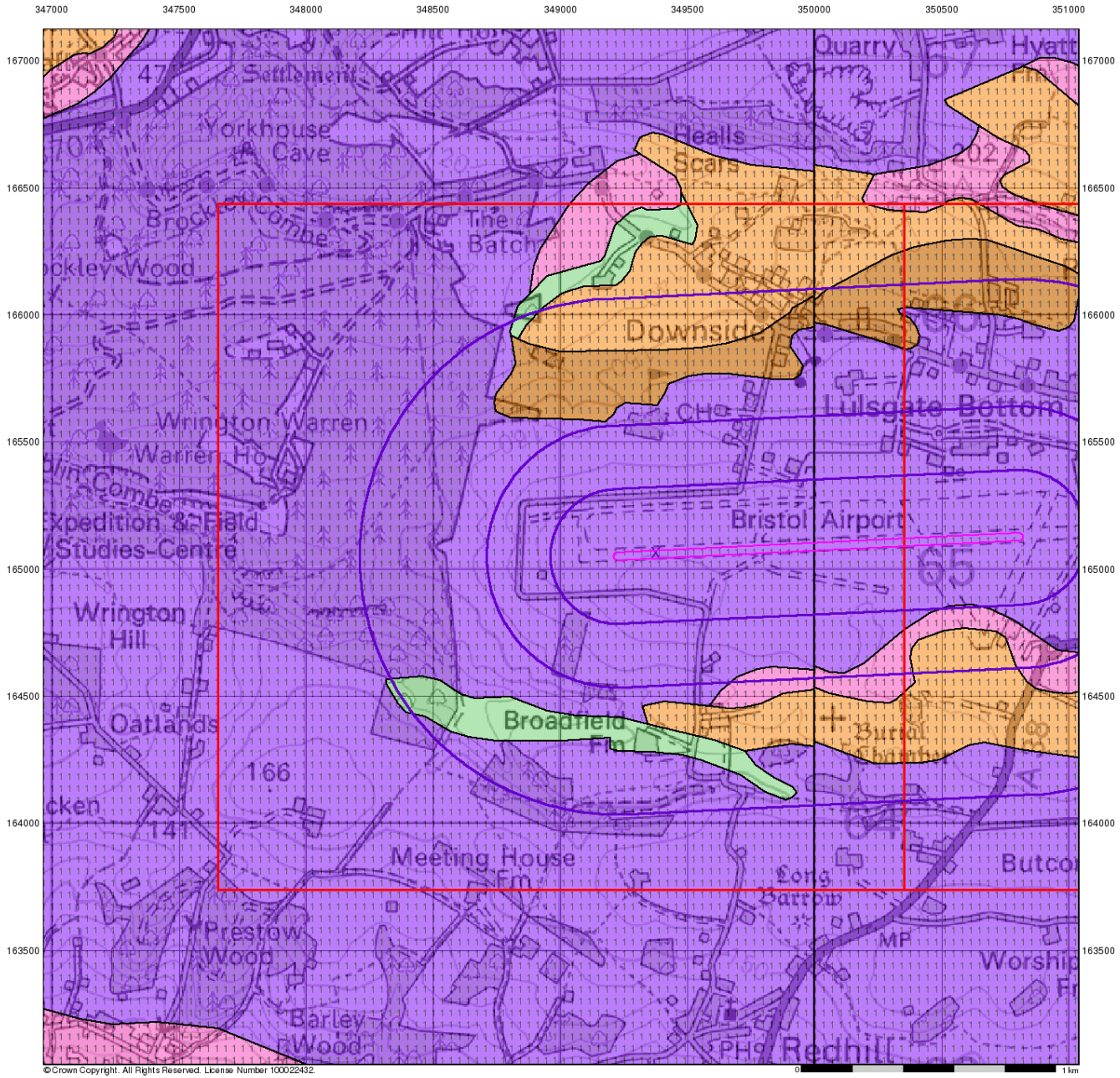


Groundwater Vulnerability

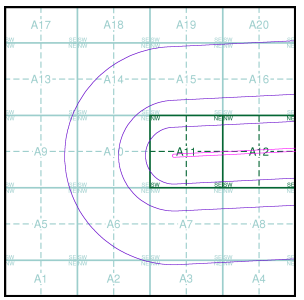
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes	Soil Classes
Major Aquifer (Highly Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Minor Aquifer (Variably Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Non Aquifer (Negligibly Permeable)	
Water or Sea	
Drift Deposit	

Site Sensitivity Context Map - Slice A



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Slice:	A
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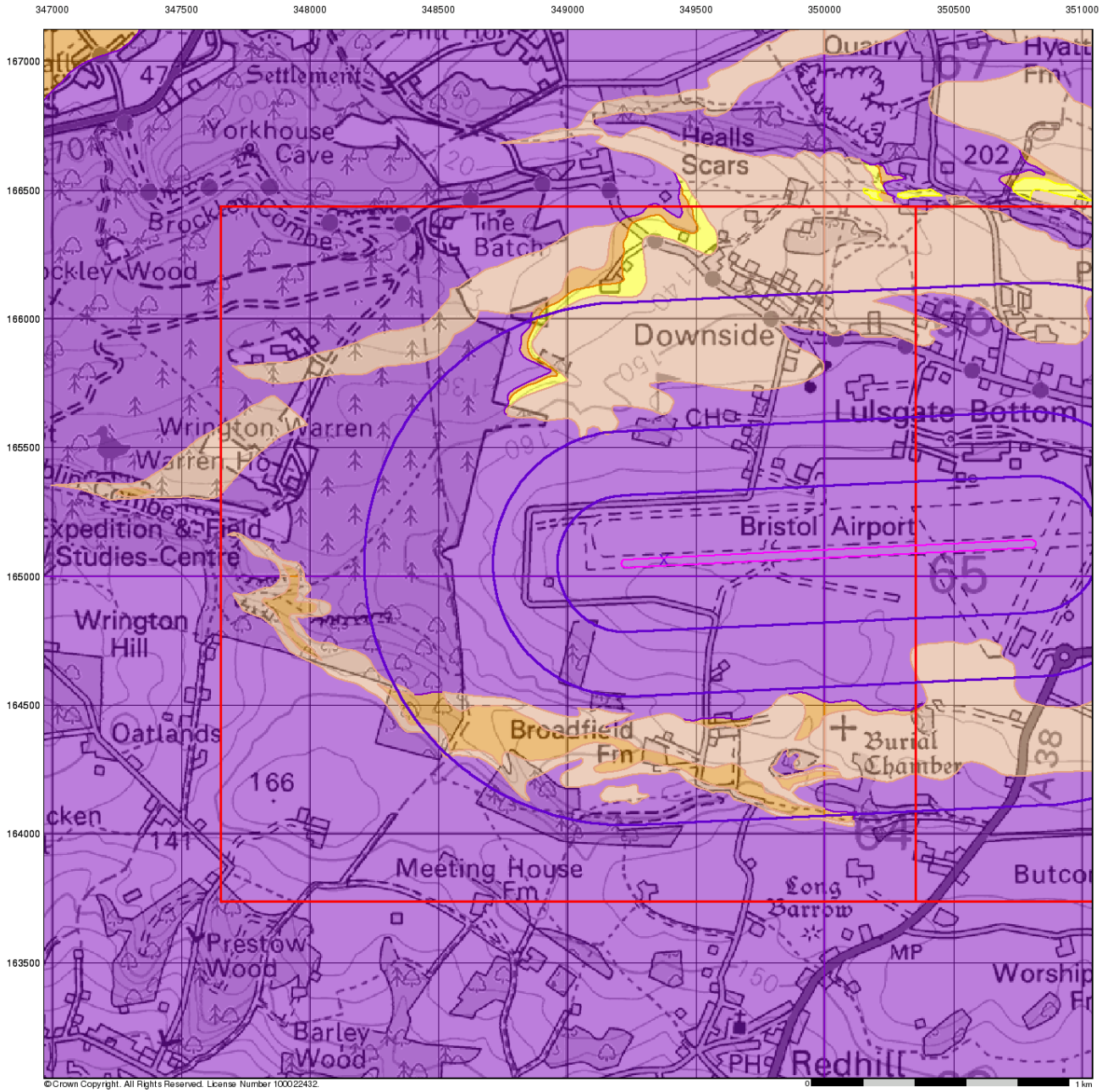
Search Buffer (m):	1000

Site Details

Bristol International Airport, North Side Road, FELTON, BS48 3DY



Bedrock Aquifer Designation

General

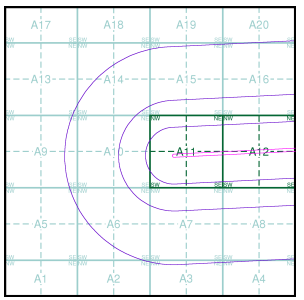
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



Order Details

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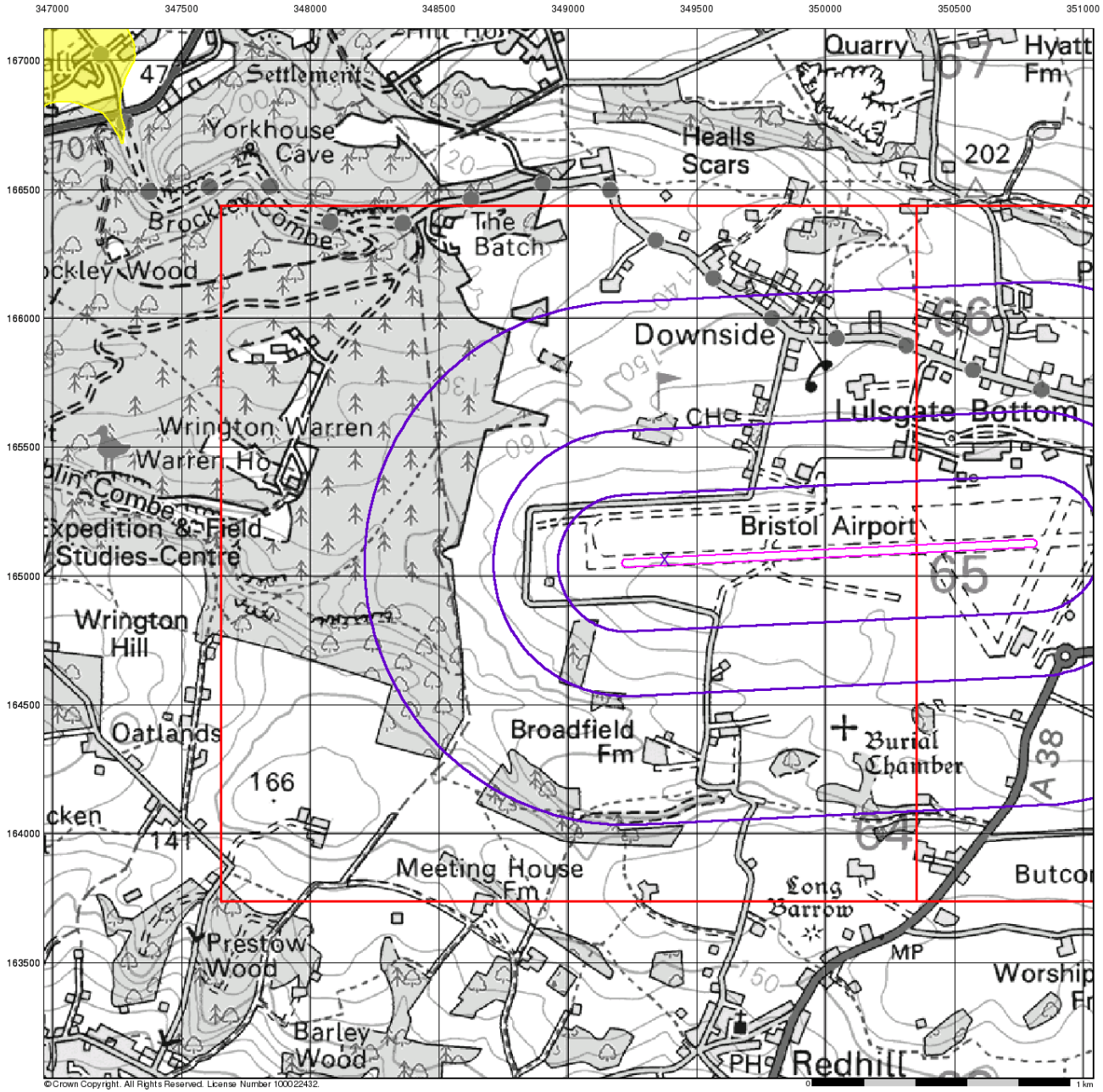
National Grid Reference:	349380, 165060
Slice:	A
Site Area (Ha):	4.82
Search Buffer (m):	1000

Site Details

Bristol International Airport, North Side Road, FELTON, BS48 3DY



Superficial Aquifer Designation

General

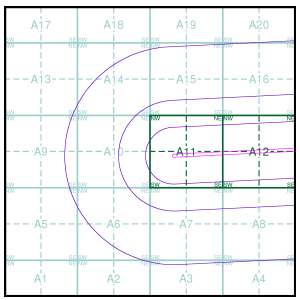
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



Order Details

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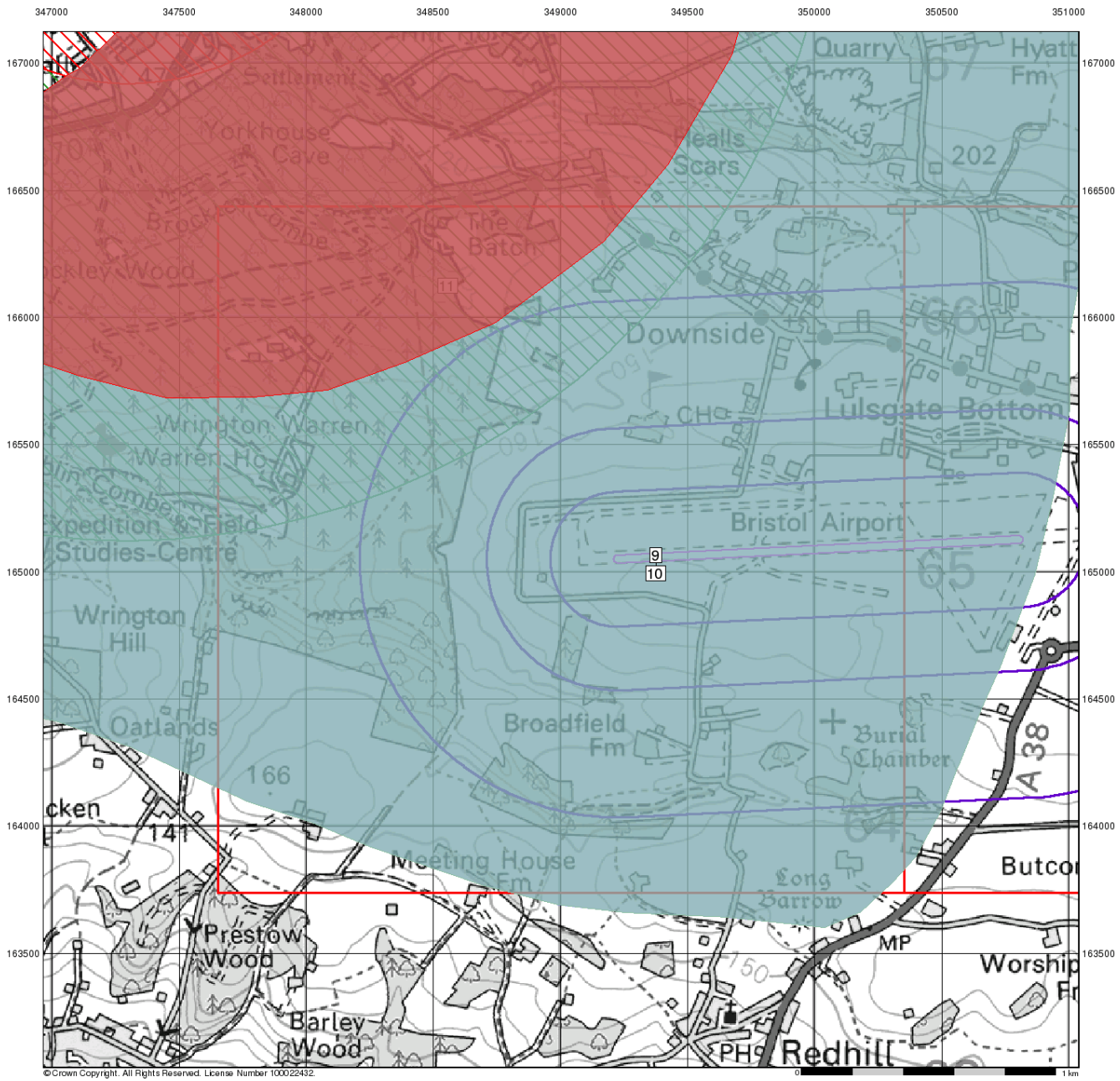
National Grid Reference:	349380, 165060
Slice:	A
Site Area (Ha):	4.82
Search Buffer (m):	1000

Site Details

Bristol International Airport, North Side Road, FELTON, BS48 3DY



Source Protection Zones

General

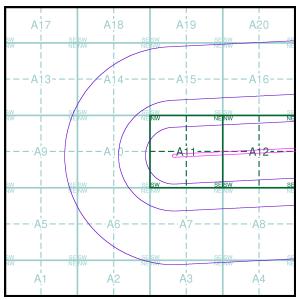
Specified Site | Specified Buffer(s) | Bearing Reference Point

Slice | Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)
- Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



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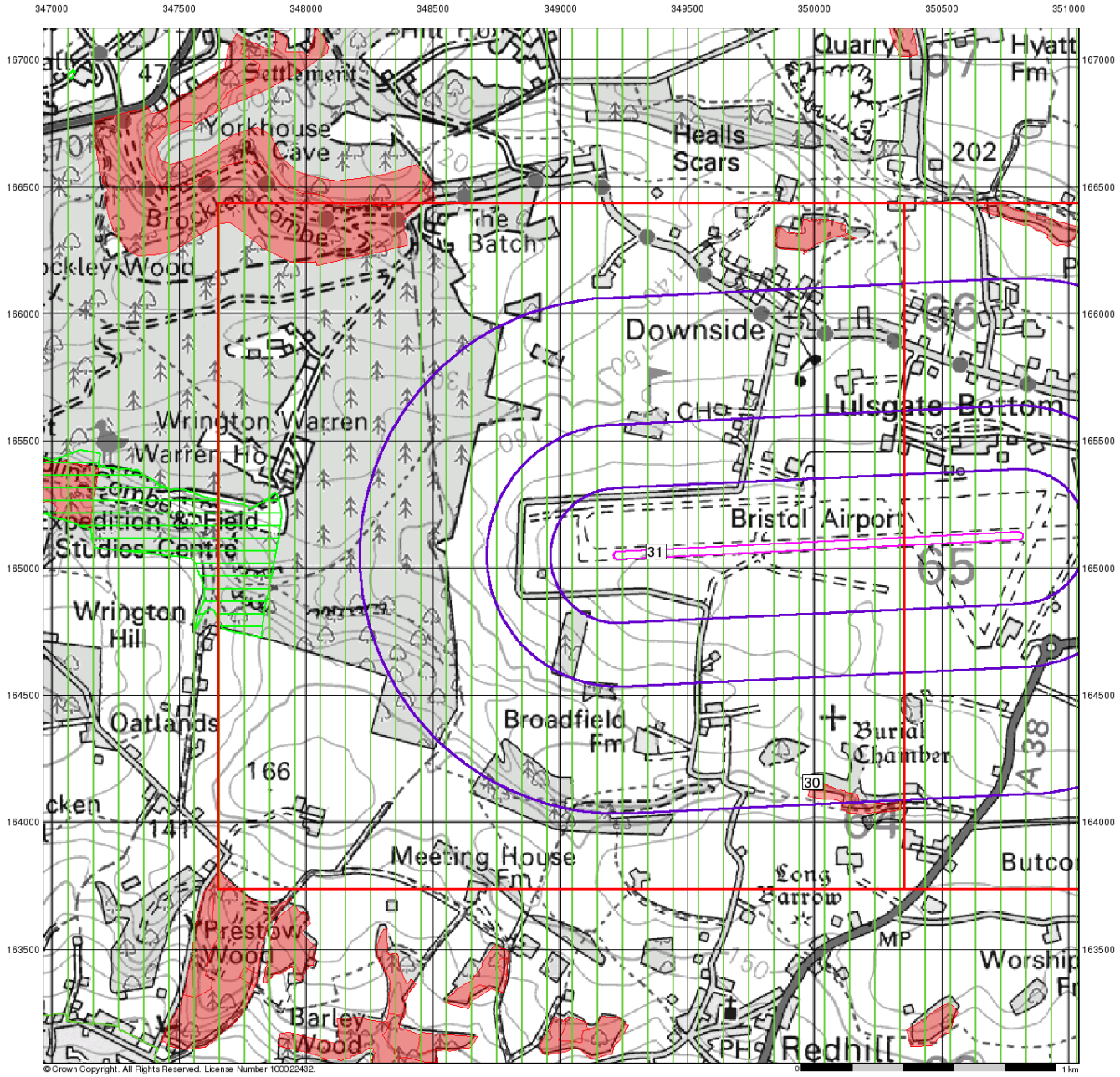


amec

Sensitive Land Uses

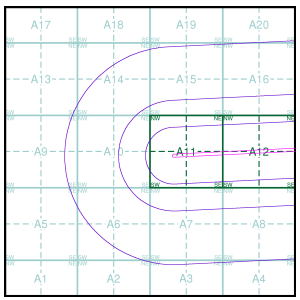
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Sensitive Land Uses

- Ancient Woodland
- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- World Heritage Sites

Site Sensitivity Context Map - Slice A



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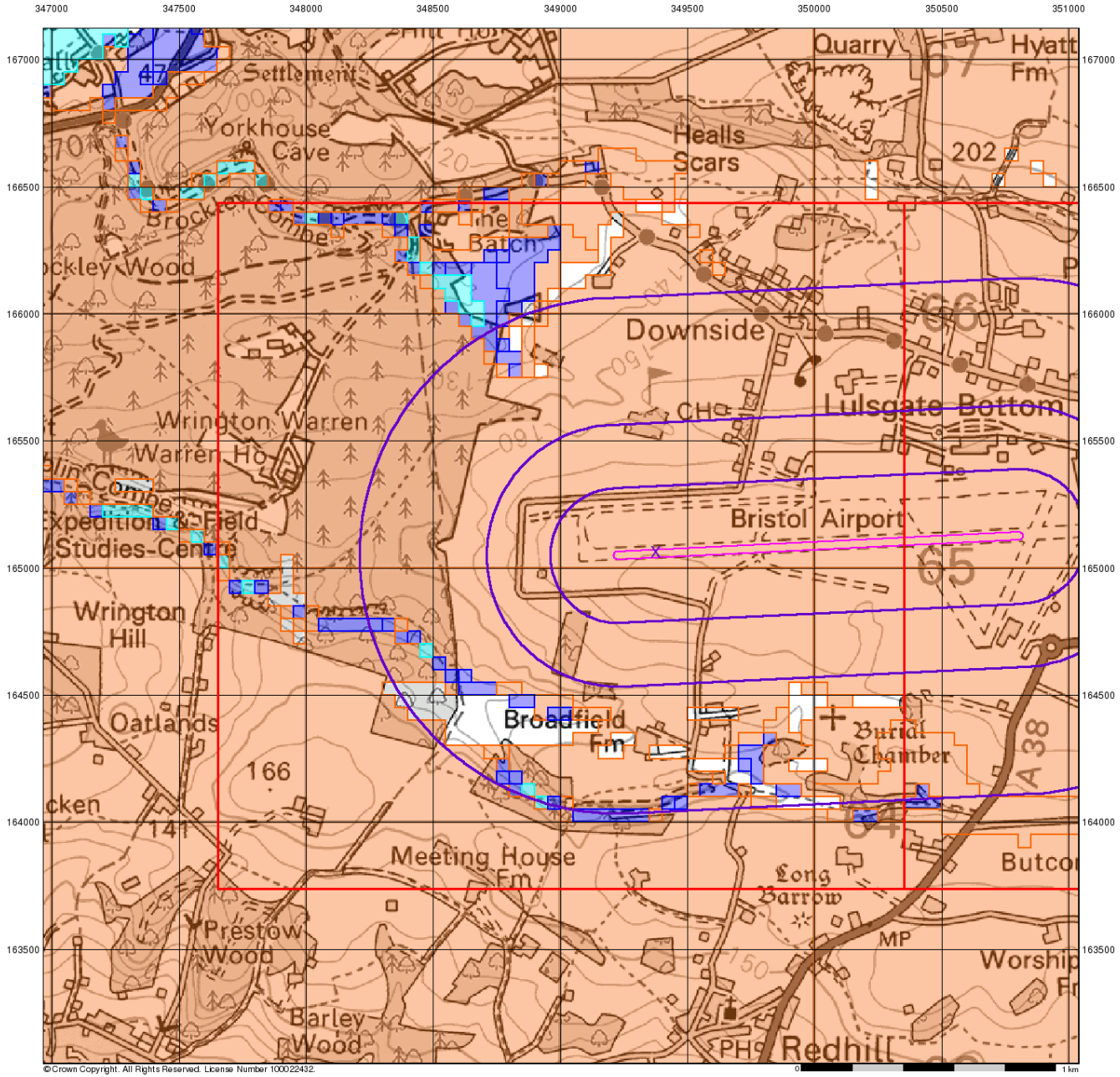


amec

BGS Flood GFS Data

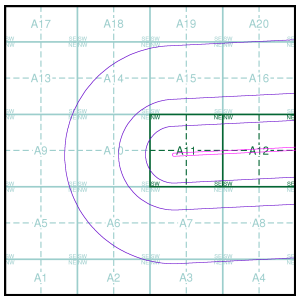
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice

Agency and Hydrological (Flood)

- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

Site Sensitivity Context Map - Slice A



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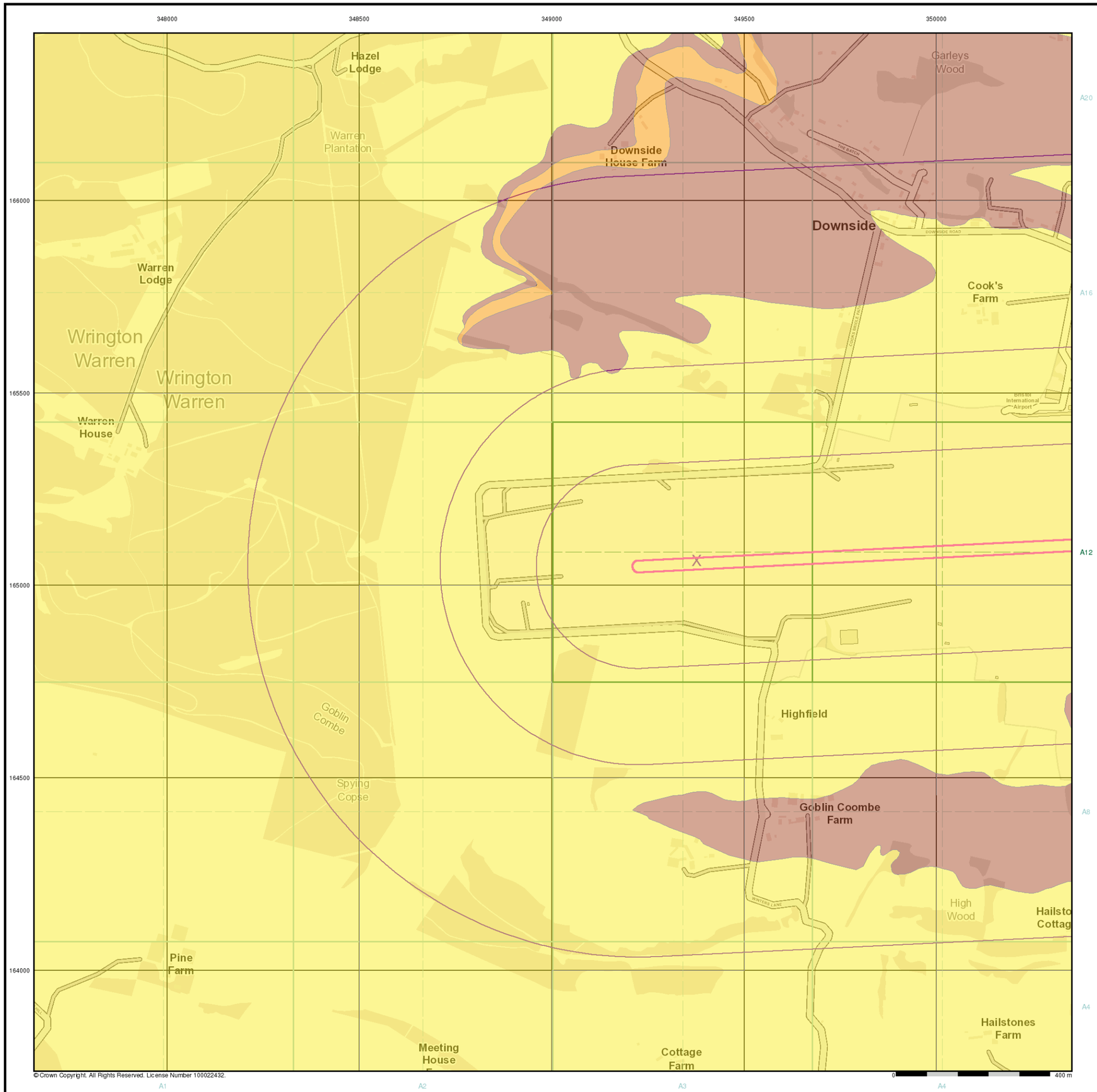


General

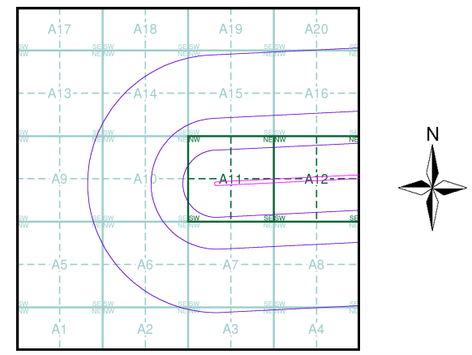
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Arsenic

Arsenic Concentrations mg/kg

- < 15
- 15 - 25
- 25 - 35
- 35 - 45
- 45 - 60
- 60 - 120
- > 120

Estimated Soil Chemistry Arsenic - Slice A



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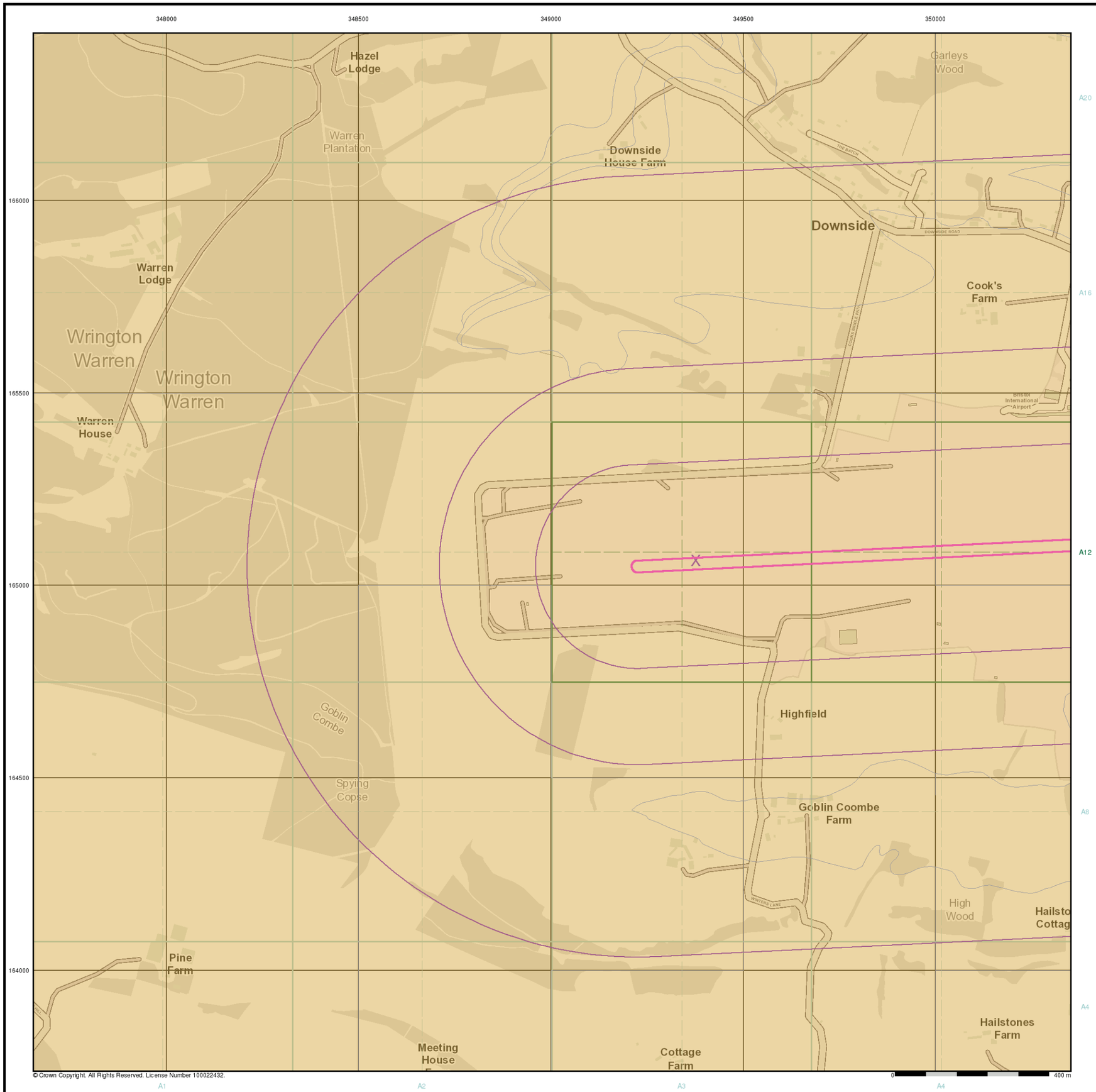


General

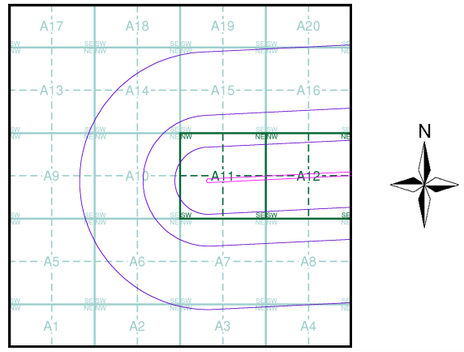
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Cadmium

Cadmium Concentrations mg/kg

- < 1.8
- 1.8 - 2.2
- 2.2 - 3.0
- > 3.0

Estimated Soil Chemistry Cadmium - Slice A



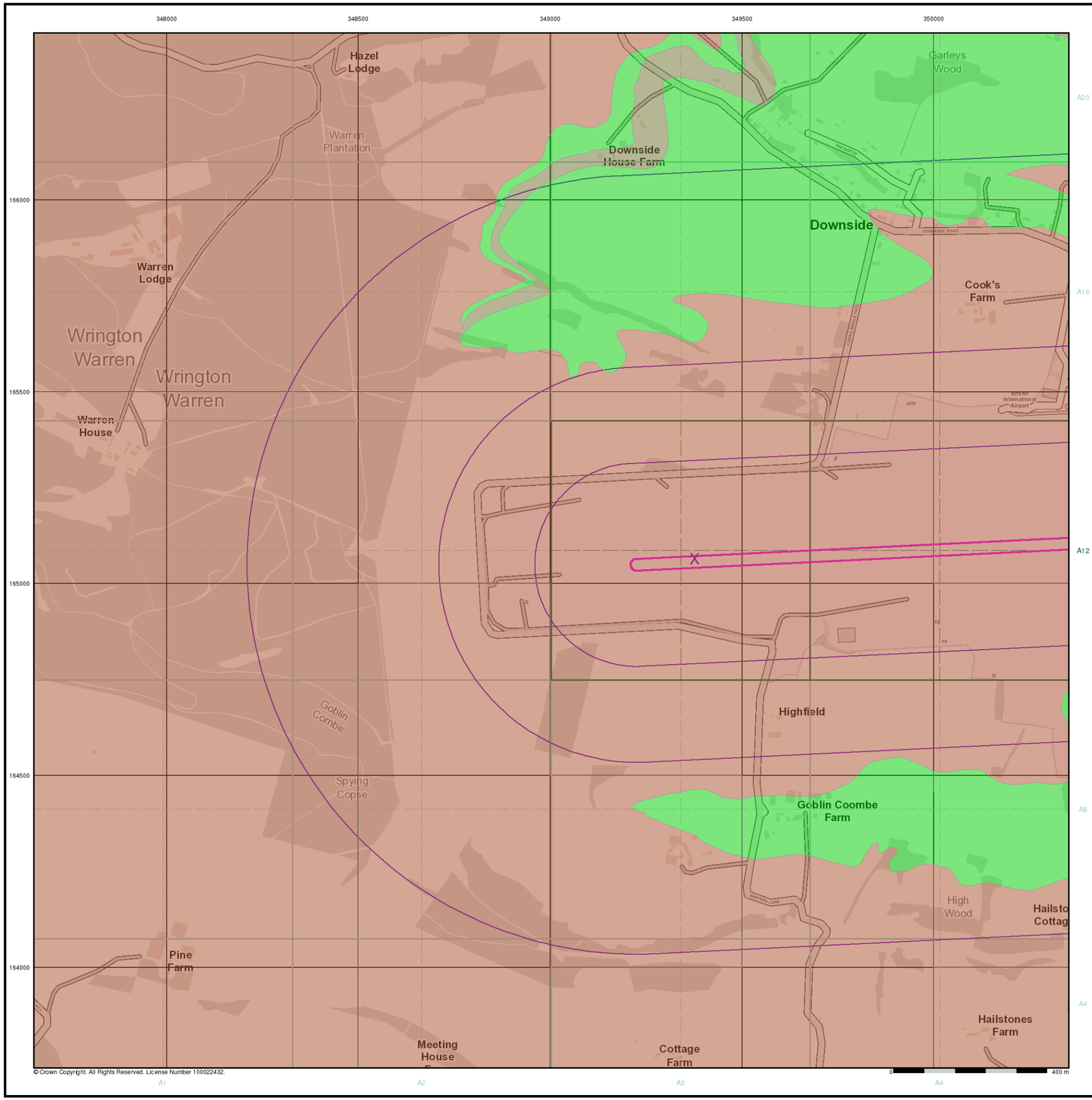
Order Details

Order Details:	128842570_1_1
Customer Ref:	38970
National Grid Reference:	349380, 165060
Slice:	A
Site Area (Ha):	4.82
Search Buffer (m):	1000

Site Details

Bristol International Airport, North Side Road, FELTON, BS48 3DY

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



General

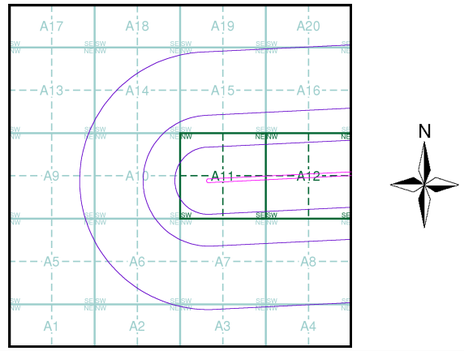
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Chromium

Chromium Concentrations mg/kg

- < 20
- 20 - 40
- 40 - 60
- 60 - 90
- 90 - 120
- 120 - 180
- > 180

Estimated Soil Chemistry Chromium - Slice A



Order Details

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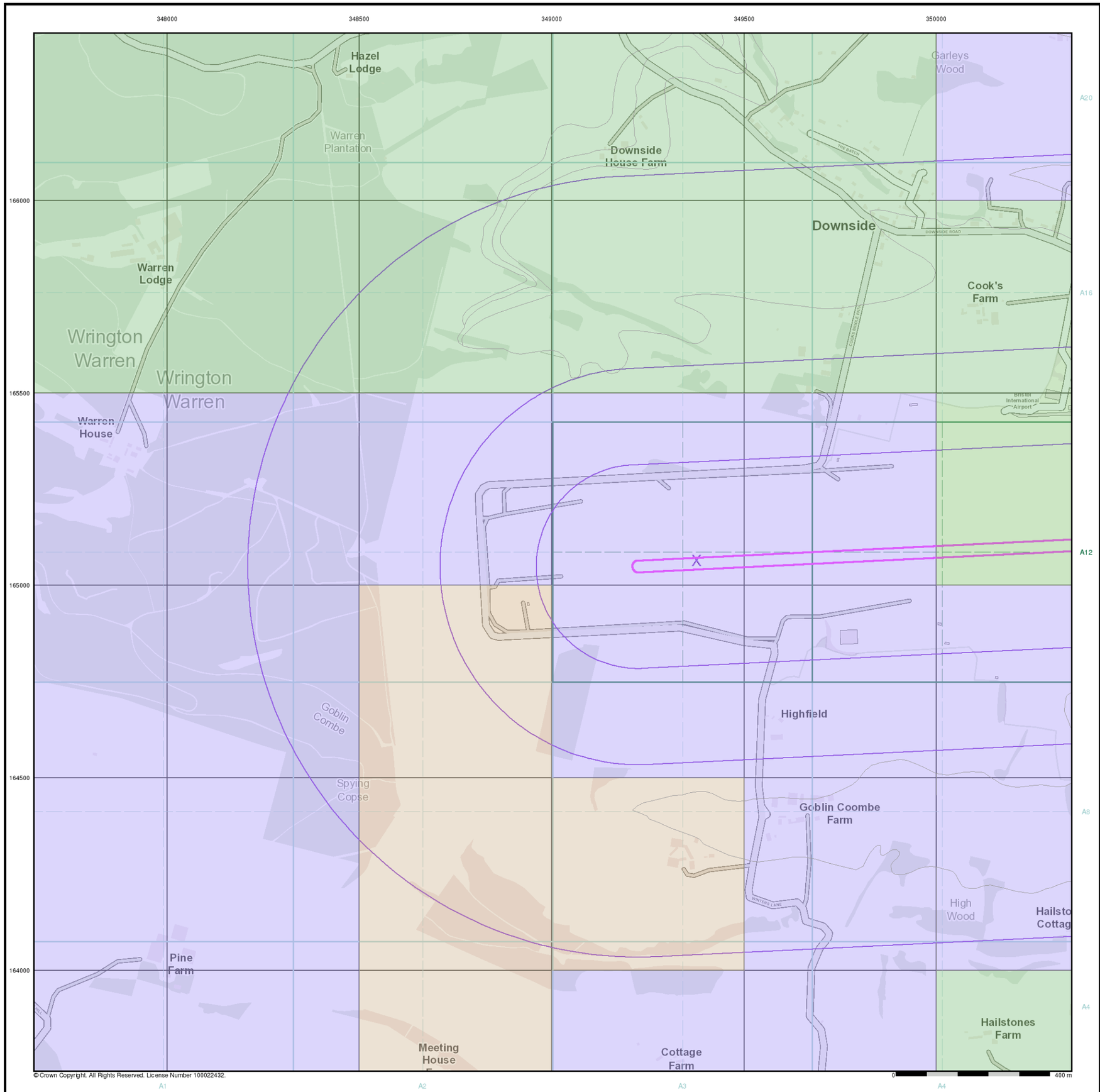


General

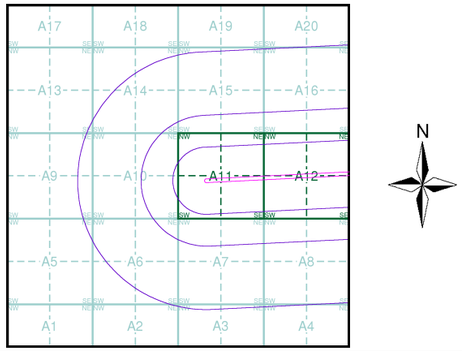
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Lead

Lead Concentrations mg/kg

- <100 mg/kg
- 100 - 200
- 200 - 300
- 300 - 600
- 600 - 1200
- >1200

Estimated Soil Chemistry Lead - Slice A



Order Details

Order Details:	128842570_1_1
Customer Ref:	38970
National Grid Reference:	349380, 165060
Slice:	A
Site Area (Ha):	4.82
Search Buffer (m):	1000

Site Details

Bristol International Airport, North Side Road, FELTON, BS48 3DY

Landmark INFORMATION GROUP
Tel: 0844 844 9952
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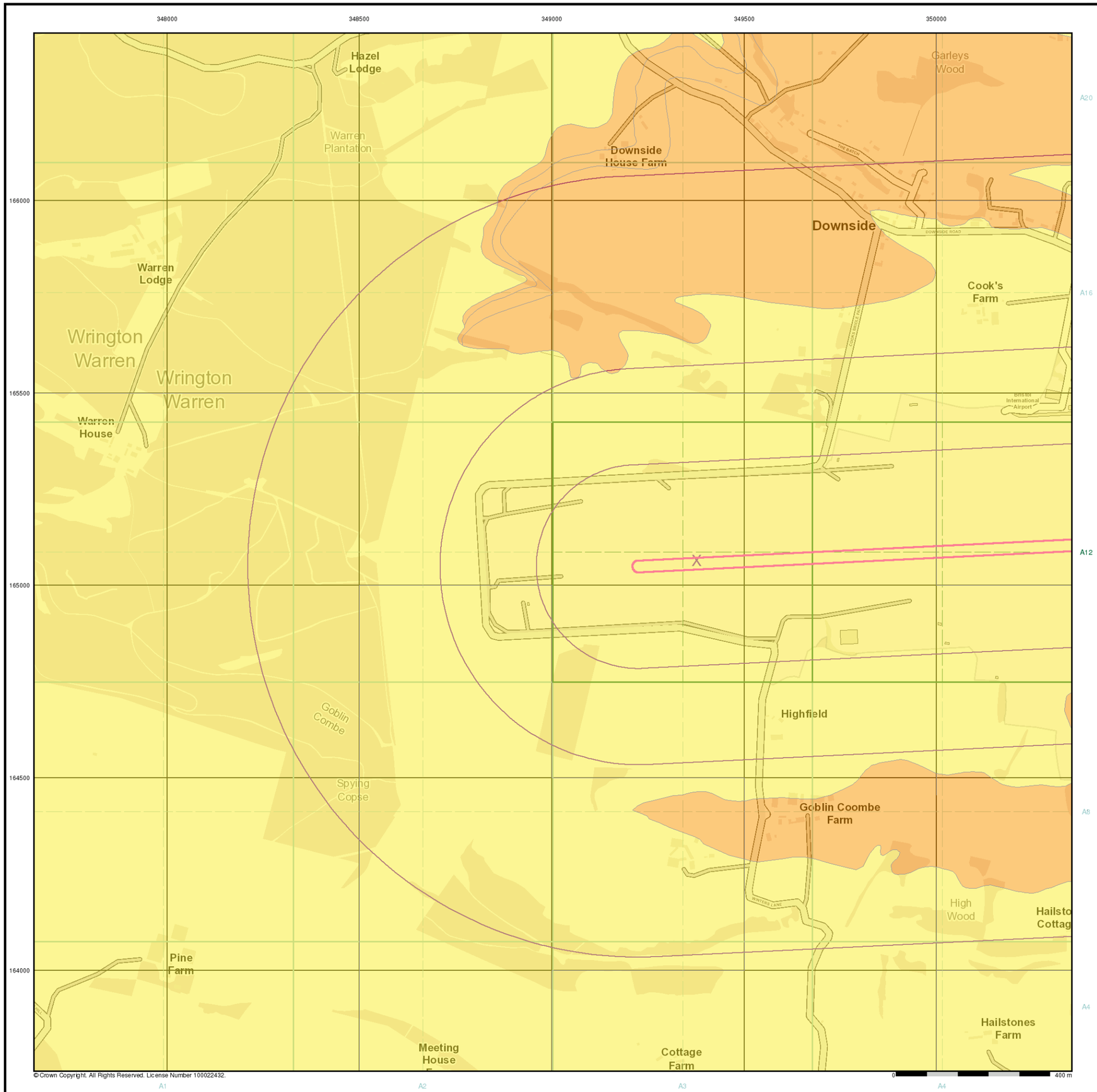


General

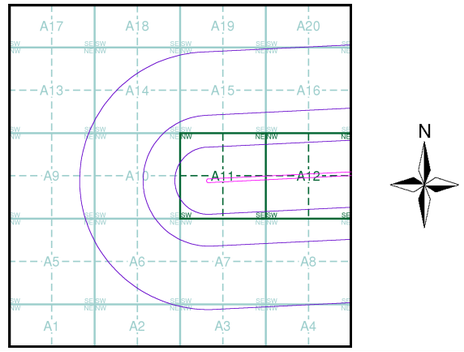
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Nickel

Nickel Concentrations mg/kg

- < 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 80
- 80 - 100
- > 100

Estimated Soil Chemistry Nickel - Slice A



Order Details

Order Details:	128842570_1_1
Customer Ref:	38970
National Grid Reference:	349380, 165060
Slice:	A
Site Area (Ha):	4.82
Search Buffer (m):	1000

Site Details

Bristol International Airport, North Side Road, FELTON, BS48 3DY

Landmark INFORMATION GROUP
Tel: 0844 844 9952
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Envirocheck® Report:

Datasheet

Order Details:

Order Number:
128842570_1_1

Customer Reference:
38970

National Grid Reference:
351000, 165120

Slice:
B

Site Area (Ha):
4.82

Search Buffer (m):
1000

Site Details:

Bristol International Airport
North Side Road
FELTON
BS48 3DY

Client Details:

Mr E Gilligan
Amec Foster Wheeler E & I UK Ltd
Floor 12
25 Canada Square
Canary Wharf
London
E14 5LQ

Contents

Report Section	Page Number
Summary	-
Agency & Hydrological	1
Waste	6
Hazardous Substances	7
Geological	8
Industrial Land Use	14
Sensitive Land Use	18
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Data Suppliers	24
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Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Natural England Copyright Notice

Ove Arup Copyright Notice

Peter Brett Associates Copyright Notice

Radon Potential dataset Copyright Notice

Report Version v53.0

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes		n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 1		1	11	2
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls					
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 4				Yes
Pollution Incidents to Controlled Waters					
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality					
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions					
Water Industry Act Referrals					
Groundwater Vulnerability	pg 4	Yes	n/a	n/a	n/a
Drift Deposits			n/a	n/a	n/a
Bedrock Aquifer Designations	pg 4	Yes	n/a	n/a	n/a
Superficial Aquifer Designations			n/a	n/a	n/a
Source Protection Zones	pg 5	2			4
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
OS Water Network Lines					

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites					
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)	pg 6				1
Licensed Waste Management Facilities (Locations)					
Local Authority Landfill Coverage	pg 6	1	n/a	n/a	n/a
Local Authority Recorded Landfill Sites					
Potentially Infilled Land (Non-Water)	pg 6		1		
Potentially Infilled Land (Water)					
Registered Landfill Sites					
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents	pg 7		1		1
Planning Hazardous Substance Enforcements					

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Geological					
BGS 1:625,000 Solid Geology	pg 8	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 8	Yes		Yes	Yes
BGS Recorded Mineral Sites	pg 9		1		2
BGS Urban Soil Chemistry					
BGS Urban Soil Chemistry Averages					
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability	pg 10	Yes	n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities	pg 10		3	10	
Non Coal Mining Areas of Great Britain	pg 12	Yes	Yes	n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 12	Yes	Yes	n/a	n/a
Potential for Compressible Ground Stability Hazards				n/a	n/a
Potential for Ground Dissolution Stability Hazards	pg 12	Yes	Yes	n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 12	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards				n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards				n/a	n/a
Radon Potential - Radon Affected Areas	pg 13	Yes	n/a	n/a	n/a
Radon Potential - Radon Protection Measures	pg 13	Yes	n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 14			11	8
Fuel Station Entries					
Points of Interest - Commercial Services	pg 15			2	1
Points of Interest - Education and Health					
Points of Interest - Manufacturing and Production	pg 15		4	3	3
Points of Interest - Public Infrastructure	pg 16			7	
Points of Interest - Recreational and Environmental					
Gas Pipelines					
Underground Electrical Cables					

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Ancient Woodland	pg 18				1
Areas of Adopted Green Belt	pg 18	1			
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones					
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	B9NE (W)	0	1	350998 165121
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	(W)	0	1	350000 165121
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	(W)	35	1	350000 165000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	B9SE (S)	72	1	350998 165000
1	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896wz Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	B9NW (W)	13	2	350617 165088
2	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896vc Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	B9SE (SW)	270	2	350766 164838
2	**Discharge Consents** Operator: Bristol Airport Limited Property Type: MAKING OF OTHER TRANSPORT EQUIP/SHIPS/TRAINS/BIKES Location: Western Power Distribution Helicopter Hanger, Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Land Yeo/Kenn/Blind Yeo Reference: 103156 Permit Version: 2 Effective Date: 17th December 2012 Issued Date: 17th December 2012 Revocation Date: 26th February 2015 Discharge Type: Trade Effluent Discharge-Site Drainage Discharge Environment: Land/Soakaway Receiving Water: Soakaway **Status: Surrendered under EPR 2010** Positional Accuracy: Located by supplier to within 10m	B9SE (SW)	275	2	350773 164834

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
2	**Discharge Consents** Operator: Bristol Airport Limited Property Type: MAKING OF OTHER TRANSPORT EQUIP/SHIPS/TRAINS/BIKES Location: Western Power Distribution Helicopter Hanger, Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Land Yeo/Kenn/Blind Yeo Reference: 103156 Permit Version: 1 Effective Date: 2nd December 2005 Issued Date: 2nd December 2005 Revocation Date: 16th December 2012 Discharge Type: Trade Effluent Discharge-Site Drainage Discharge Environment: Land/Soakaway Receiving Water: Soakaway **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	B9SE (SW)	275	2	350773 164834
3	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896vc Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	B9SE (SW)	314	2	350742 164793
3	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896vc Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	B9SE (SW)	327	2	350745 164780
4	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896vc Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	B9SW (SW)	337	2	350523 164760

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
5	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896rk Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	B14SW (N)	415	2	351043 165482
5	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896rk Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	B14SW (N)	419	2	351056 165479
6	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896rk Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	B13SE (N)	415	2	350915 165540
7	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896vc Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	B5NE (SW)	483	2	350745 164624

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
8	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896rk Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	B13SE (N)	494	2	350914 165622
9	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896rk Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	B13SW (NW)	521	2	350387 165641
10	**Discharge Consents** Operator: Bristol Airport Limited Property Type: AIR TRANSPORT/AIRPORT Location: Bristol International Airport, Bridgwater Road, Lulsgate, Bristol, Bs48 3dy Authority: Environment Agency, South West Region Catchment Area: Not Supplied Reference: Eprbb3896rk Permit Version: 1 Effective Date: 21st January 2015 Issued Date: 21st January 2015 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage (Contam Surface Water, Not Waste Site) Discharge Environment: Land/Soakaway Receiving Water: Ground Water Via Infiltration **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	B13SW (NW)	623	2	350402 165744
	Nearest Surface Water Feature	B5NW (SW)	655	-	350393 164432
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (H1) - Soils which readily transmit liquid discharges because they are either shallow, or susceptible to rapid by-pass flow directly to rock, gravel or groundwater Map Sheet: Sheet 36 Mid Glamorgan Scale: 1:100,000	(W)	0	2	350000 165121
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (H1) - Soils which readily transmit liquid discharges because they are either shallow, or susceptible to rapid by-pass flow directly to rock, gravel or groundwater Map Sheet: Sheet 37 Southern Cotswolds Scale: 1:100,000	B9NE (W)	0	2	350998 165121
	Drift Deposits None				
	Bedrock Aquifer Designations Aquifer Designation: Principal Aquifer	(W)	0	1	350000 165121
	Bedrock Aquifer Designations Aquifer Designation: Principal Aquifer	B9NE (W)	0	1	350998 165121

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Superficial Aquifer Designations No Data Available				
11	**Source Protection Zones** Name: Not Supplied Source: Environment Agency, Head Office Reference: Not Supplied Type: Zone II (Outer Protection Zone): Either 25% of the source area or a 400 day travel time whichever is greater.	B9NE (W)	0	2	350903 165143
12	**Source Protection Zones** Name: Not Supplied Source: Environment Agency, Head Office Reference: Not Supplied Type: Zone III (Total Catchment): The total area needed to support the discharge from the protected groundwater source.	B9NE (W)	0	2	350903 165143
13	**Source Protection Zones** Name: Chew Magna Reservoir Source: Environment Agency, Head Office Reference: Sw238 Type: Zone I (Inner Protection Zone): Travel time of 50 days or less to the groundwater source.	B10NE (NE)	588	2	351387 165303
14	**Source Protection Zones** Name: Chew Magna Reservoir Source: Environment Agency, Head Office Reference: Sw238 Type: Zone II (Outer Protection Zone): Either 25% of the source area or a 400 day travel time whichever is greater.	B10NE (NE)	588	2	351387 165303
15	**Source Protection Zones** Name: Chew Magna Reservoir Source: Environment Agency, Head Office Reference: Sw238 Type: Zone III (Total Catchment): The total area needed to support the discharge from the protected groundwater source.	B10NE (NE)	588	2	351387 165303
16	**Source Protection Zones** Name: Chelvey Well Source: Environment Agency, Head Office Reference: Sw044 Type: Zone IIc (Outer Protection Zone): Either 25% of the source area or a 400 day travel time whichever is greater - subsurface activity only.	(NW)	648	2	349538 166253
	Extreme Flooding from Rivers or Sea without Defences None				
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
	OS Water Network Lines None				

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
17	**Licensed Waste Management Facilities (Landfill Boundaries)** Name: Lulsgate Quarry Licence Number: 210011 Location: Lulsgate Quarry, West Lane, Felton, Bristol, Avon, BS40 9UP Licence Holder: Churngold Recycling Limited Authority: Environment Agency - South West Region, Wessex Area Site Category: Inert LF Max Input Rate: Not Supplied **Licence Status: Issued** Issued: 31st August 2006 Positional Accuracy: Positioned by the supplier Boundary Accuracy: As Supplied	B14NE (NE)	921	2	351434 165818
	Local Authority Landfill Coverage Name: North Somerset Unitary Council - Has supplied landfill data		0	3	350998 165121
18	**Potentially Infilled Land (Non-Water)** Bearing Ref: NW Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1982	B9NW (NW)	219	-	350513 165345

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
19	**Planning Hazardous Substance Consents** Name: Bristol International Airport Location: North Side Road, Felton, Wrington, Bs48 3dy Authority: North Somerset Council Application Ref: 09/P/1929/HAZ Hazardous Substance: Combination of Dangerous Substances Maximum Quantity: 0 Application date: 4th November 2009 **Decision: Deemed Consent GrantedGranted** Positional Accuracy: Manually positioned to the address or location	B9NW (NW)	250	4	350539 165377
20	**Planning Hazardous Substance Consents** Name: Bristol International Airport Location: Northside Road, Lulsgate, Wrington, Bs48 3dy Authority: North Somerset Council Application Ref: 09/P/1602/HAZ Hazardous Substance: Extremely flammable (extremely flammable gases and liquids with a flash point <21C and boiling point at normal pressure <=35C, and gaseous substances flammable in contact with air at ambient temperature and pressure excluding extremely flammable gases and natural gas, and flammable liquid substances maintained at a temerature above their boiling point) Maximum Quantity: 0 Application date: 7th September 2009 **Decision: Deemed Consent GrantedGranted** Positional Accuracy: Manually positioned to the address or location	B13SW (NW)	558	4	350377 165678

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Dinantian Rocks (Undifferentiated)	B9NE (W)	0	1	350998 165121
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 15 - 30 mg/kg	B9NE (W)	0	1	350998 165121
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 200 - 300 mg/kg Nickel Concentration: 15 - 30 mg/kg	B9SW (W)	0	1	350500 165000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 35 - 45 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 30 - 45 mg/kg	B10SW (SE)	346	1	351344 164934
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 35 - 45 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: 200 - 300 mg/kg Nickel Concentration: 30 - 45 mg/kg	B5NW (SW)	348	1	350500 164744
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 35 - 45 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 30 - 45 mg/kg	B13NE (N)	769	1	350979 165902
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 35 - 45 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 30 - 45 mg/kg	B13NW (NW)	775	1	350417 165903

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 200 - 300 mg/kg Nickel Concentration: 15 - 30 mg/kg	B5SW (SW)	802	1	350500 164227
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 100 - 200 mg/kg Nickel Concentration: 15 - 30 mg/kg	B6SE (SE)	819	1	351402 164400
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 35 - 45 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 120 - 180 mg/kg Lead Concentration: 200 - 300 mg/kg Nickel Concentration: 30 - 45 mg/kg	B13NE (N)	861	1	350998 166000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 200 - 300 mg/kg Nickel Concentration: 15 - 30 mg/kg	B13NW (N)	866	1	350668 166000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: 200 - 300 mg/kg Nickel Concentration: 15 - 30 mg/kg	B13NE (N)	888	1	351025 166000
21	**BGS Recorded Mineral Sites** Site Name: Lulsgate Farm Quarry Location: , Lulsgate Bottom, Bristol, Avon Source: British Geological Survey, National Geoscience Information Service Reference: 67387 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Black Rock Limestone Subgroup Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	B9NW (NW)	221	1	350507 165346

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
22	**BGS Recorded Mineral Sites** Site Name: Felton Hill Quarry Location: , Lulsgate Bottom, Bristol, Avon Source: British Geological Survey, National Geoscience Information Service Reference: 67388 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Black Rock Limestone Subgroup Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	B14SW (NE)	681	1	351314 165599
23	**BGS Recorded Mineral Sites** Site Name: Felton Hill Quarry Location: , Lulsgate Bottom, Bristol, Avon Source: British Geological Survey, National Geoscience Information Service Reference: 67389 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Black Rock Limestone Subgroup Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	B10NE (NE)	779	1	351560 165369
	BGS Measured Urban Soil Chemistry No data available				
	BGS Urban Soil Chemistry Averages No data available				
	Coal Mining Affected Areas In an area that might not be affected by coal mining				
	Mining Instability Mining Evidence: Inconclusive Metaliferous Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	B9SE (S)	0	-	350998 165000
	Natural Cavities Easting: 350500 Northing: 165050 Distance: 46 Quadrant Reference: B9 Quadrant Reference: SW Bearing Ref: W Cavity Type: Solution Pipe Solid Geology Detail: Carboniferous Limestone Supergroup Superficial Geology Detail: No Details	B9SW (W)	46	5	350500 165050
	Natural Cavities Easting: 351050 Northing: 165200 Distance: 242 Quadrant Reference: B10 Quadrant Reference: NW Bearing Ref: NE Cavity Type: Sinkhole x 1 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	B10NW (NE)	242	5	351050 165200
	Natural Cavities Easting: 351030 Northing: 165260 Distance: 248 Quadrant Reference: B10 Quadrant Reference: NW Bearing Ref: N Cavity Type: Sinkhole x 1 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	B10NW (N)	248	5	351030 165260

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Natural Cavities Easting: 350540 Northing: 165430 Distance: 303 Quadrant Reference: B13 Quadrant Reference: SW Bearing Ref: NW Cavity Type: Sinkhole x 1 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	B13SW (NW)	303	5	350540 165430
	Natural Cavities Easting: 350490 Northing: 165440 Distance: 315 Quadrant Reference: B13 Quadrant Reference: SW Bearing Ref: NW Cavity Type: Sinkhole x 1 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	B13SW (NW)	315	5	350490 165440
	Natural Cavities Easting: 351090 Northing: 165300 Distance: 320 Quadrant Reference: B10 Quadrant Reference: NW Bearing Ref: NE Cavity Type: Sinkhole x 1 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	B10NW (NE)	320	5	351090 165300
	Natural Cavities Easting: 351060 Northing: 165350 Distance: 326 Quadrant Reference: B10 Quadrant Reference: NW Bearing Ref: N Cavity Type: Sinkhole x 1 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	B10NW (N)	326	5	351060 165350
	Natural Cavities Easting: 350850 Northing: 165480 Distance: 343 Quadrant Reference: B13 Quadrant Reference: SE Bearing Ref: N Cavity Type: Sinkhole x 2 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	B13SE (N)	343	5	350850 165480
	Natural Cavities Easting: 350860 Northing: 165480 Distance: 345 Quadrant Reference: B13 Quadrant Reference: SE Bearing Ref: N Cavity Type: Sinkhole x 1 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	B13SE (N)	345	5	350860 165480
	Natural Cavities Easting: 350900 Northing: 165490 Distance: 363 Quadrant Reference: B13 Quadrant Reference: SE Bearing Ref: N Cavity Type: Sinkhole x 1 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	B13SE (N)	363	5	350900 165490

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Natural Cavities Easting: 351070 Northing: 165430 Distance: 390 Quadrant Reference: B14 Quadrant Reference: SW Bearing Ref: N Cavity Type: Sinkhole x 3 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	B14SW (N)	390	5	351070 165430
	Natural Cavities Easting: 351050 Northing: 165470 Distance: 409 Quadrant Reference: B14 Quadrant Reference: SW Bearing Ref: N Cavity Type: Sinkhole x 1 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	B14SW (N)	409	5	351050 165470
	Natural Cavities Easting: 350730 Northing: 165570 Distance: 434 Quadrant Reference: B13 Quadrant Reference: SE Bearing Ref: NW Cavity Type: Solution Widened Joint or Fissure x 1 Solid Geology Detail: Lower Carboniferous Limestone Superficial Geology Detail: No Details	B13SE (NW)	434	5	350730 165570
	Non Coal Mining Areas of Great Britain Risk: Highly Unlikely Source: British Geological Survey, National Geoscience Information Service	B9NE (W)	0	1	350998 165121
	Non Coal Mining Areas of Great Britain Risk: Highly Unlikely Source: British Geological Survey, National Geoscience Information Service	B9SE (S)	72	1	350998 165000
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	B9NE (W)	0	1	350998 165121
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	B9SE (S)	72	1	350998 165000
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	B9NE (W)	0	1	350998 165121
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	B9SE (S)	72	1	350998 165000
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	B9NE (W)	0	1	350998 165121
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	B9SE (S)	72	1	350998 165000
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	B9NE (W)	0	1	350998 165121
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	B9SE (S)	72	1	350998 165000
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	B9NE (W)	0	1	350998 165121
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	B9SE (S)	72	1	350998 165000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	B9NE (W)	0	1	350998 165121
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	B9SE (S)	72	1	350998 165000
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Higher probability radon area (10 to 30% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	B9NE (W)	0	1	350998 165121
	Radon Potential - Radon Protection Measures Protection Measure: Full radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	B9NE (W)	0	1	350998 165121

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
24	**Contemporary Trade Directory Entries** Name: S R Technics Location: Bristol, BS48 3DY Classification: Aviation Engineers **Status: Active** Positional Accuracy: Automatically positioned to the address	B13SW (NW)	318	-	350492 165443
24	**Contemporary Trade Directory Entries** Name: Bristol International Airport Location: BRISTOL, BS48 3DY Classification: Airports **Status: Active** Positional Accuracy: Automatically positioned to the address	B13SW (NW)	318	-	350492 165443
24	**Contemporary Trade Directory Entries** Name: Bristol International Airport Location: Bristol, BS48 3DY Classification: Airports **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B13SW (NW)	318	-	350492 165443
24	**Contemporary Trade Directory Entries** Name: Bristol International Cars Location: Bristol, BS48 3DY Classification: Mirrors & Decorative Glass **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B13SW (NW)	318	-	350492 165443
24	**Contemporary Trade Directory Entries** Name: Frans Maas (Uk) Ltd Location: Bristol, BS48 3DY Classification: Freight Forwarders **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B13SW (NW)	318	-	350492 165443
24	**Contemporary Trade Directory Entries** Name: D M S Ltd Location: Bristol, BS48 3DY Classification: Commercial Cleaning Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B13SW (NW)	318	-	350492 165443
24	**Contemporary Trade Directory Entries** Name: Bristol International Airport Location: Bristol, BS48 3DY Classification: Airports **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B13SW (NW)	318	-	350492 165443
24	**Contemporary Trade Directory Entries** Name: Bristol International Airport Location: Bristol, Avon, BS48 3DY Classification: Airports **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B13SW (NW)	318	-	350492 165443
25	**Contemporary Trade Directory Entries** Name: Ward Aviation Support Ltd Location: Bristol & Wessex Aero Club, Bristol International Airport, Bristol, Avon, BS48 3EP Classification: Cargo Handling Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B10NW (N)	364	-	351037 165424
25	**Contemporary Trade Directory Entries** Name: Swissport Location: Bristol International Airport, Bristol, Avon, BS48 3DS Classification: Cargo Handling Services **Status: Active** Positional Accuracy: Manually positioned within the geographical locality	B14SW (N)	407	-	351046 165471
26	**Contemporary Trade Directory Entries** Name: Dixons Travel Location: Unit 3,Bristol Airport, Bristol, Avon, BS48 3DY Classification: Electrical Goods Sales, Manufacturers & Wholesalers **Status: Active** Positional Accuracy: Manually positioned to the address or location	B13SW (NW)	365	-	350620 165496

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
27	**Contemporary Trade Directory Entries** Name: D P S Location: Greenacres, Downside Road, Backwell, Bristol, BS48 3EW Classification: Digital Printing **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B14SW (NE)	641	-	351273 165584
27	**Contemporary Trade Directory Entries** Name: D P S Location: Greenacres, Downside Road, Backwell, Bristol, BS48 3EW Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B14SW (NE)	641	-	351273 165584
27	**Contemporary Trade Directory Entries** Name: Digital Print Specialists Location: Greenacres, Downside Road, Backwell, Bristol, BS48 3EW Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B14SW (NE)	641	-	351273 165584
27	**Contemporary Trade Directory Entries** Name: D P S Location: Greenacres, Downside Road, Backwell, Bristol, BS48 3EW Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B14SW (NE)	641	-	351273 165584
28	**Contemporary Trade Directory Entries** Name: J W & T J Pearce Ltd Location: St. Katherines Farm, Downside Road, Backwell, Bristol, BS48 3DZ Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B14SW (N)	646	-	351167 165677
29	**Contemporary Trade Directory Entries** Name: Forge Car Sales Location: The Old Forge, Bridgwater Road, Felton, Bristol, BS40 9UR Classification: Car Dealers - Used **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B14SW (NE)	692	-	351350 165574
30	**Contemporary Trade Directory Entries** Name: D M D Woodworking Location: Melody Cottage, Downside Road, Backwell, Bristol, BS48 3DN Classification: Joinery Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B13NW (NW)	742	-	350398 165862
31	**Contemporary Trade Directory Entries** Name: West Country Fuels Location: Park Farm, West Lane, Felton, Bristol, BS40 9UD Classification: Fuel Dealers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	B14SE (NE)	906	-	351673 165430
32	**Points of Interest - Commercial Services** Name: Ward Aviation Support Ltd Location: Bristol & Wessex Aero Club, Bristol International Airport, Bristol, BS48 3EP Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	B10NW (N)	364	6	351037 165424
33	**Points of Interest - Commercial Services** Name: Airport Car Parking Bristol Location: North, Side Road, Bristol, BS48 3DY Category: Personal, Consumer and other Services Class Code: Vehicle Cleaning Services Positional Accuracy: Positioned to address or location	B10NW (NE)	442	6	351171 165397
34	**Points of Interest - Commercial Services** Name: Chips Away - Paul Clift Location: Ellandee, Downside Road, Backwell, Bristol, BS48 3EW Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	B14SW (NE)	630	6	351211 165625
35	**Points of Interest - Manufacturing and Production** Name: Tank Location: BS48 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	B9NW (NW)	235	6	350540 165362

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
35	**Points of Interest - Manufacturing and Production** Name: Tank Location: BS48 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	B9NW (NW)	235	6	350551 165363
35	**Points of Interest - Manufacturing and Production** Name: Tanks Location: BS48 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	B9NW (NW)	247	6	350568 165375
35	**Points of Interest - Manufacturing and Production** Name: Tank Location: BS48 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	B9NW (NW)	249	6	350544 165376
35	**Points of Interest - Manufacturing and Production** Name: Tank Location: BS48 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	B9NW (NW)	264	6	350543 165391
36	**Points of Interest - Manufacturing and Production** Name: Tank Location: BS48 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	B9SE (S)	307	6	350961 164844
37	**Points of Interest - Manufacturing and Production** Name: Tank Location: BS48 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	B13SE (NW)	351	6	350821 165490
38	**Points of Interest - Manufacturing and Production** Name: Tank Location: BS40 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	B14NE (NE)	952	6	351472 165825
38	**Points of Interest - Manufacturing and Production** Name: Tank Location: BS40 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	B14NE (NE)	956	6	351478 165824
38	**Points of Interest - Manufacturing and Production** Name: Tanks Location: BS40 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	B14NE (NE)	957	6	351475 165829
39	**Points of Interest - Public Infrastructure** Name: Bristol Airport Location: Bristol, BS48 3DY Category: Air Class Code: Airports and Landing Strips Positional Accuracy: Positioned to address or location	B13SW (NW)	317	6	350491 165442
39	**Points of Interest - Public Infrastructure** Name: Bristol International Airport Location: Bristol, BS48 3DY Category: Air Class Code: Airports and Landing Strips Positional Accuracy: Positioned to address or location	B13SW (NW)	318	6	350492 165443
39	**Points of Interest - Public Infrastructure** Name: Bristol International Airport Location: Bristol, BS48 3DY Category: Air Class Code: Airports and Landing Strips Positional Accuracy: Positioned to address or location	B13SW (NW)	318	6	350492 165443

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
39	**Points of Interest - Public Infrastructure** Name: Bristol International Airport Police Station Location: Bristol International Airport, Bristol, BS48 3DY Category: Central and Local Government Class Code: Police Stations Positional Accuracy: Positioned to address or location	B13SW (NW)	318	6	350492 165443
40	**Points of Interest - Public Infrastructure** Name: Gate Gourmet Bonded Stores Location: Bristol International Airport, Bristol, BS48 3DP Category: Air Class Code: Airports and Landing Strips Positional Accuracy: Positioned to address or location	B10NW (N)	364	6	351037 165424
40	**Points of Interest - Public Infrastructure** Name: Bristol Flying Centre Location: Bristol International Airport, Bristol, BS48 3DP Category: Air Class Code: Airports and Landing Strips Positional Accuracy: Positioned to address or location	B10NW (N)	364	6	351037 165424
41	**Points of Interest - Public Infrastructure** Name: Bristol International Airport Location: Bristol, BS48 3DY Category: Air Class Code: Airports and Landing Strips Positional Accuracy: Positioned to address or location	B13SW (NW)	365	6	350620 165496

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
42	**Ancient Woodland** Name: Not Supplied Reference: 1418505 Area(m²): 18241.71 Type: Ancient and Semi-Natural Woodland	(SW)	915	7	350338 164092
43	**Areas of Adopted Green Belt** Authority: North Somerset Council Plan Name: North Somerset Replacement Local Plan **Status: Adopted** Plan Date: 30th March 2007	B9NE (W)	0	3	350998 165121

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices		
Bath and North East Somerset Council - Environmental Health Department	October 2014	Annual Rolling Update
North Somerset Council - Environmental Health Department	September 2014	Annual Rolling Update
Discharge Consents		
Environment Agency - South West Region	April 2017	Quarterly
Enforcement and Prohibition Notices		
Environment Agency - South West Region	March 2013	As notified
Integrated Pollution Controls		
Environment Agency - South West Region	October 2008	Not Applicable
Integrated Pollution Prevention And Control		
Environment Agency - South West Region	April 2017	Quarterly
Local Authority Integrated Pollution Prevention And Control		
Bath and North East Somerset Council - Environmental Health Department	February 2015	Annual Rolling Update
North Somerset Council - Environmental Health Department	September 2013	Annual Rolling Update
Local Authority Pollution Prevention and Controls		
Bath and North East Somerset Council - Environmental Health Department	February 2015	Annual Rolling Update
North Somerset Council - Environmental Health Department	March 2015	Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements		
Bath and North East Somerset Council - Environmental Health Department	February 2015	Annual Rolling Update
North Somerset Council - Environmental Health Department	September 2013	Annual Rolling Update
Nearest Surface Water Feature		
Ordnance Survey	March 2017	
Pollution Incidents to Controlled Waters		
Environment Agency - South West Region	September 1999	Not Applicable
Prosecutions Relating to Authorised Processes		
Environment Agency - South West Region	March 2013	As notified
Prosecutions Relating to Controlled Waters		
Environment Agency - South West Region	March 2013	As notified
Registered Radioactive Substances		
Environment Agency - South West Region	January 2015	
River Quality		
Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points		
Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points		
Environment Agency - Head Office	July 2012	Annually
Substantiated Pollution Incident Register		
Environment Agency - South West Region - North Wessex Area	April 2017	Quarterly
Environment Agency - South West Region - Wessex Area	April 2017	Quarterly
Water Abstractions		
Environment Agency - South West Region	October 2016	Quarterly
Water Industry Act Referrals		
Environment Agency - South West Region	April 2017	Quarterly
Groundwater Vulnerability		
Environment Agency - Head Office	April 2015	Not Applicable
Drift Deposits		
Environment Agency - Head Office	January 1999	Not Applicable
Bedrock Aquifer Designations		
British Geological Survey - National Geoscience Information Service	August 2015	As notified
Superficial Aquifer Designations		
British Geological Survey - National Geoscience Information Service	August 2015	As notified

Agency & Hydrological	Version	Update Cycle
Source Protection Zones Environment Agency - Head Office	April 2017	Quarterly
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	May 2017	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	May 2017	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	May 2017	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	May 2017	Quarterly
Flood Defences Environment Agency - Head Office	May 2017	Quarterly
OS Water Network Lines Ordnance Survey	April 2017	6 Weekly
Surface Water 1 in 30 year Flood Extent Environment Agency - Head Office	October 2013	As notified
Surface Water 1 in 100 year Flood Extent Environment Agency - Head Office	October 2013	As notified
Surface Water 1 in 1000 year Flood Extent Environment Agency - Head Office	October 2013	As notified
Surface Water Suitability Environment Agency - Head Office	October 2013	As notified
BGS Groundwater Flooding Susceptibility British Geological Survey - National Geoscience Information Service	May 2013	Annually

Waste	Version	Update Cycle
BGS Recorded Landfill Sites		
British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Historical Landfill Sites		
Environment Agency - Head Office	May 2017	Quarterly
Integrated Pollution Control Registered Waste Sites		
Environment Agency - South West Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries)		
Environment Agency - South West Region - North Wessex Area	May 2017	Quarterly
Environment Agency - South West Region - Wessex Area	May 2017	Quarterly
Licensed Waste Management Facilities (Locations)		
Environment Agency - South West Region - North Wessex Area	May 2017	Quarterly
Environment Agency - South West Region - Wessex Area	May 2017	Quarterly
Local Authority Landfill Coverage		
Bath and North East Somerset Council - Planning Services Department	May 2000	Not Applicable
North Somerset Council	May 2000	Not Applicable
Local Authority Recorded Landfill Sites		
Bath and North East Somerset Council - Planning Services Department	May 2000	Not Applicable
North Somerset Council	May 2000	Not Applicable
Potentially Infilled Land (Non-Water)		
Landmark Information Group Limited	December 1999	Not Applicable
Potentially Infilled Land (Water)		
Landmark Information Group Limited	December 1999	Not Applicable
Registered Landfill Sites		
Environment Agency - South West Region - North Wessex Area	March 2003	Not Applicable
Registered Waste Transfer Sites		
Environment Agency - South West Region - North Wessex Area	March 2003	Not Applicable
Registered Waste Treatment or Disposal Sites		
Environment Agency - South West Region - North Wessex Area	March 2003	Not Applicable
Hazardous Substances	**Version**	**Update Cycle**
Control of Major Accident Hazards Sites (COMAH)		
Health and Safety Executive	March 2017	Bi-Annually
Explosive Sites		
Health and Safety Executive	March 2017	Bi-Annually
Notification of Installations Handling Hazardous Substances (NIHHS)		
Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements		
Bath and North East Somerset Council - Economic and Environmental Development	February 2016	Annual Rolling Update
North Somerset Council	February 2016	Annual Rolling Update
Planning Hazardous Substance Consents		
Bath and North East Somerset Council - Economic and Environmental Development	February 2016	Annual Rolling Update
North Somerset Council	February 2016	Annual Rolling Update

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	January 2009	Not Applicable
BGS Estimated Soil Chemistry British Geological Survey - National Geoscience Information Service	October 2015	As notified
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	April 2017	Bi-Annually
CBSCB Compensation District Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	As notified
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	As notified
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	As notified
Industrial Land Use	**Version**	**Update Cycle**
Contemporary Trade Directory Entries Thomson Directories	March 2017	Quarterly
Fuel Station Entries Catalist Ltd - Experian	May 2017	Quarterly
Gas Pipelines National Grid	July 2014	Quarterly
Points of Interest - Commercial Services PointX	December 2016	Quarterly
Points of Interest - Education and Health PointX	December 2016	Quarterly
Points of Interest - Manufacturing and Production PointX	December 2016	Quarterly
Points of Interest - Public Infrastructure PointX	December 2016	Quarterly
Points of Interest - Recreational and Environmental PointX	December 2016	Quarterly
Underground Electrical Cables National Grid	December 2015	Bi-Annually

Sensitive Land Use	Version	Update Cycle
Ancient Woodland Natural England	May 2017	Bi-Annually
Areas of Adopted Green Belt Bath and North East Somerset Council North Somerset Council	May 2017 May 2017	As notified As notified
Areas of Unadopted Green Belt Bath and North East Somerset Council North Somerset Council	May 2017 May 2017	As notified As notified
Areas of Outstanding Natural Beauty Natural England	January 2017	Bi-Annually
Environmentally Sensitive Areas Natural England	January 2017	Annually
Forest Parks Forestry Commission	April 1997	Not Applicable
Local Nature Reserves Natural England	January 2017	Bi-Annually
Marine Nature Reserves Natural England	January 2017	Bi-Annually
National Nature Reserves Natural England	January 2017	Bi-Annually
National Parks Natural England	February 2017	Bi-Annually
Nitrate Vulnerable Zones Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	October 2015	Annually
Ramsar Sites Natural England	January 2017	Bi-Annually
Sites of Special Scientific Interest Natural England	January 2017	Bi-Annually
Special Areas of Conservation Natural England	January 2017	Bi-Annually
Special Protection Areas Natural England	January 2017	Bi-Annually
World Heritage Sites English Heritage - National Monument Record Centre	May 2017	Bi-Annually

Data Suppliers

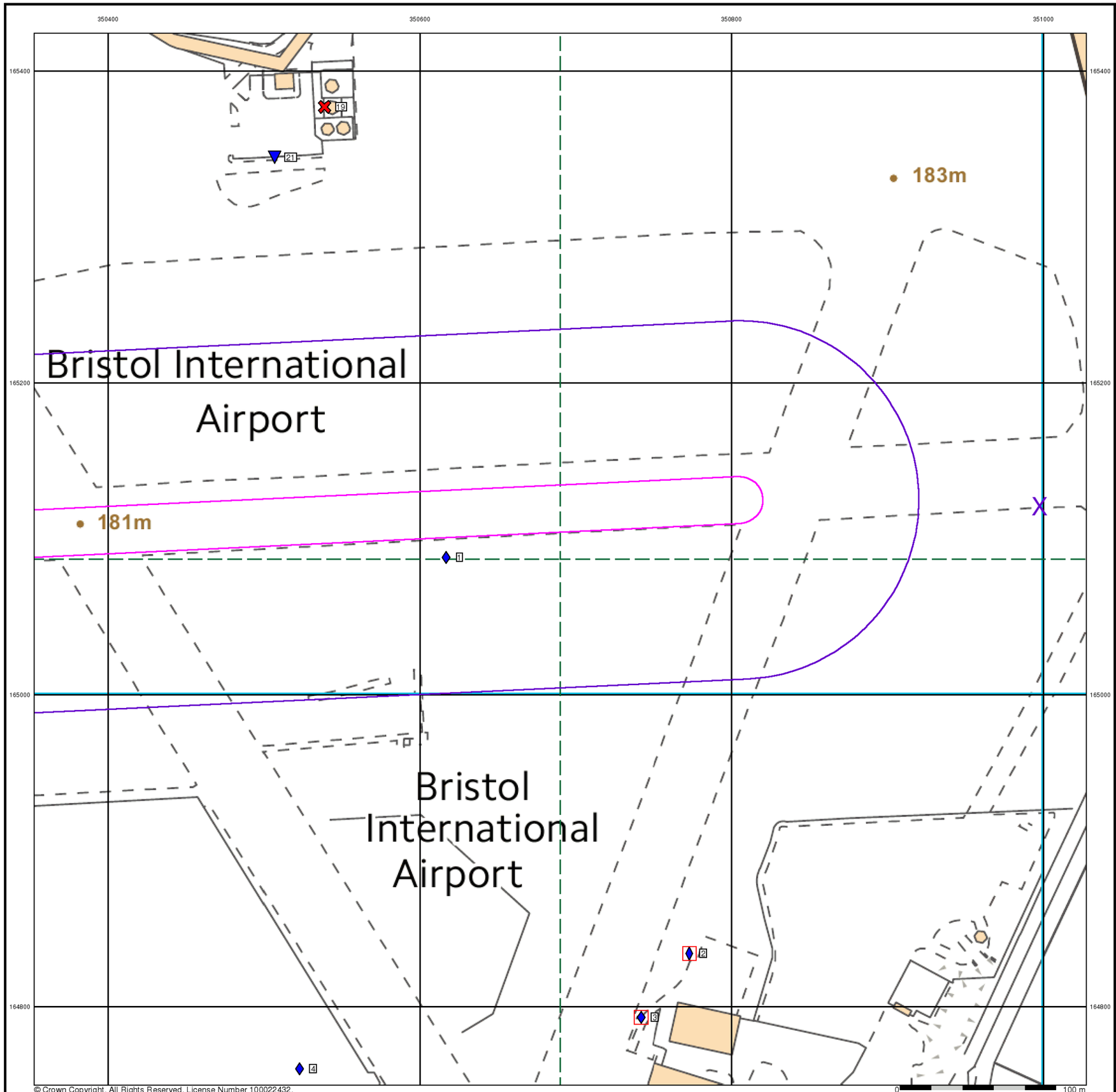
A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	
Centre for Ecology and Hydrology	
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Peter Brett Associates	

Useful Contacts

Contact	Name and Address	Contact Details
1	**British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 03708 506 506 Email: enquiries@environment-agency.gov.uk
3	**North Somerset Council** PO Box 140, Town Hall, Weston-super-Mare, Avon, BS23 1UJ	Telephone: 01934 888888 Fax: 01934 888822 Website: www.n-somerset.gov.uk
4	**North Somerset Council** Town Hall, Weston-super-Mare, Avon, BS23 1UJ	Telephone: 01934 888888 Fax: 01934 888822 Website: www.n-somerset.gov.uk
5	**Peter Brett Associates** Caversham Bridge House, Waterman Place, Reading, Berkshire, RG1 8DN	Telephone: 0118 950 0761 Fax: 0118 959 7498 Email: reading@pba.co.uk Website: www.pba.co.uk
6	**PointX** 7 Abbey Court, Eagle Way, Sowton, Exeter, Devon, EX2 7HY	Website: www.pointx.co.uk
7	**Natural England** County Hall, Spetchley Road, Worcester, WR5 2NP	Telephone: 0300 060 3900 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
8	**Bath and North East Somerset Council** Guildhall, High Street, Bath, BA1 5AW	Telephone: 01225 477000 Fax: 01225 477489 Website: www.bathnes.gov.uk
9	**Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)** Government Buildings, Otley Road, Lawnswood, Leeds, West Yorkshire, LS16 5QT	Telephone: 0113 2613333 Fax: 0113 230 0879
10	**Environment Agency - Head Office** Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD	Telephone: 01454 624400 Fax: 01454 624409
-	**Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.



General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Map ID
Several of Type at Location

Agency and Hydrological

Contaminated Land Register Entry or Notice (Location)
Contaminated Land Register Entry or Notice
Discharge Consent
Enforcement or Prohibition Notice
Integrated Pollution Control
Integrated Pollution Prevention Control
Local Authority Integrated Pollution Prevention and Control
Local Authority Pollution Prevention and Control
Local Authority Pollution Prevention and Control Enforcement
Pollution Incident to Controlled Waters
Prosecution Relating to Authorised Processes
Prosecution Relating to Controlled Waters
Registered Radioactive Substance
River Network or Water Feature
River Quality Sampling Point
Substantiated Pollution Incident Register
Water Abstraction
Water Industry Act Referral

Geological

BGS Recorded Mineral Site

Industrial Land Use

Contemporary Trade Directory Entry
Fuel Station Entry

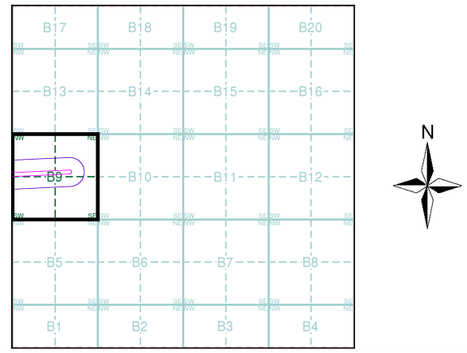
Waste

BGS Recorded Landfill Site (Location)
BGS Recorded Landfill Site
EA Historic Landfill (Buffered Point)
EA Historic Landfill (Polygon)
Integrated Pollution Control Registered Waste Site
Licensed Waste Management Facility (Landfill Boundary)
Licensed Waste Management Facility (Location)
Local Authority Recorded Landfill Site (Location)
Local Authority Recorded Landfill Site
Registered Landfill Site
Registered Landfill Site (Location)
Registered Landfill Site (Point Buffered to 100m)
Registered Landfill Site (Point Buffered to 250m)
Registered Waste Transfer Site (Location)
Registered Waste Transfer Site
Registered Waste Treatment or Disposal Site (Location)
Registered Waste Treatment or Disposal Site

Hazardous Substances

COMAH Site
Explosive Site
NIHHS Site
Planning Hazardous Substance Consent
Planning Hazardous Substance Enforcement

Site Sensitivity Map - Segment B9



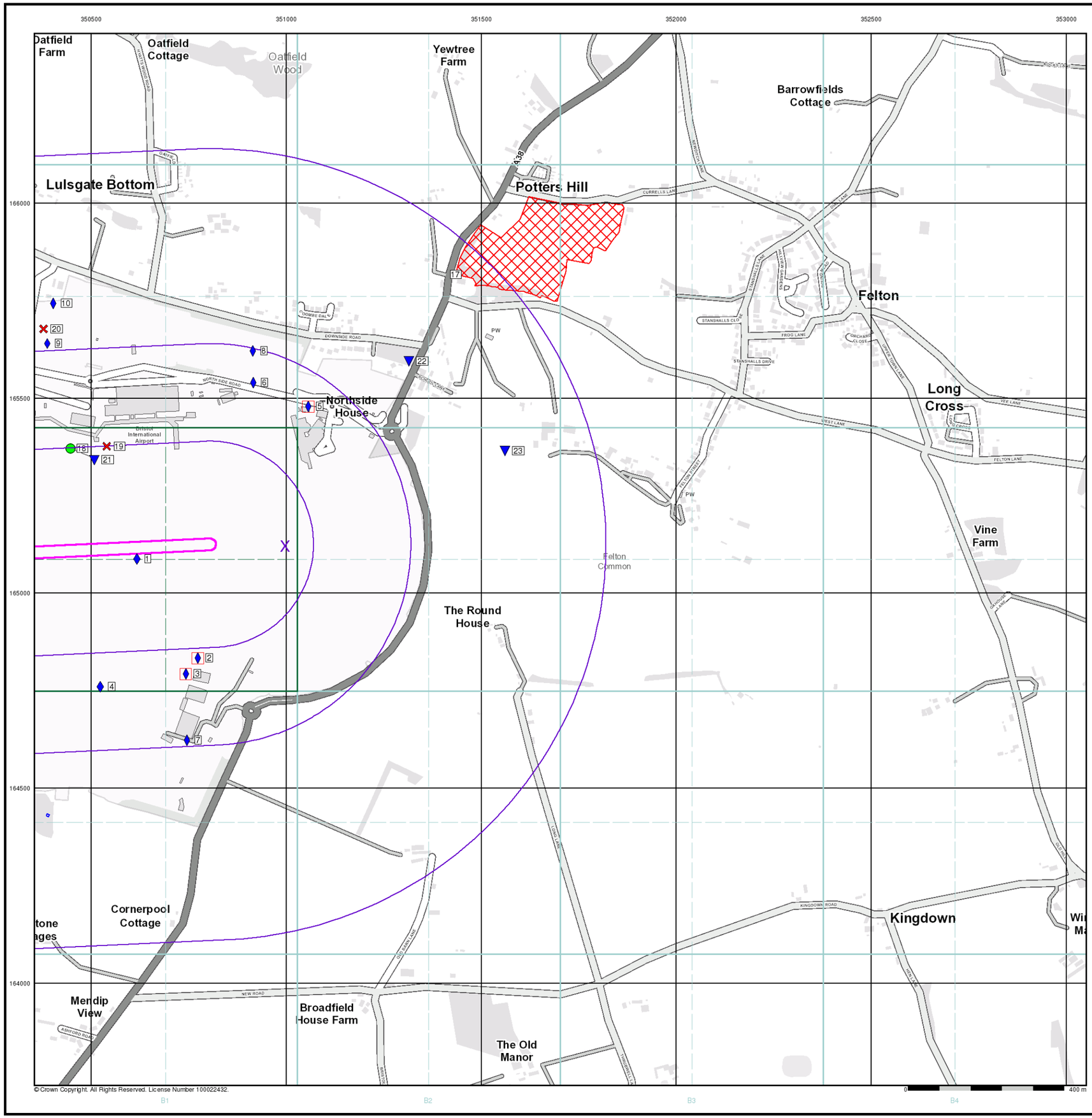
Order Details

Order Number:	128842570_1_1
Customer Ref:	38970
National Grid Reference:	351000, 165120
Slice:	B
Site Area (Ha):	4.82

Site Details

Bristol International Airport, North Side Road, FELTON, BS48 3DY

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



General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Hazardous Substances

COMAH Site | Explosive Site | NIHHS Site

- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

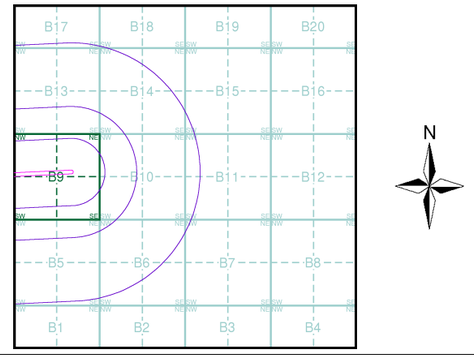
Geological

- BGS Recorded Mineral Site

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Slice B



Order Details

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National Grid Reference:	351000, 165120
Slice:	B
Site Area (Ha):	4.82
Search Buffer (m):	1000

Site Details

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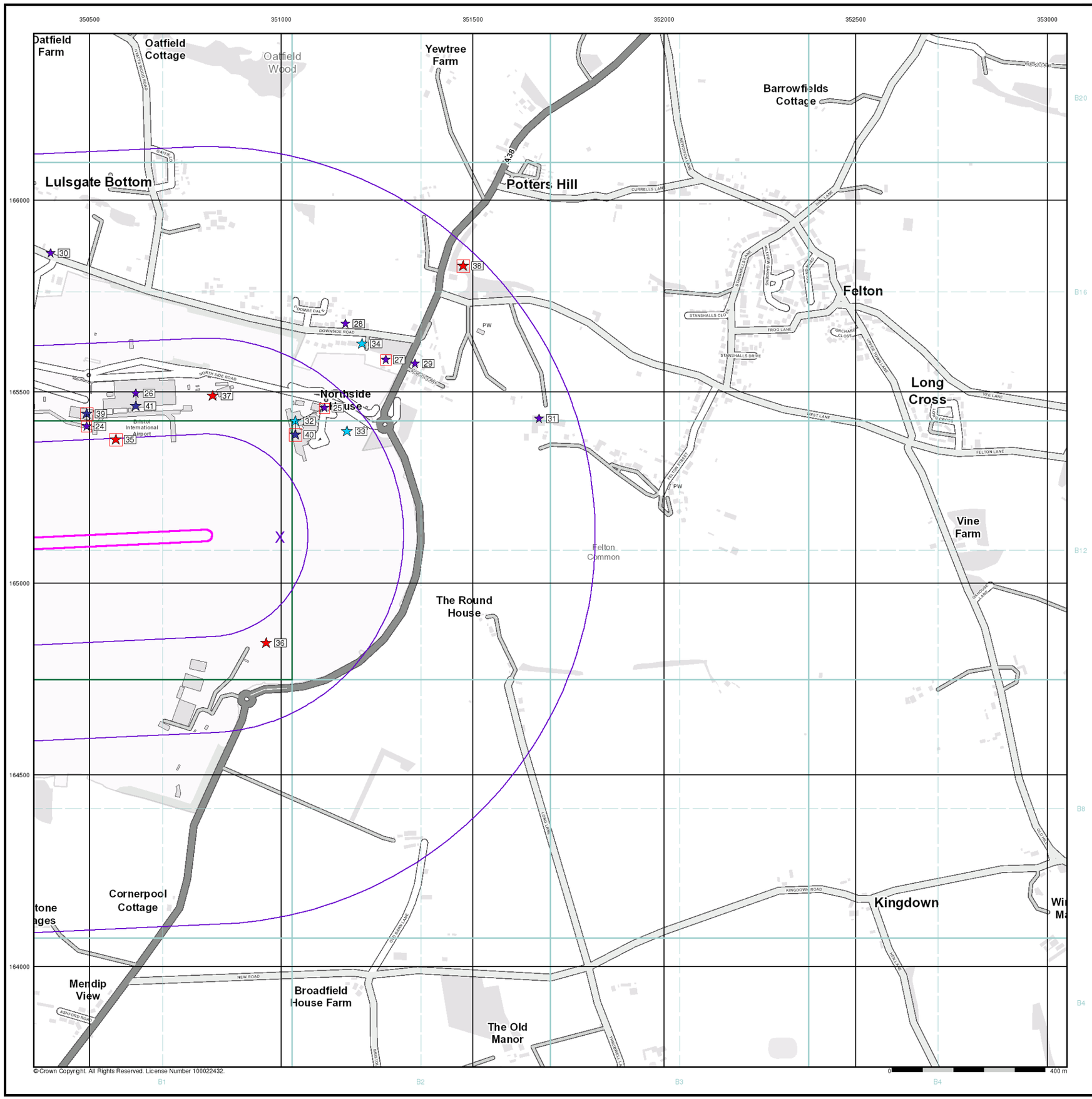

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Industrial Land Use Map

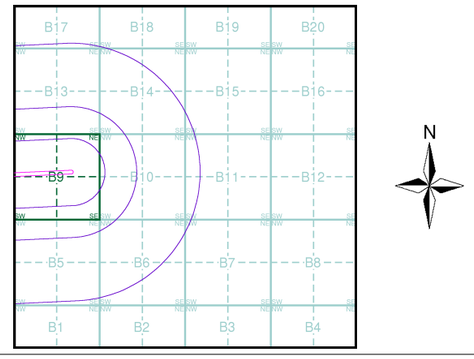
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry
- Gas Pipeline
- Points of Interest - Commercial Services
- Points of Interest - Education and Health
- Points of Interest - Manufacturing and Production
- Points of Interest - Public Infrastructure
- Points of Interest - Recreational and Environmental
- Underground Electrical Cables

Industrial Land Use Map - Slice B



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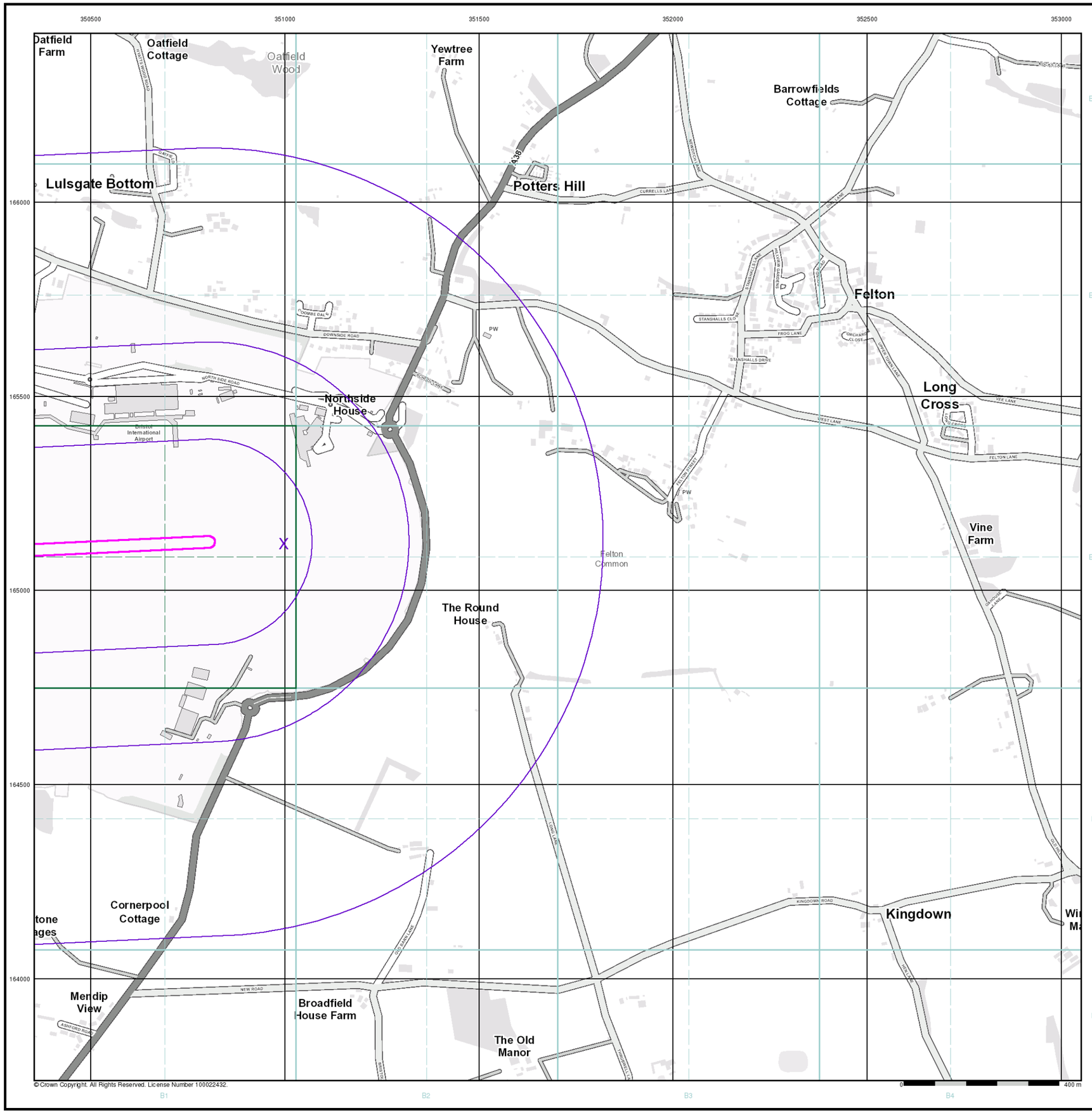


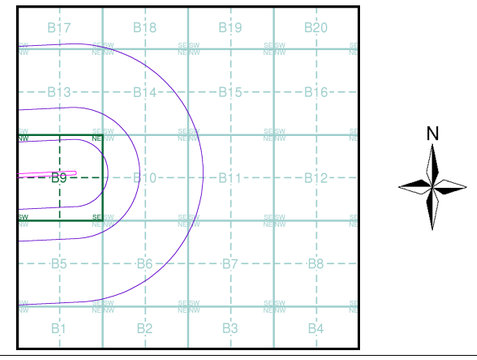
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice B



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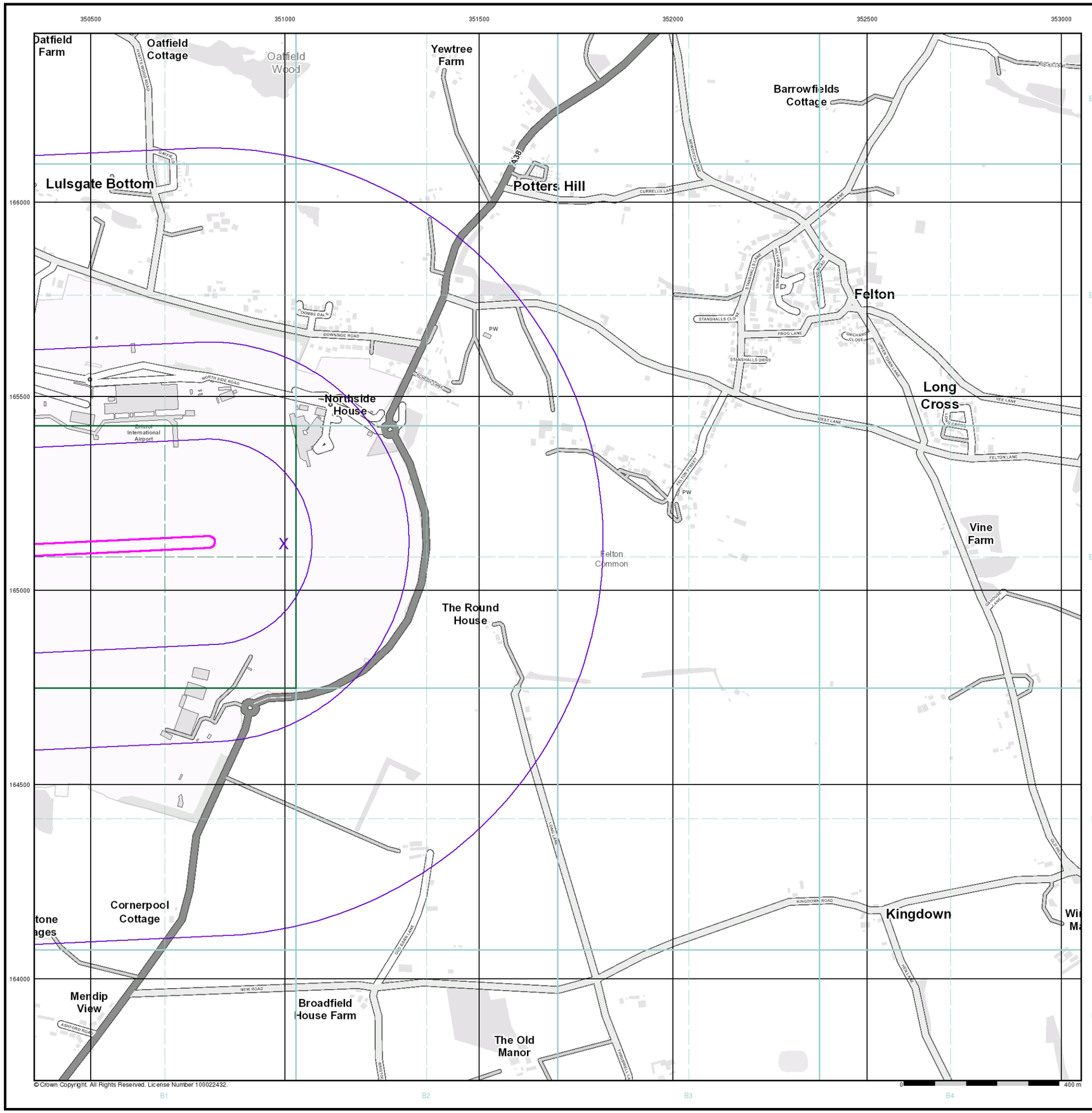


General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

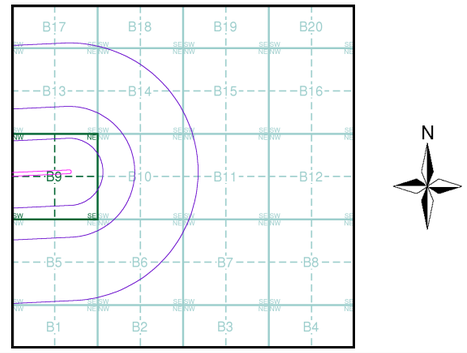
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice B



Order Details

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Slice:	B
Site Area (Ha):	4.82
Search Buffer (m):	1000

Site Details

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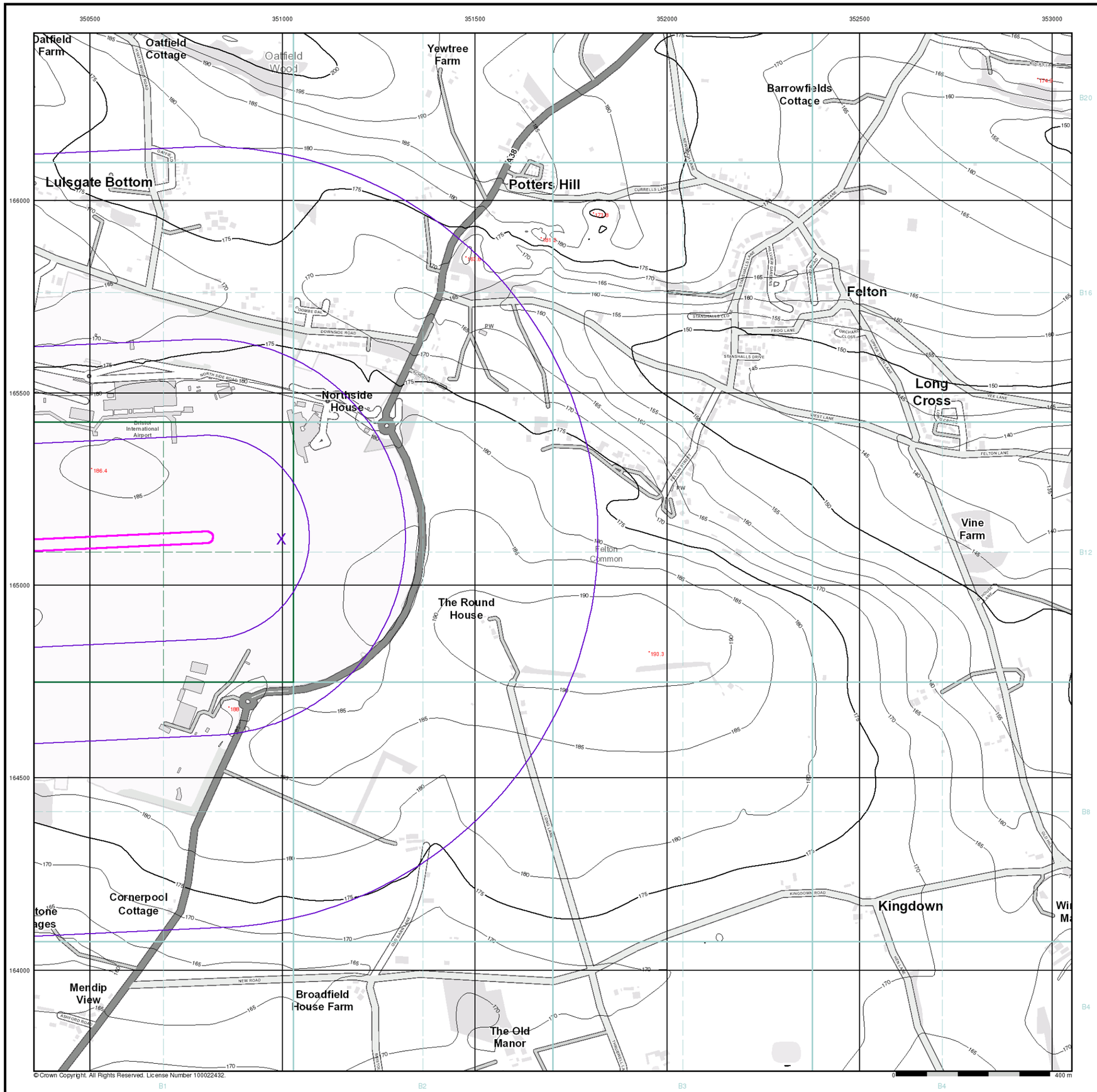


General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

OS Water Network Data

- Canal
- Reservoir
- Foreshore
- Marsh
- Tidal River
- Inland River
- Drain
- Other
- Lake
- Transfer
- Lock Or Flight Of Locks
- Sea

Contours (height in meters)

Standard Contour 105 100 95

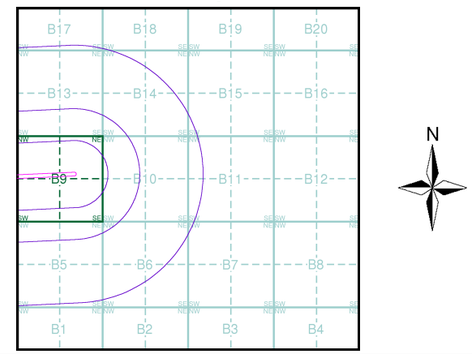
Master Contour

Spot Height 167.3

MLW Mean Low Water

MHW Mean High Water

OS Water Network Map - Slice B



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Customer Ref:	38970
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Slice:	B
Site Area (Ha):	4.82
Search Buffer (m):	1000

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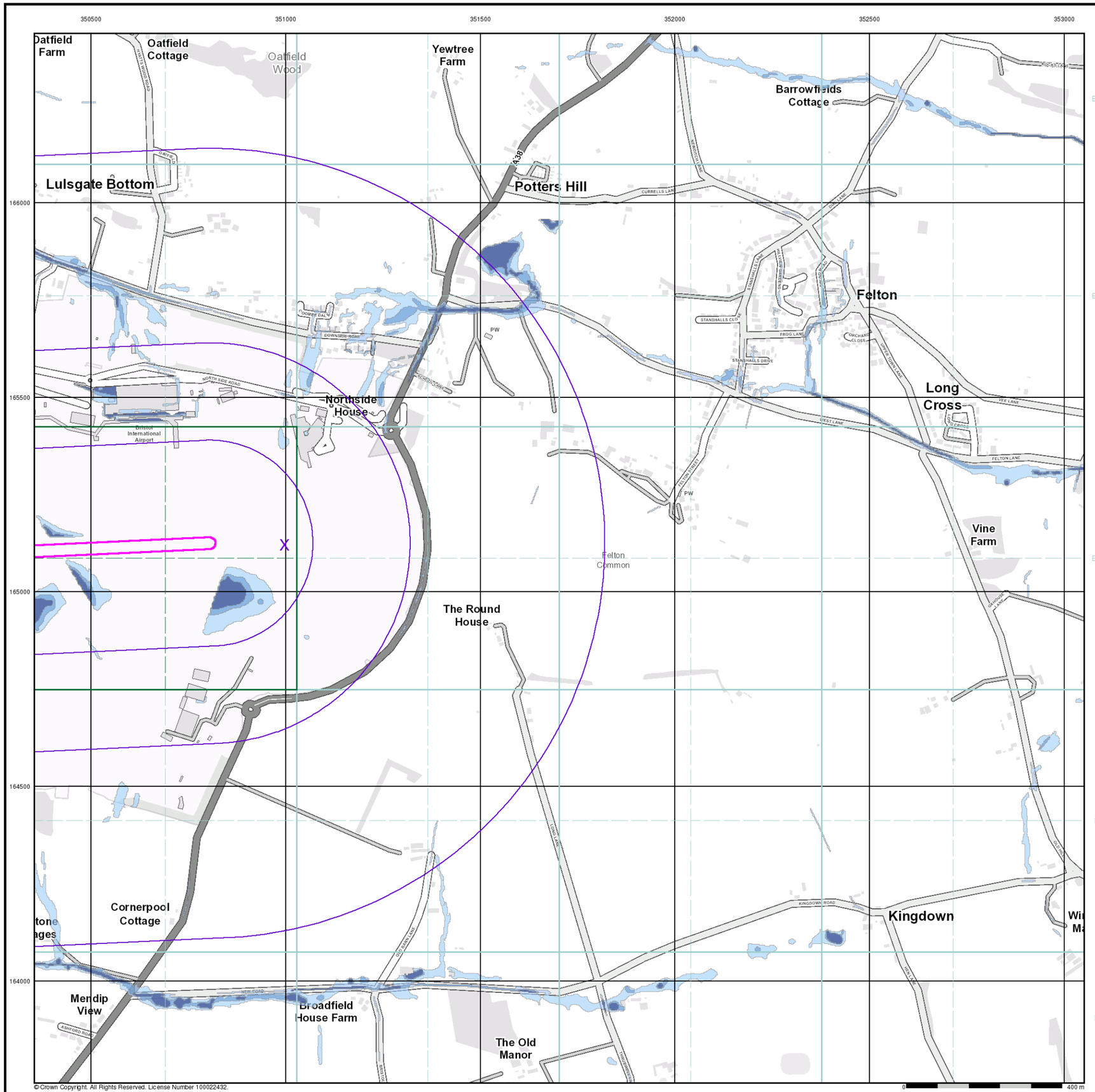


General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Risk of Flooding from Surface Water

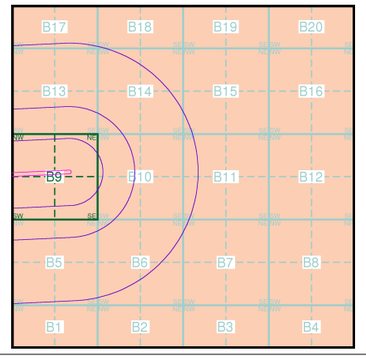
- High - 30 Year Return
- Medium - 100 Year Return
- Low - 1000 Year Return

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice B



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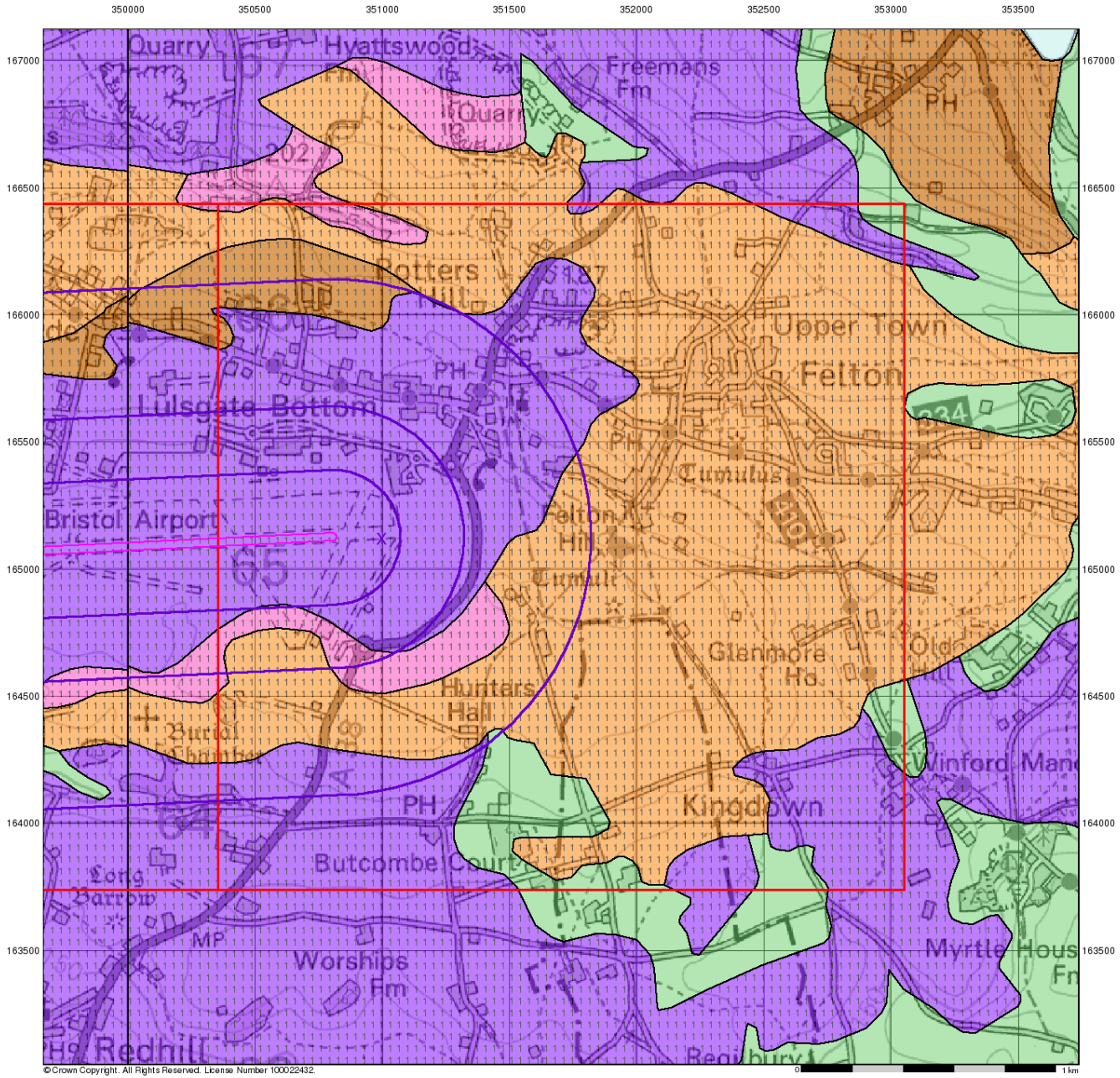


amec

Groundwater Vulnerability

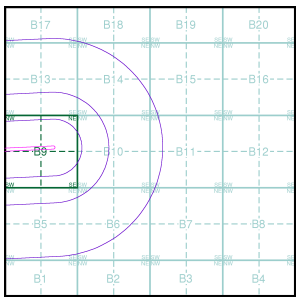
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes	Soil Classes
Major Aquifer (Highly Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Minor Aquifer (Variably Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Non Aquifer (Negligibly Permeable)	
Water or Sea	
Drift Deposit	

Site Sensitivity Context Map - Slice B



Order Details

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Customer Ref:	38970
National Grid Reference:	351000, 165120
Slice:	B
Site Area (Ha):	4.82
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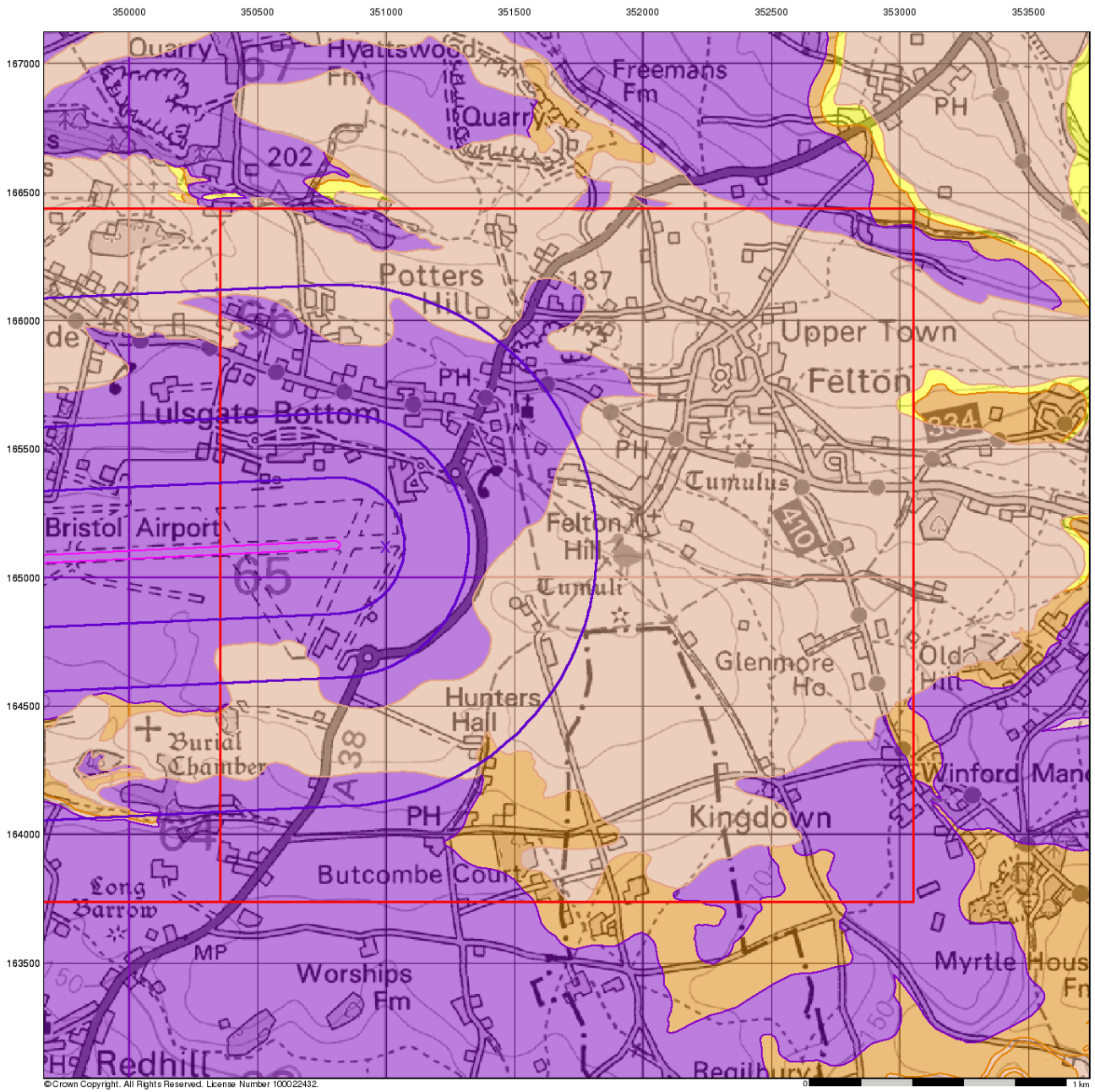


Bedrock Aquifer Designation

General

Specified Site | Specified Buffer(s) | Bearing Reference Point

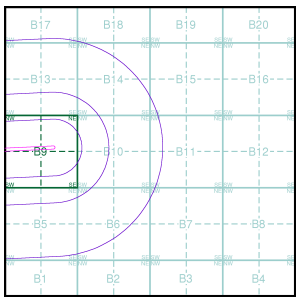
Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice B



Order Details

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Slice:	B
Site Area (Ha):	4.82
Search Buffer (m):	1000

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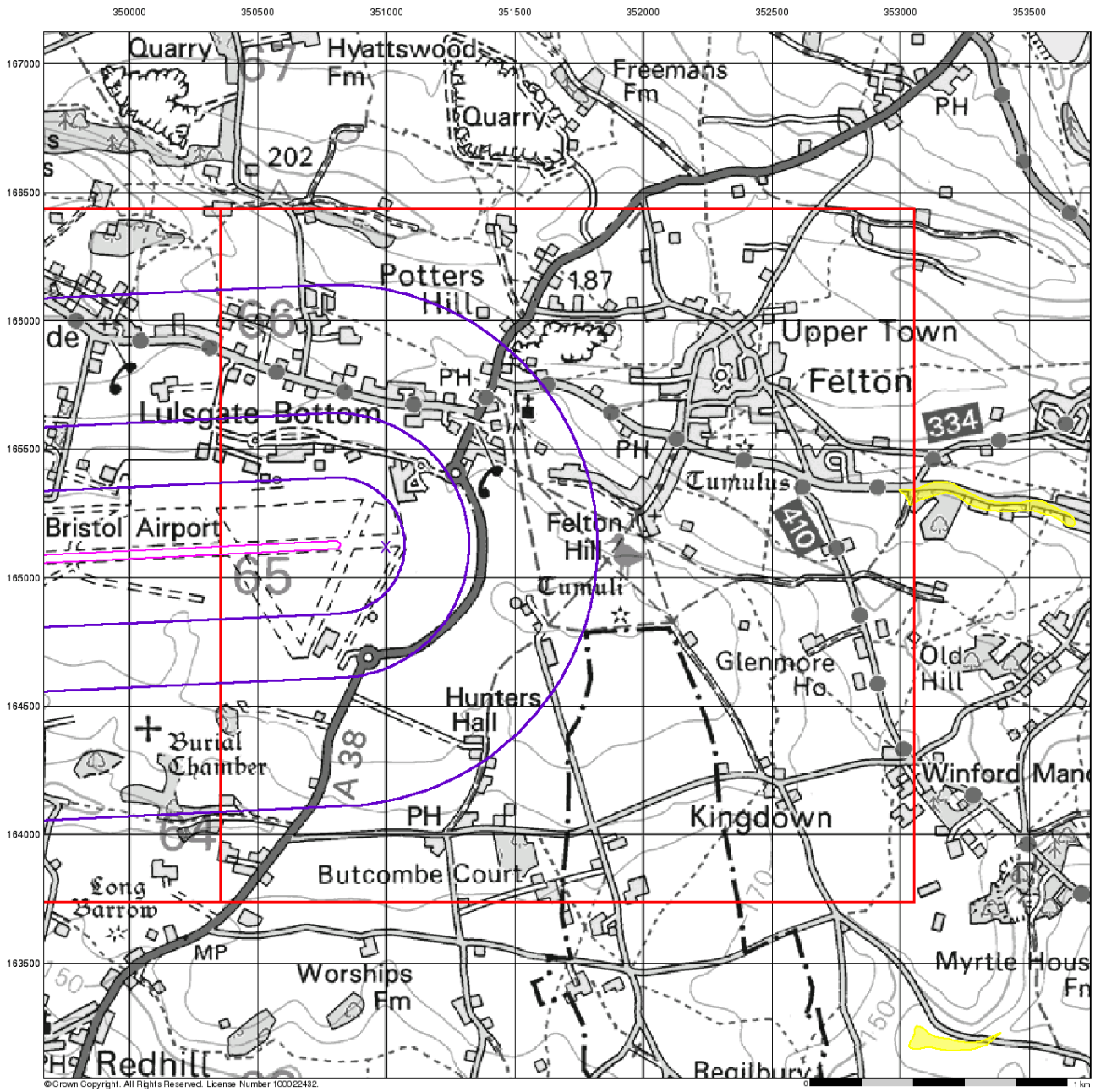


Superficial Aquifer Designation

General

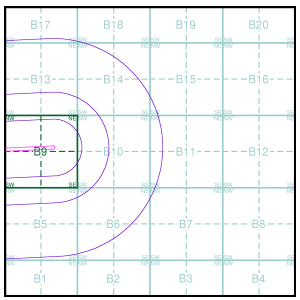
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice B



Order Details

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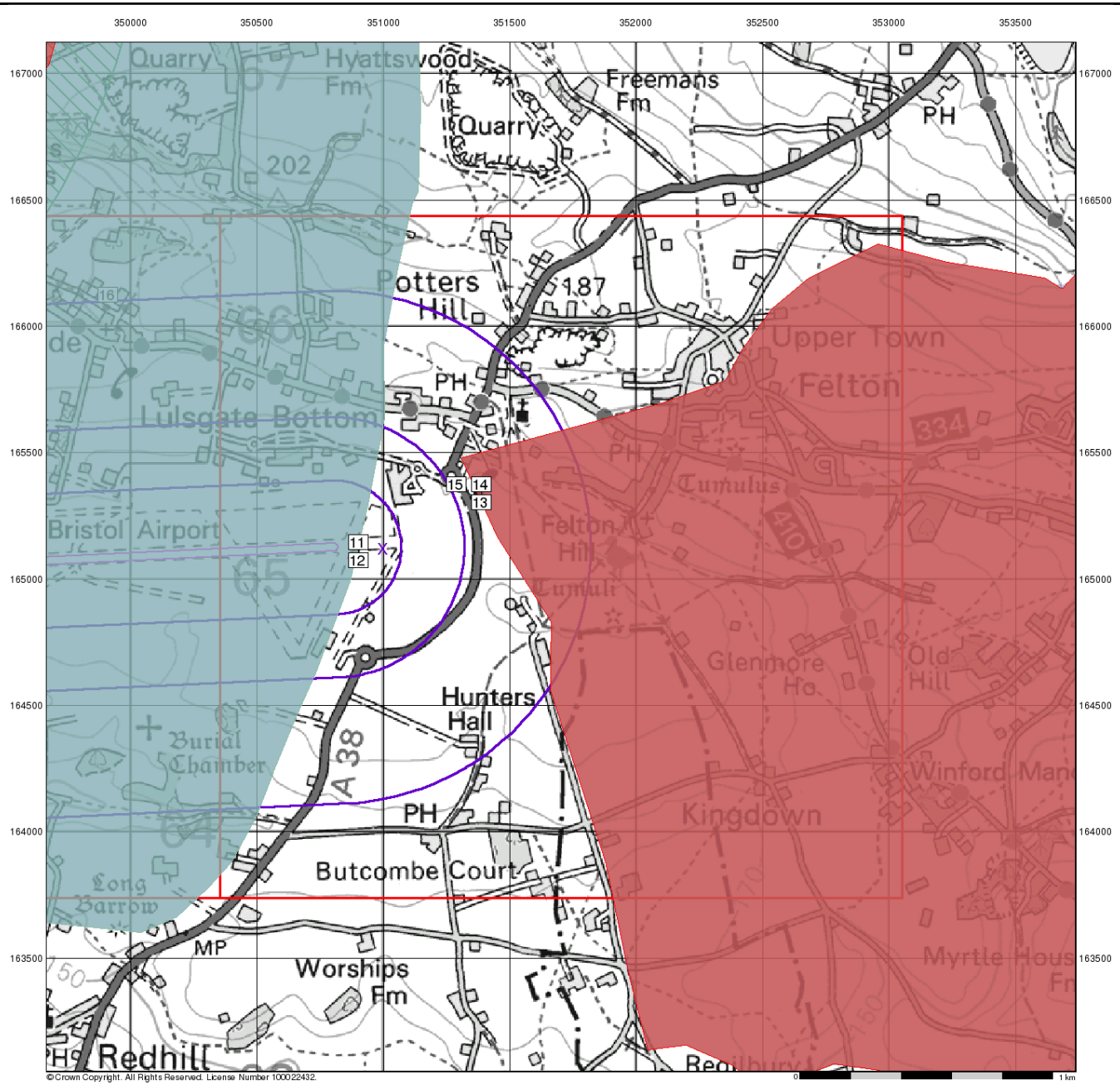


amec

Source Protection Zones

General

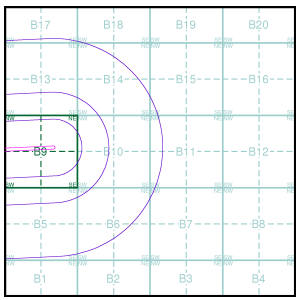
Specified Site | Specified Buffer(s) | Bearing Reference Point

Slice | Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)
- Source Protection Zone Borehole

Site Sensitivity Context Map - Slice B



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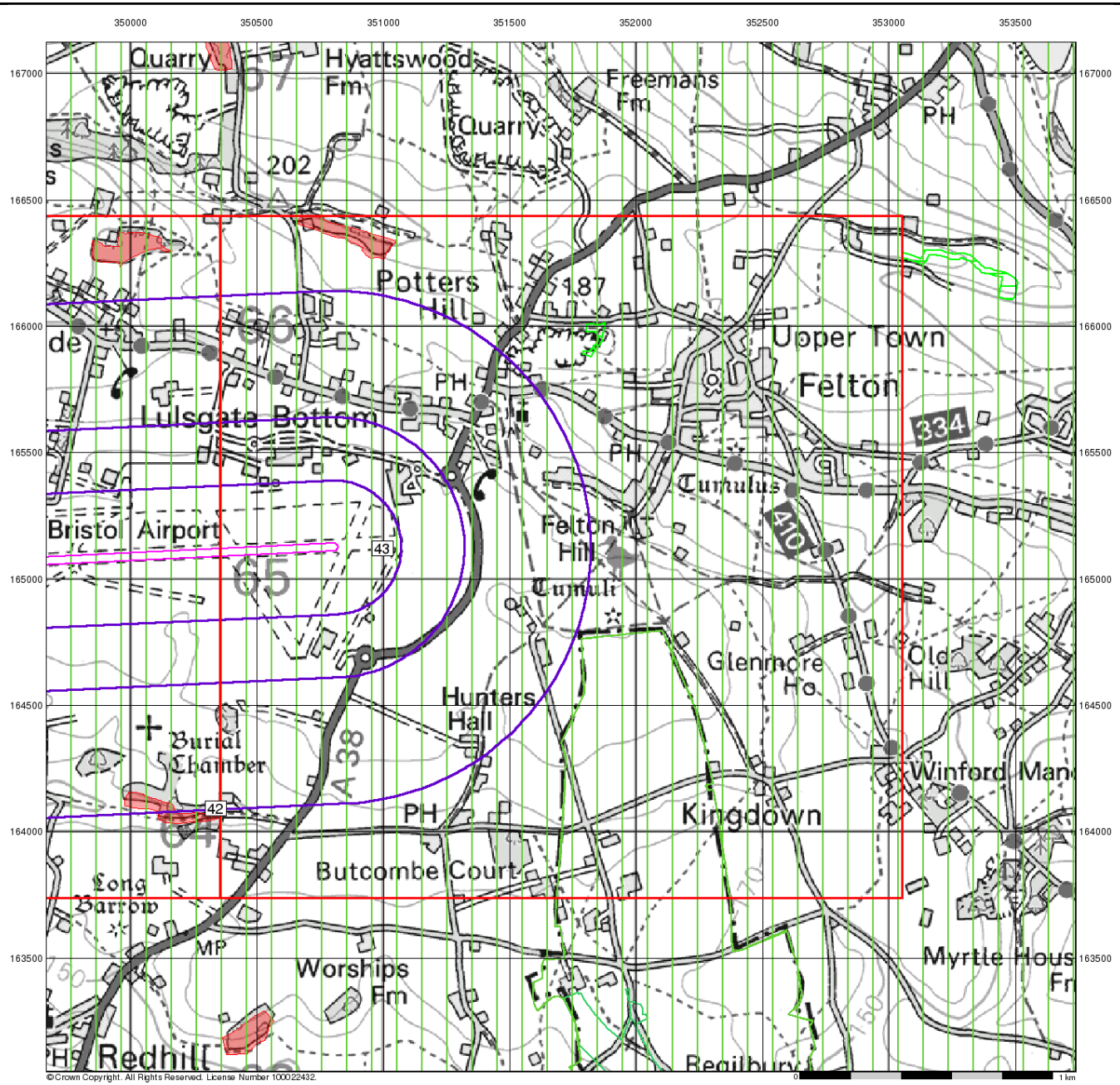
National Grid Reference:	351000, 165120
Slice:	B
Site Area (Ha):	4.82
Search Buffer (m):	1000

Site Details

Bristol International Airport, North Side Road, FELTON, BS48 3DY

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



Sensitive Land Uses

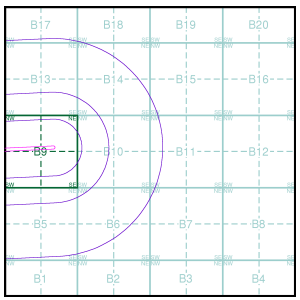
General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Sensitive Land Uses

- Ancient Woodland
- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- World Heritage Sites

Site Sensitivity Context Map - Slice B



Order Details

Order Number:	128842570_1_1
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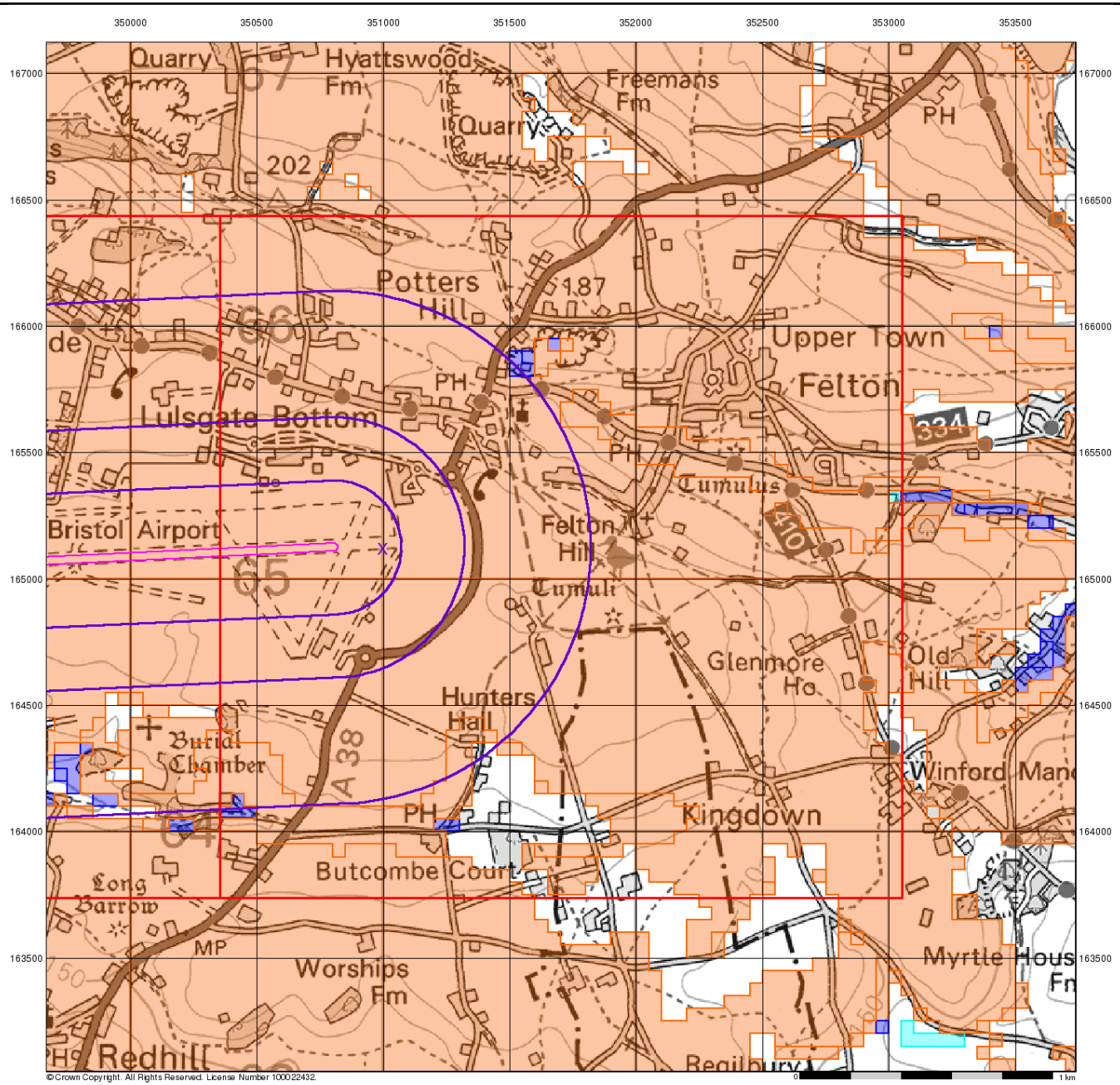


amec

BGS Flood GFS Data

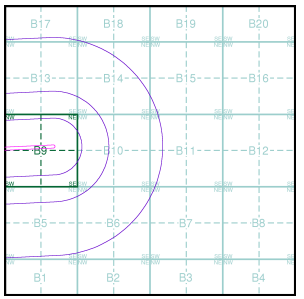
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice

Agency and Hydrological (Flood)

- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

Site Sensitivity Context Map - Slice B



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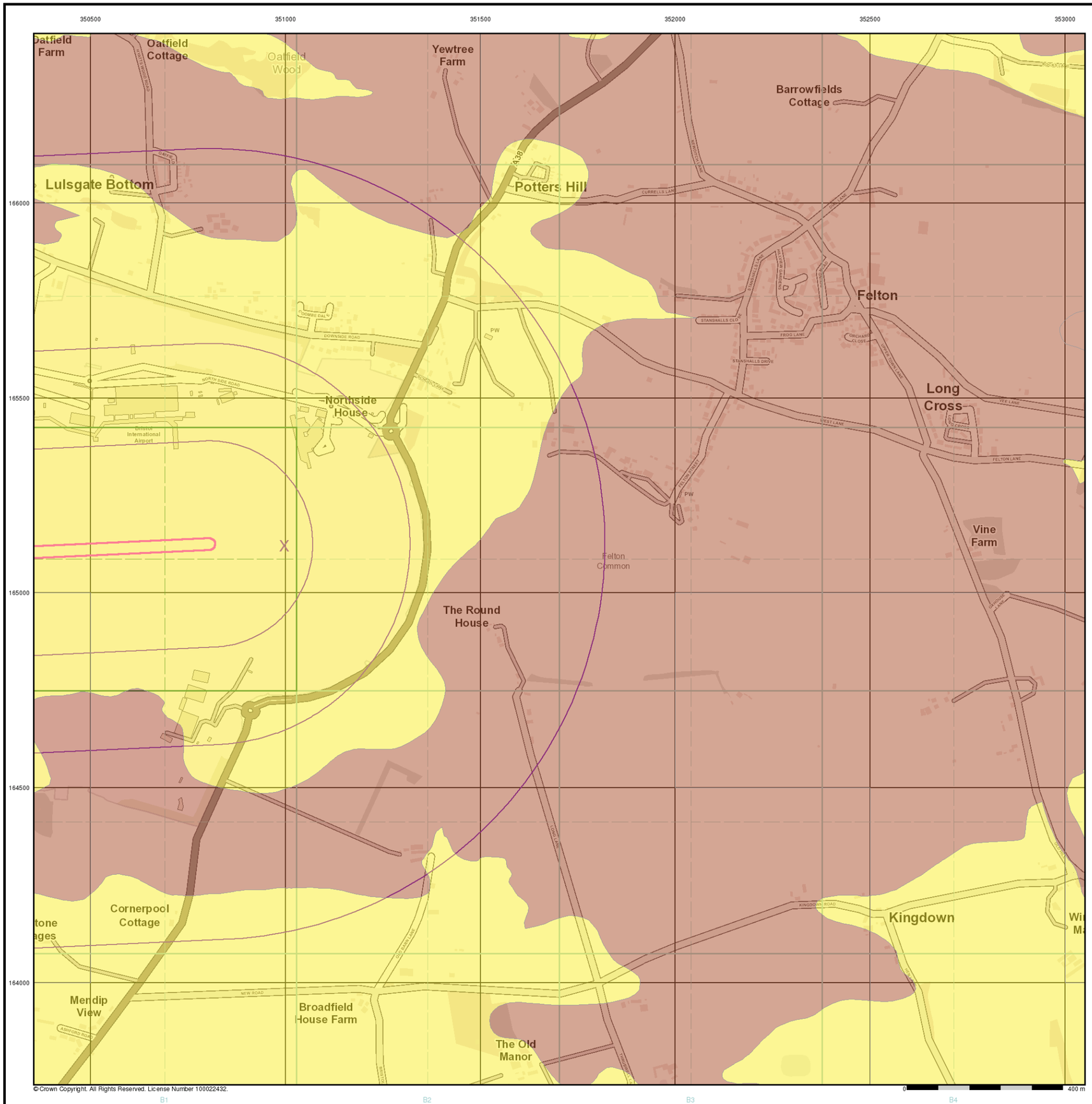


General

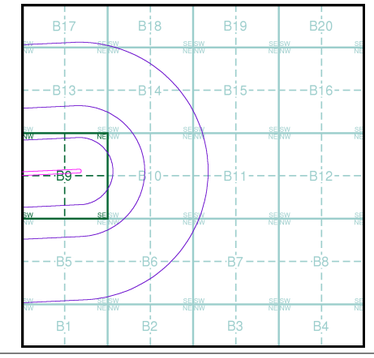
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Arsenic

Arsenic Concentrations mg/kg

- < 15
- 15 - 25
- 25 - 35
- 35 - 45
- 45 - 60
- 60 - 120
- > 120

Estimated Soil Chemistry Arsenic - Slice B



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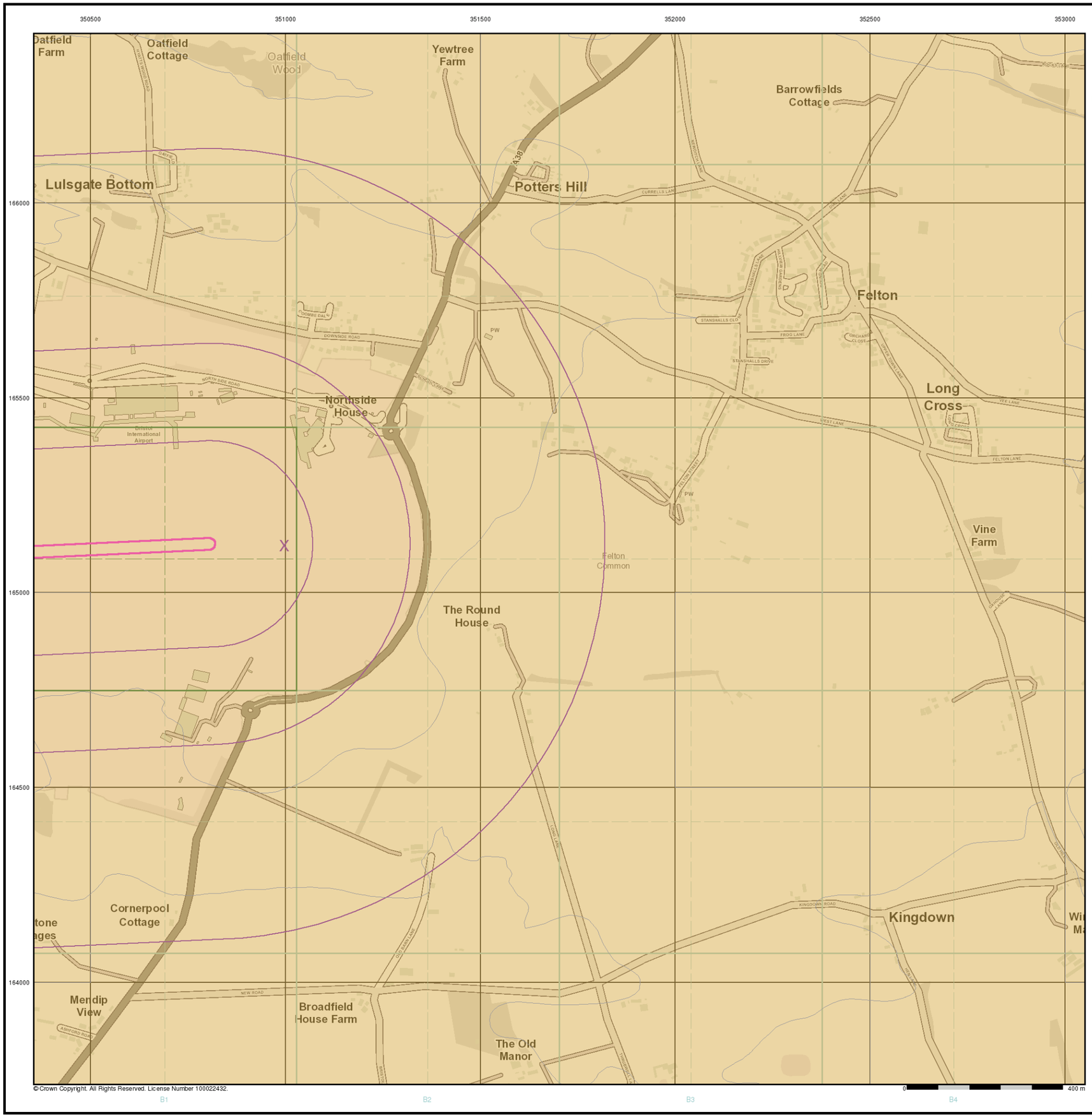


General

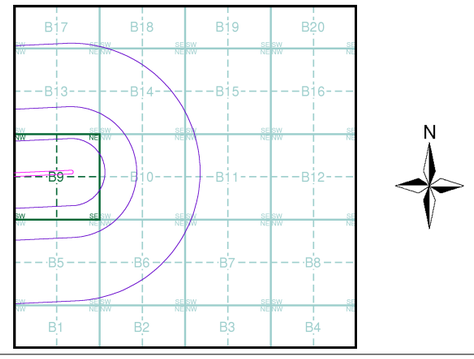
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Cadmium

Cadmium Concentrations mg/kg

- < 1.8
- 1.8 - 2.2
- 2.2 - 3.0
- > 3.0

Estimated Soil Chemistry Cadmium - Slice B



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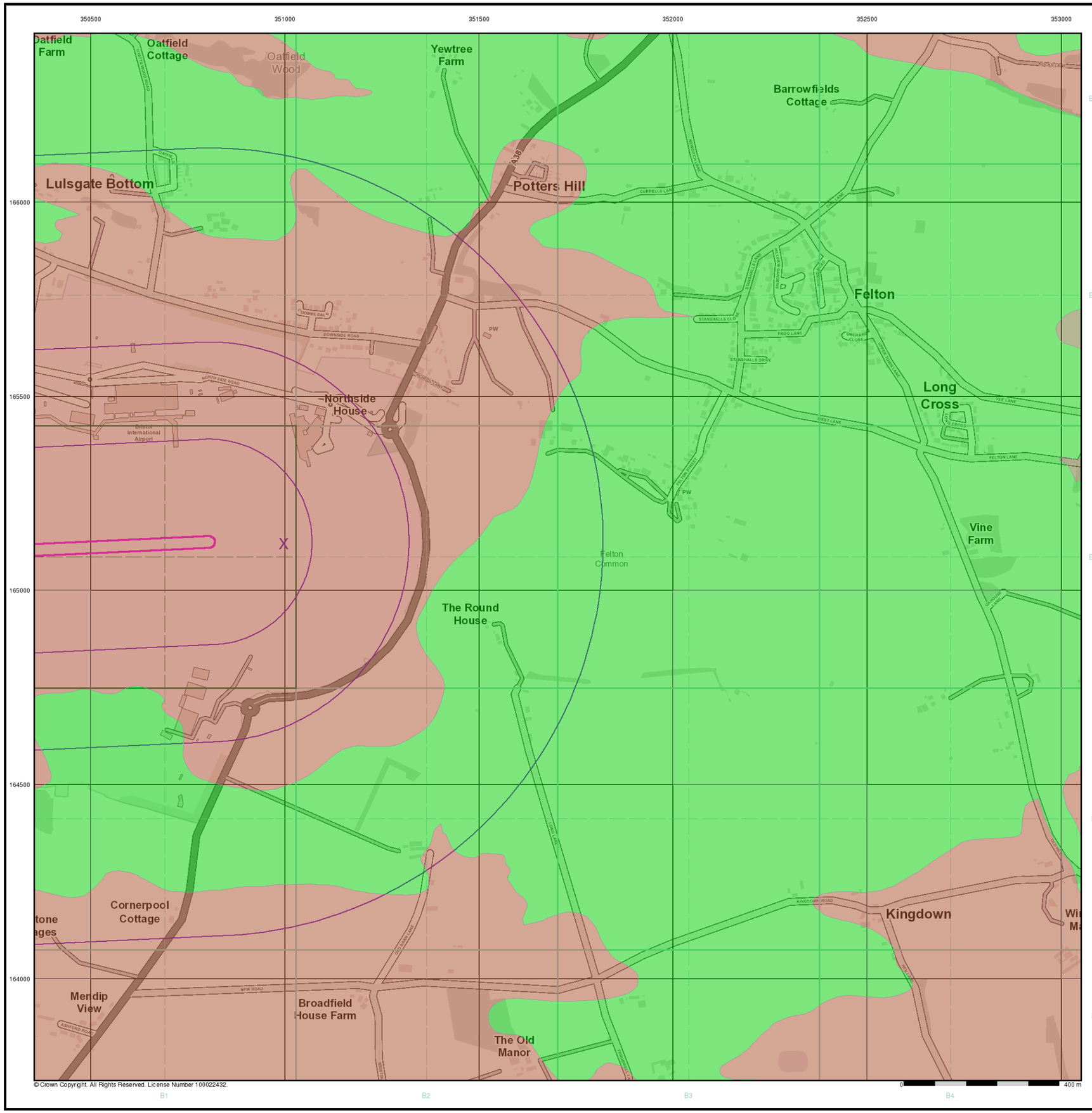


General

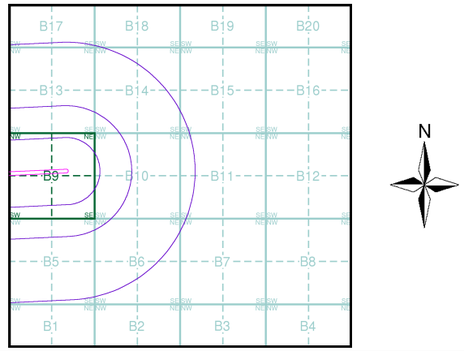
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Chromium

Chromium Concentrations mg/kg

- < 20
- 20 - 40
- 40 - 60
- 60 - 90
- 90 - 120
- 120 - 180
- > 180

Estimated Soil Chemistry Chromium - Slice B



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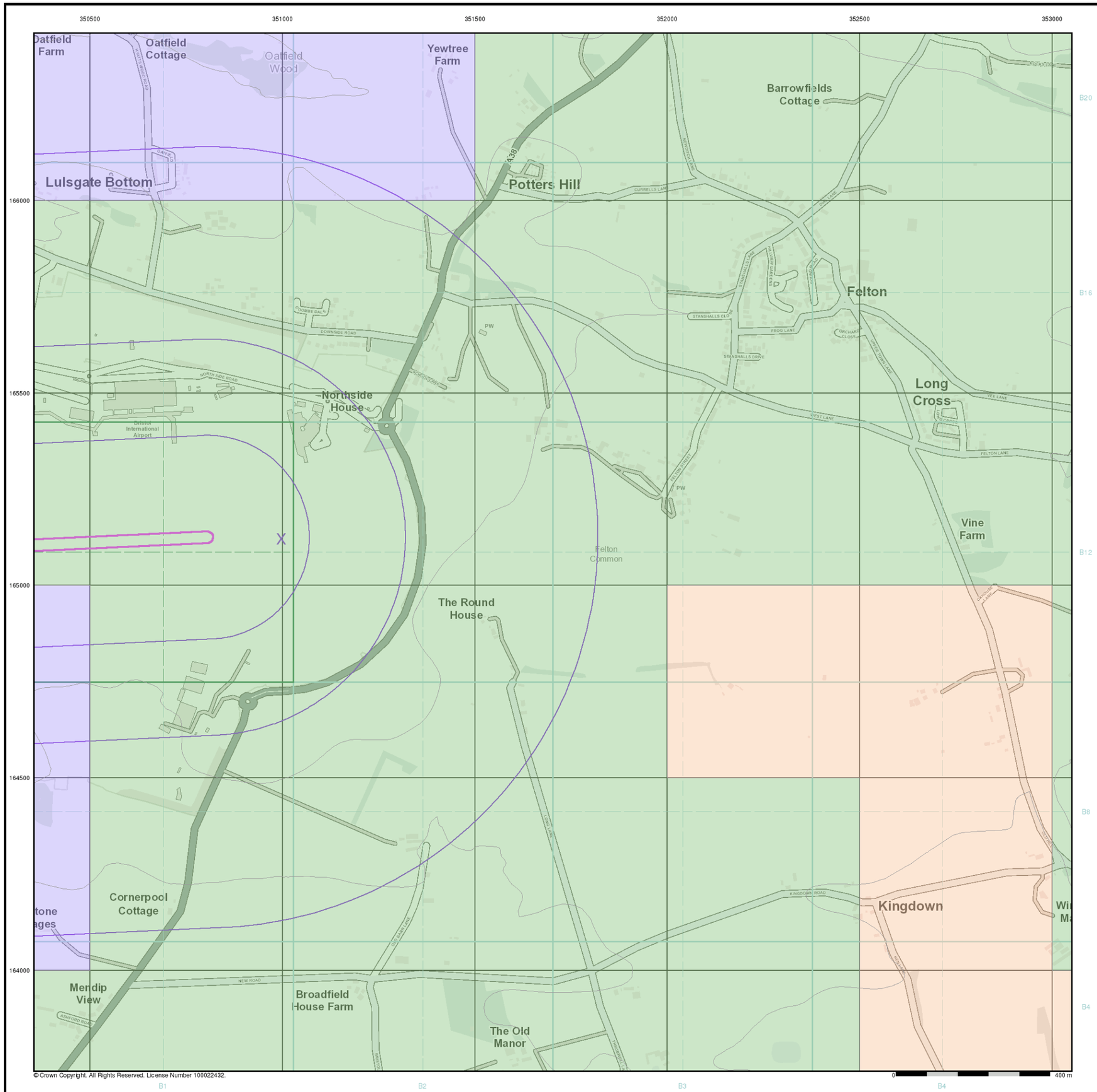


General

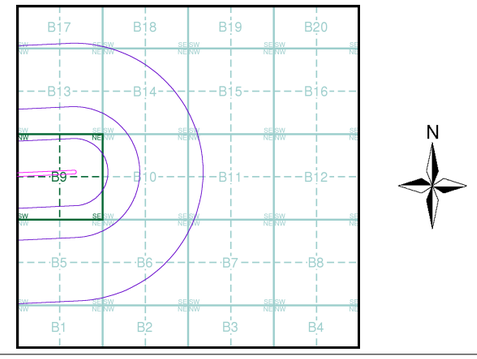
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Lead

Lead Concentrations mg/kg

- <100 mg/kg
- 100 - 200
- 200 - 300
- 300 - 600
- 600 - 1200
- >1200

Estimated Soil Chemistry Lead - Slice B



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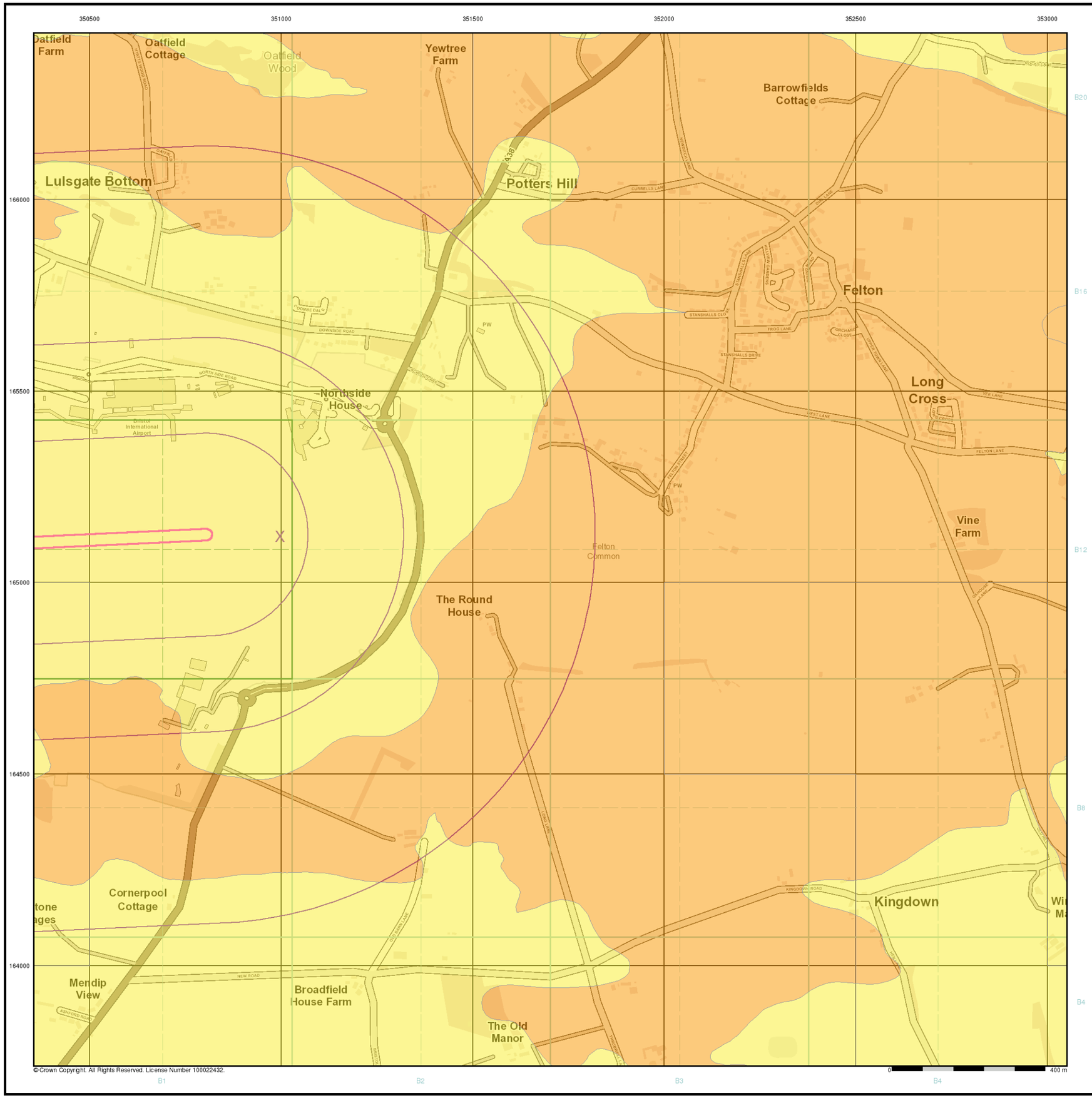


General

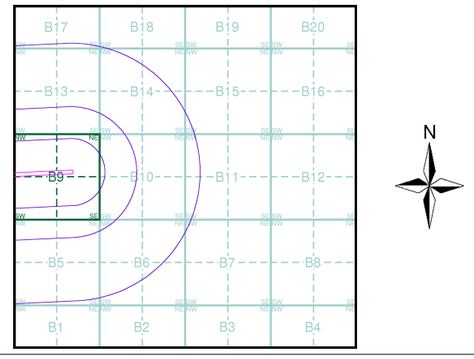
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Nickel

Nickel Concentrations mg/kg

- < 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 80
- 80 - 100
- > 100

Estimated Soil Chemistry Nickel - Slice B



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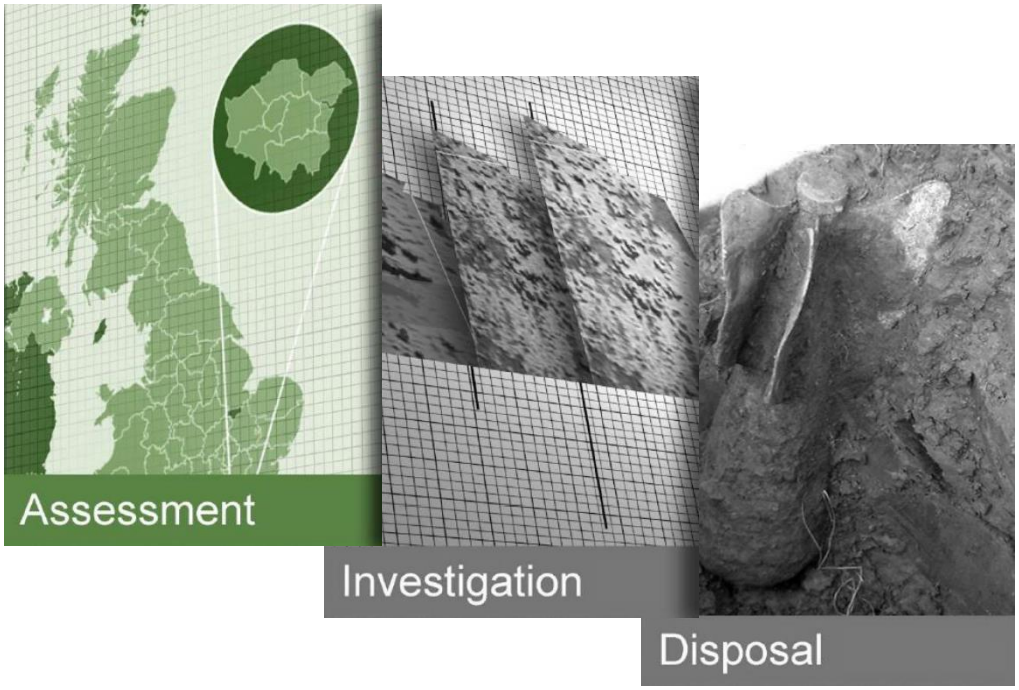
Appendix C
UXO Desk Study and Risk Assessment

zeticauxo



Bristol Airport – UXO Desk Study & Risk Assessment

Drafted by Lucy Warwick
Checked by Stefan Lang
Authorised by Mike Sainsbury

Document Title	**UXO Desk Study & Risk Assessment**
Document Ref.	**P7872-18-R1**
Revision	**A**
Project Location	**Bristol Airport**
Client	**Wood Plc**
Date	**4th September 2018**

UXO DESK STUDY & RISK ASSESSMENT

Bristol Airport

EXECUTIVE SUMMARY

Zetica Ltd was commissioned by Wood Plc to carry out an Unexploded Ordnance (UXO) Desk Study and Risk Assessment for an area of approximately 221 hectares (ha) at Bristol Airport, Lulsgate Bottom, Somerset (the 'Site').

The aim of this report is to gain a fair and representative view of the UXO hazard for the Site and its immediate surrounding area in accordance with the Construction Industry Research and Information Association (CIRIA) C681 'Unexploded Ordnance (UXO), a Guide for the Construction Industry'.

During World War Two (WWII) the Site encompassed Royal Air Force (RAF) Lulsgate Bottom, which was primarily used as a training airfield. Activity at the airfield is not considered to provide a significant source of UXO hazard to the Site.

Additionally, no records of High Explosive (HE) bombs falling on the Site have been found.

Given this, it is considered that the Site has a low UXO hazard level, as shown in the accompanying Figure, reproduced as Figure 7 in the main report.

Figure	UXO hazard zone plan of the Site

Source: Bing Maps *Not to Scale*

Legend					
	Very Low		Low		Moderate
	High		Very High		Site boundary

It should be noted that the potential for encountering Small Arms Ammunition (SAA) across any former military airfield as a result of aircraft crashes, localised disposal or spillages cannot be totally discounted. SAA is not considered to provide a significant UXO hazard.

The main findings of the report are summarised below:

- No records of bombing or military activity on the Site during World War One (WWI) have been found.
- During WWII the Site comprised Royal Air Force (RAF) Lulsgate Bottom, which was primarily used as a training airfield. The airfield had a machine gun range, munitions stores and cannon test butts. By 2015 these areas had all been redeveloped and it is likely that any remaining UXO would have been removed.
- Records indicate that 2No. High Explosive (HE) bombs fell on the northern boundary of the Site during WWII. They were recorded as Unexploded Bombs (UXB) and removed.
- Incendiary Bombs (IBs) are recorded falling on the Site during WWII. IBs had a very low explosive content and were not designed to penetrate the ground, and are not considered to provide a significant UXO hazard.
- Post-WWII RAF Lulsgate Bottom reverted to private and civilian flying, and now operates as Bristol Airport.

The Table below, reproduced as Table 4 in the main report, provides a UXO risk assessment for potential works on the Site.

Further details on the methodology for the risk assessment are provided in Section 11.1 of the main report.

Table UXO risk assessment for the Site

Potential UXO Hazard	Anticipated Works	PE	PD	P = PE x PD	Likelihood	Severity	Risk Rating	UXO Risk
UXB	Shallow Excavations	1	1	1	1	5	5	Low
	Deep Excavations	1	1	1	1	5	5	Low
	Piling/Boreholes	1	1	1	1	4	4	Low
Other UXO	Shallow Excavations	1	1	1	1	4	4	Low
	Deep Excavations	1	1	1	1	4	4	Low
	Piling/Boreholes	1	1	1	1	3	3	Low
SAA	Shallow Excavations	3	1	3	2	2	4	Low
	Deep Excavations	3	1	3	2	2	4	Low
	Piling/Boreholes	2	1	2	2	2	4	Low

PE (Probability of Encounter), PD (Probability of Detonation), P (Overall Probability)

Shallow Excavations defined as <1.0m below ground level (bgl).

Risk Mitigation Recommendations

To ensure that the UXO risk is reduced to As Low As Reasonably Practicable (ALARP) the following mitigation is advised:

Where a low risk of UXO encounter is anticipated, industry good practice is to raise the awareness of those involved in excavations so that in the unlikely event that a suspect item is discovered, appropriate action is taken. This can be achieved through UXO awareness briefings to site staff.

Clearance certification for borehole or pile locations is considered prudent only if a zero tolerance to risk is adopted. Zero tolerance is commonly adopted for sites that have safety critical infrastructure such as nuclear establishments and oil refineries.

Table 5 in the main report gives recommended actions in relation to the potential UXO risk level and the anticipated Site activity.

Further advice on the mitigation methods can be provided by Zetica on request.

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Plate 1 Recent aerial photograph of the Site
Plate 2 Aerial photograph, 1999

Plate 3 Luftwaffe target photograph of RAF Lulsgate Bottom, October 1940
Plate 4 Aerial photograph, 12th July 1946
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Table 1 Bombing statistics
Table 2 Estimated average maximum bomb penetration depths
Table 3 WWII HAA gun and ZAA rocket batteries within 10km of the Site
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UXO DESK STUDY & RISK ASSESSMENT

Bristol Airport

Note: To aid the reader of this report, Zetica has colour coded each paragraph. Paragraphs with black text on a white background are paragraphs that provide site-specific information or information specifically researched as part of this project.

Paragraphs in a dark green text with a green background are paragraphs providing general information and, where appropriate, links to online resources giving further detail on particular sources of UXO.

1 INTRODUCTION

1.1 Project Outline

Zetica Ltd was commissioned by Wood Plc to carry out an Unexploded Ordnance (UXO) Desk Study and Risk Assessment for an area of approximately 221 hectares (ha) at Bristol Airport, Lulsgate Bottom, Somerset (the 'Site').

The aim of this report is to gain a fair and representative view of the UXO hazard for the Site and its immediate surrounding area in accordance with the Construction Industry Research and Information Association (CIRIA) C681 'Unexploded Ordnance (UXO), a Guide for the Construction Industry'. This hazard assessment includes:

- Likelihood of ordnance being present.
- Type of ordnance (size, filling, fuze mechanisms).
- Quantity of ordnance.
- Potential for live ordnance (UXO).
- Probable location.
- Ordnance condition.

It should be noted that some military activity providing a source of UXO hazard may not be readily identifiable and therefore there cannot be any guarantee that all UXO hazards within the Site have been identified in this report.

1.2 Historical Information

With most locations, the potential presence of UXO as a result of enemy action, unauthorised disposal or unrecorded military activity can never be totally discounted.

Detailed records of military activity are rarely released into the public domain. Even when military information is made public there may be gaps in the records because files have been lost or destroyed.

Press records can supplement local information, although this source of information must be treated with caution, as inaccuracies do exist, either inadvertently or intentionally in order to confuse enemy intelligence. Classified official records can sometimes be considered inaccurate for the same reason.

Recent research indicates that England alone had 17,434No. recorded defence sites, of which 12,464No. were classified as defensive anti-invasion sites. The precise locations of many of these sites are still to be identified, illustrating the scale of the problem when establishing potential risks from limited historical data.

1.3 Sources of Information

Zetica Ltd researched the military history of the Site and its surrounding area utilising a range of information sources. The main sources of information are detailed in the following sections and referenced at the end of this report.

1.3.1 Zetica Ltd Defence Related Site Records

Zetica Ltd's in-house records were consulted, including reference books and archived materials from past work in the region. Relevant documents have been cited within the bibliography of this report.

1.3.2 Zetica Ltd Bombing Density Records and Maps

Reference has been made to the Zetica Ltd bomb risk maps located on Zetica Ltd's website (http://zeticauxo.com/downloads-and-resources/risk-maps/).

1.3.3 Ministry of Defence and Government Records

Various government departments and units within the Ministry of Defence (MoD) were approached for information of past and present military activity in the area. These included the Home Office records of abandoned bombs.

1.3.4 Other Historical Records, Maps and Drawings

Numerous reference documents including historical maps, aerial photographs and drawings have been consulted from sources such as the Royal Air Force (RAF) Museum, the National Archives, the US National Archives and Records Administration (NARA), Historic England and the Defence of Britain Project.

The British Geological Survey (BGS) was consulted for borehole information.

1.3.5 Local Authority Records

Information was obtained from Gloucestershire and Somerset County Councils, Bristol City Council and North Somerset and Bath Council.

1.3.6 Local Record Offices and Libraries

Somerset Heritage Centre and Bristol Archives were consulted for information.

1.3.7 Local Historical and Other Groups

Local history groups and archaeological bodies, such as the Somerset Historic Environment Record (HER), were consulted.

1.4 Data Confidence Level

In general, there is a high level of confidence in the researched information sources used for this report. Any exceptions to this are specifically detailed in the text of this report.

It should be noted that official WWII airfield plans for Royal Air Force (RAF) Lulsgate Bottom were unavailable at the time of writing. This is for security purposes as the current airfield (Bristol Airport) is operational.

Other sources, such as books and aerial photography, have been used to provide details of airfield facilities on the Site.

2 THE SITE

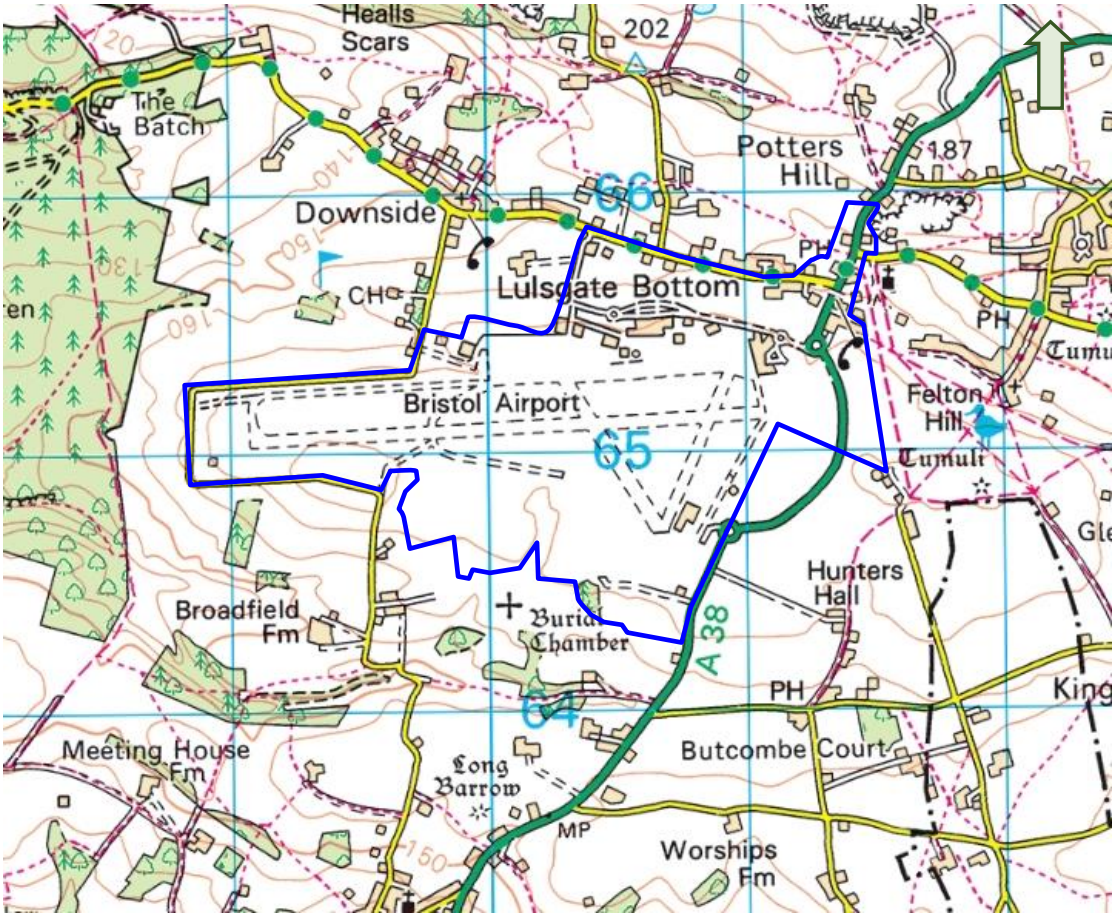
2.1 Site Location

The Site is centred on Ordnance Survey National Grid Reference (OSNGR) ST 505655. It is located in Lulsgate Bottom, approximately 12.9km southwest of Bristol city centre.

The Site comprises Bristol Airport, open land, and parts of the A38, Winters Lane and West Lane. It is bounded to the north by Downside Road and to the east, south and west by open fields.

Figure 1 is a Site location map and Plate 1 is a recent aerial photograph of the Site.

Figure 1	Site location map



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Legend	Site boundary

Plate 1	Recent aerial photograph of the Site

Source: Bing Maps *Not to Scale*

Legend	Site boundary

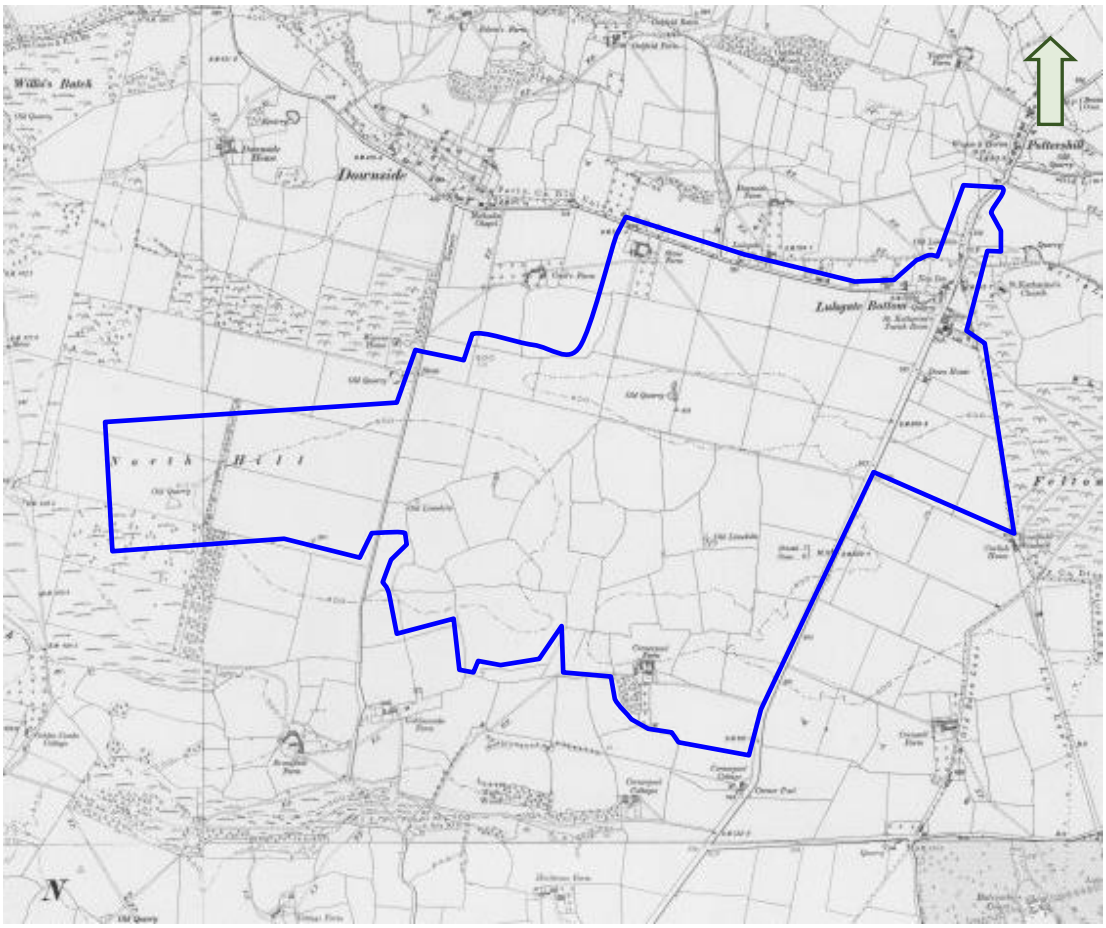
2.2 Proposed Works

It is understood that proposed works on the Site may include intrusive ground investigations, excavations and piling.

2.3 Site History

The historical map of 1904 (Figure 2) shows that at the beginning of the 20th century the Site comprised open ground and farmland to the southwest of Lulsgate Bottom.

Figure 2	Historical map, 1904



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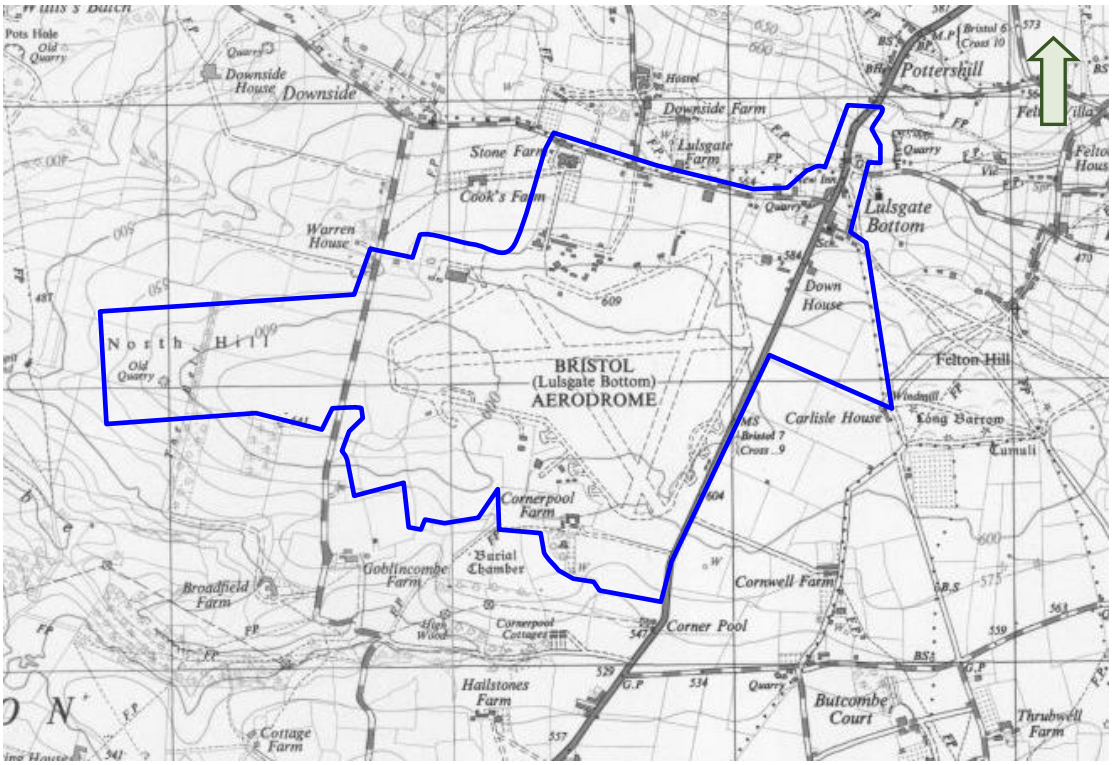
Legend	Site boundary

In 1940 an airfield was opened on the Site as a Relief Landing Ground (RLG). It was later expanded and renamed RAF Lulsgate Bottom (see Section 5.1).

After WWII, RAF Lulsgate Bottom reverted to civilian use as Bristol Airport. This is shown on the historical map of 1961 (Figure 3). The area surrounding the Site remained predominantly rural.

Figure 3	Historical map, 1961



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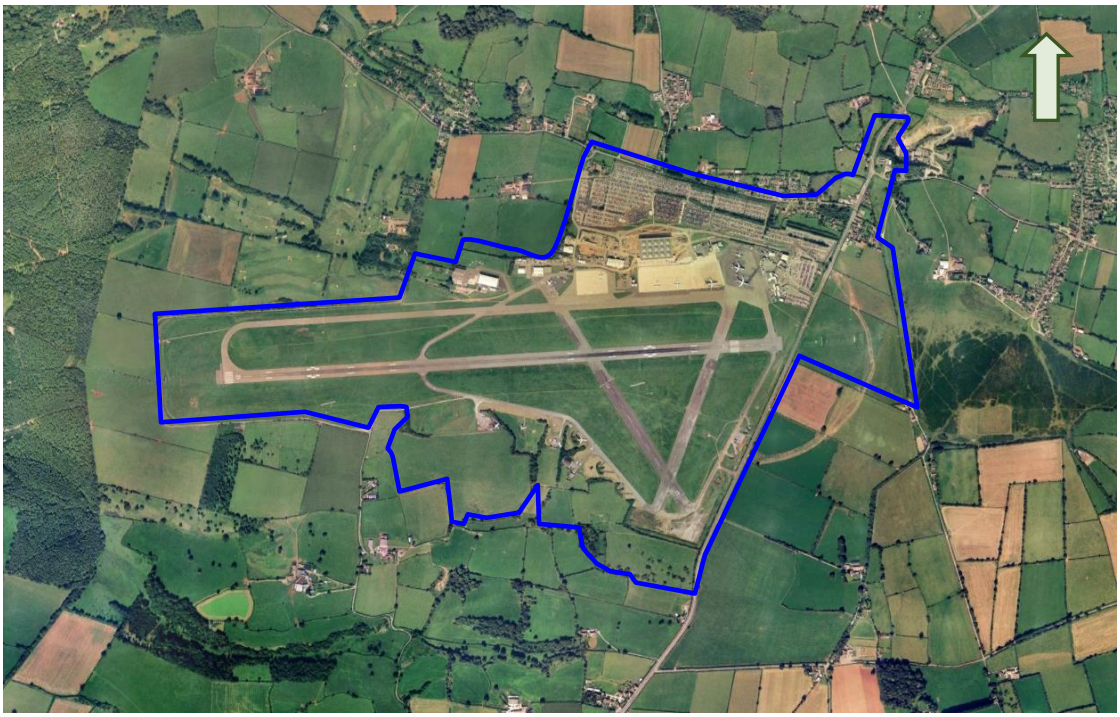
Legend	Site boundary

By the mid-1970s Bristol Airport had undergone significant expansion, including the construction of a new runway, control tower and terminal, in addition to car parks along the northern boundary of the Site.

The A38, previously bisecting the Site, was redeveloped along the eastern part of the Site.

These developments are shown in Plate 2, an aerial photograph dating from 1999.

Plate 2	Aerial photograph, 1999



Source: Google Earth *Not to Scale*

Legend	Site boundary

Since 1999 new terminal buildings and extensive car parking facilities have been constructed on the southern part of the Site (see Plate 1).

2.4 Pre-WWI Military Activity

No records of any significant pre-WWI military activity on or in close proximity to the Site have been found.

2.5 WWI Military Activity

No records of any significant WWI military activity on or in close proximity to the Site have been found.

During WWI an estimated 9,000No. German bombs were dropped over Britain. It was the first time that strategic aerial bombing had been used.

No records have been found indicating that the Site was bombed during WWI.

In response to regional air raids, Anti-Aircraft (AA) guns were established. These were potential sources of Unexploded AA (UXAA) shells which could land up to 13km from the firing point, although more typically fell within 10km during WWI.

No records have been found to indicate that any static AA guns were located within 10km of the Site.

WWI military activity is not considered to provide a source of UXO hazard to the Site.

2.6 WWII Military Activity

During WWII the area around the Site remained predominantly rural with few strategic targets. Details of air raids in the vicinity of the Site are provided in Section 3.

Defensive and offensive military structures were built during WWII. These included lines of defences (Stop Lines), pillboxes, bombing decoys and AA guns. Details of those nearest to the Site are provided in Section 4.

In 1940 RAF Lulsgate Bottom was established on the Site. Operational details of the airfield are given in Section 5. Section 6 provides details of the potential sources of UXO hazard associated with activities on the airfield.

Other military establishments in the vicinity of the Site are described in Sections 7 to 8.

2.7 Post-WWII Military Activity

RAF Lulsgate Bottom remained active until 1946 when it reverted to private flying. It now operates as Bristol Airport.

Post-WWII military activity is not considered to provide a source of UXO hazard to the Site.

3 WWII BOMBING

Bombing raids began in the summer of 1940 and continued until the end of WWII. Bombing densities generally increased towards major cities or strategic targets such as docks, industrial premises, power stations and airfields.

The German bombing campaign saw the extensive use of both High Explosive (HE) bombs and Incendiary Bombs (IBs). The most common HE bombs were the 50kg and 250kg bombs, although 500kg were also used to a lesser extent. More rarely 1,000kg, 1,400kg and 1,800kg bombs were dropped.

The HE bombs tended to contain about half of their weight in explosives and were fitted with one or sometimes two fuzes. Not all HE bombs were intended to explode on impact. Some contained timing mechanisms where detonation could occur more than 70 hours after impact.

Incendiary devices ranged from small 1kg thermite filled, magnesium bodied bombs to a 250kg 'Oil Bomb' (OB) and a 500kg 'C300' IB. In some cases the IBs were fitted with a bursting charge. This exploded after the bomb had been alight for a few minutes causing burning debris to be scattered over a greater area. The C300 bombs were similar in appearance to 500kg HE bombs, although their design was sufficiently different to warrant a specially trained unit of the Royal Engineers to deal with their disposal.

Anti-Personnel (AP) bombs and Parachute Mines (PMs) were also deployed. 2No. types of anti-personnel bombs were in common use, the 2kg and the 12kg bomb. The 2kg bomb could inflict injury across an area up to 150m away from the impact, within 25m of this, death or fatal injury could occur.

PMs (which were up to 4m in length) could be detonated either magnetically or by noise/vibration. Anti-shipping parachute mines were commonly dropped over navigable rivers, dockland areas and coastlines. The Royal Navy was responsible for ensuring that the bombs were made safe. Removal and disposal was still the responsibility of the Bomb Disposal Unit of the Royal Engineers.

WWII bomb targeting was inaccurate, especially in the first year of the war. A typical bomb load of 50kg HE bombs mixed with IBs which was aimed at a specific location might not just miss the intended target but fall some considerable distance away.

It is understood that the local Civil Defence authorities in urban areas had a comprehensive system for reporting bomb incidents and dealing with any UXO. In more rural areas, fewer bombing raids occurred. It is known that ARP records under-represent the number and frequency of bombs falling in rural and coastal areas.

Bombs were either released over targets or as part of 'tip and run' raids where bomber crews would drop their bombs to avoid Anti-Aircraft fire or Allied fighter aircraft on the route to and from other strategic targets. Bombs dropped as a result of poor targeting or 'tip and run' raids on rural, river, marsh or coastal areas were often unrecorded or entered as 'fell in open country', 'fell in the sea' or 'fell in the river' and left little evidence of the fall.

3.1 Bombing in North Somerset

From prior to the declaration of war in 1939, Britain was subjected to reconnaissance flights by the Luftwaffe which was building up a photographic record of potential targets. As early as 1937, German airships were flying across Western England to photograph the airfields, munitions factories and other strategic targets in the region.

Some areas of Somerset were heavily bombed in WWII. Avonmouth, Bath and Bristol were targeted by the Luftwaffe. In addition, military establishments in the region such as airfields were also specifically targeted. Records for raids on many of the region's airfields and strategic targets were suppressed until after WWII.

The county of Somerset recorded approximately 5,603No. HE bombs, 641No. of which were recorded as UXB. In addition, at least 89No. PMs, 62,074No. IBs, 152No. OBs and 19No. other air-dropped devices fell in the county. At least 28No. enemy aircraft also crashed in Somerset.

The more rural areas of Somerset received few significant raids, being subjected mainly to bombing overspill from Bristol and the targets on the Somerset coast, in addition to 'tip and run' raids.

3.2 Strategic Targets

The presence of strategic targets significantly increased the likelihood of bombing within the local area. Airfields, docks, industrial facilities, transport infrastructure and anti-invasion defences were all targeted by Luftwaffe bombers. The inherent bombing inaccuracies at the time meant that areas surrounding the targets were often subjected to bombing.

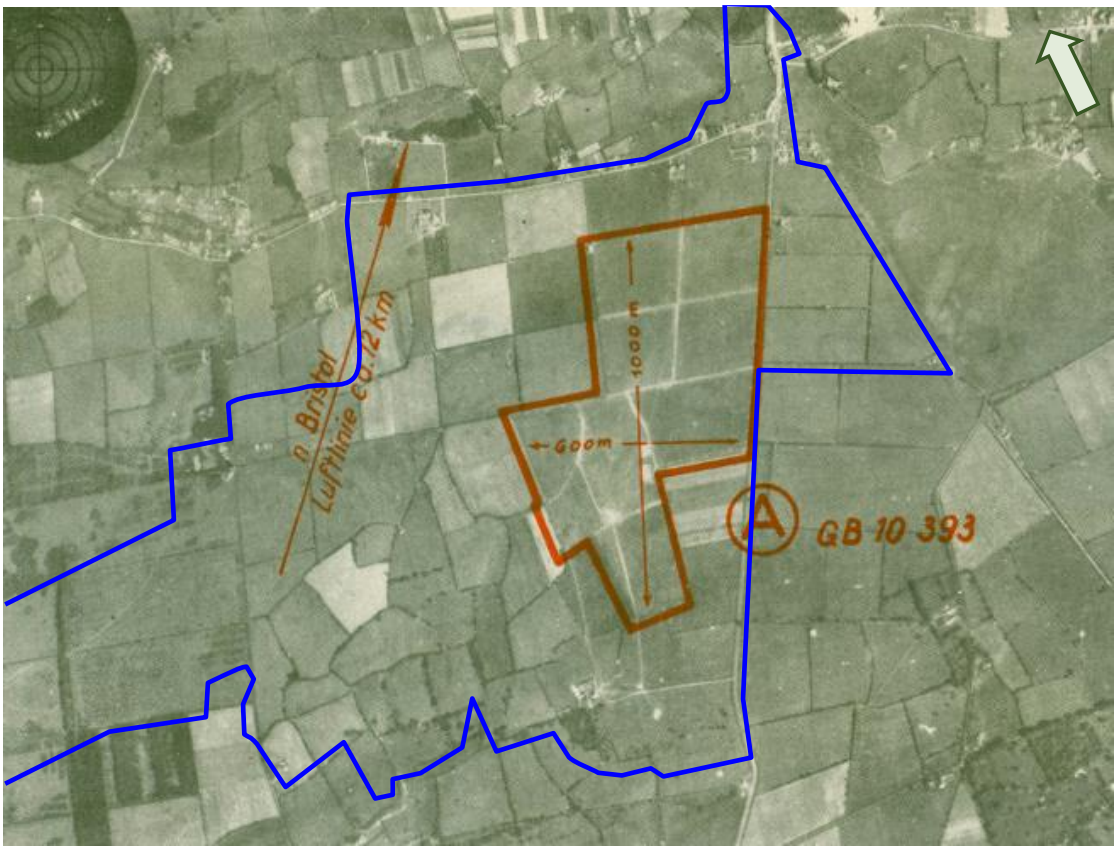
Due to the rural nature of the region there were few industrial or infrastructure targets in the vicinity of the Site.

The only significant target in the area was RAF Lulsgate Bottom, on the Site.

Plate 3 is a Luftwaffe target photograph of the airfield, dating from October 1940. It has been denoted Target A: GB 10 393.

It demonstrates the greatly reduced size of the airfield during WWII compared to the present day.

Plate 3	Luftwaffe target photograph of RAF Lulsgate Bottom, October 1940



Source: NARA *Not to Scale*

Legend	Site boundary

3.3 Bombing Density and Incidents

Table 1 gives details of the overall bombing statistics recorded for the Local Authority Districts of the Site and surrounding districts. These were categorised as County Boroughs (CB), Municipal or Metropolitan Boroughs (MB), Urban Districts (UD) and Rural Districts (RD).

WWII bomb density levels are defined below:

<5 bombs per 405ha is a Very Low regional bombing density.

5-15 bombs per 405ha is a Low regional bombing density.

15-50 bombs per 405ha is a Moderate regional bombing density.

50-250 bombs per 405ha is a High regional bombing density.

>250 per 405ha is a Very High regional bombing density.

During WWII the majority of the Site was located in Axbridge RD. A small part of the Site encroached on Long Ashton RD.

Table 1	Bombing statistics

Area	Bombs Recorded				
	High Explosive	Parachute Mines	Other	Total	Bombs per 405ha (1,000 acres)
Long Ashton RD	**1,004**	**8**	**16**	**1,028**	**22.1**
Axbridge RD	**746**	**15**	**20**	**781**	**8.6**
Bristol CB	6,184	2	17	6,203	254.2
Clutton RD	374	0	5	379	8.9

Note that Table 1 excludes the figures for Pilotless Aircraft (V1s, also known as 'Doodlebugs'), Long Range Rockets (V2s) and IBs. Discrepancies between this list and other records, such as bomb clearance records, demonstrate that this data is likely to under-represent actual bombing.

The nearest recorded air raid incidents to the Site are described below.

16th March 1941

Bombs (number and type unspecified) fell on Goblin Combe Farm, approximately 0.2km southwest of the Site.

74No. HE bombs fell on the Downside bombing decoy, approximately 1.2km northwest of the Site. These included 1No. ≥1000kg HE bomb, 4No. ≥500kg HE bombs and 19No. 250kg HE bombs. The remainder were all estimated to be 50kg in size. 1No. of the bombs was recorded as UXB. A large number of IBs also fell on the decoy.

3rd April 1941

Bombs (number and type unspecified) fell on Goblin Combe Farm, approximately 0.2km southwest of the Site.

8No. HE bombs fell on the Downside bombing decoy, approximately 1.2km northwest of the Site. These included 3No. 250kg HE bombs. The remainder were all estimated as 50kg.

4th April 1941

Several IBs fell on RAF Lulsgate Bottom, on the Site, without causing any significant damage.

2No. HE bombs fell on the edge of the airfield at RAF Lulsgate Bottom, on the northern boundary of the Site. They were recorded as UXB and removed.

10No. HE bombs fell on the Downside bombing decoy, approximately 1.2km northwest of the Site. These included 1No. 500kg or larger HE bomb and 4No. 250kg HE bombs. The remainder were all estimated to be 50kg in size.

9th April 1941

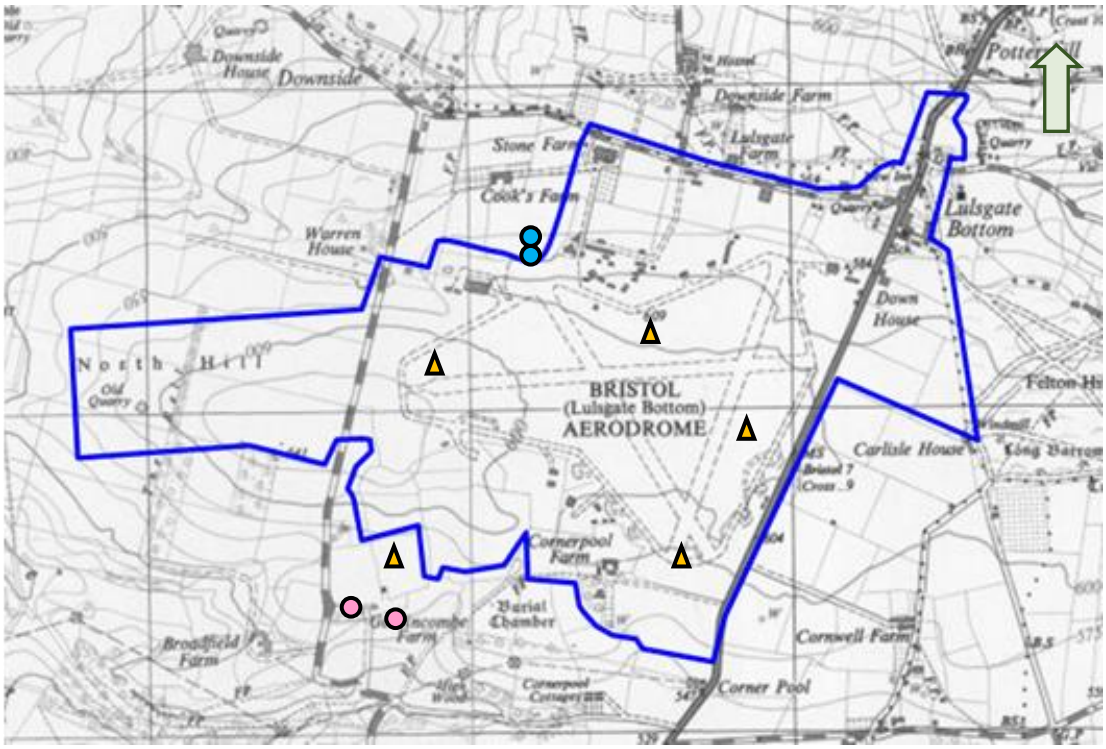
8No. HE bombs fell on the Downside bombing decoy, approximately 1.2km northwest of the Site. 1No. 500kg or larger HE bomb and 4No. 250kg HE bombs were recorded. The remainder were all estimated to be 50kg in size. 1No. was recorded as UXB.

It should be noted that during WWII, many UXB were mapped and subsequently removed as and when conditions and demands on Bomb Disposal teams allowed. Their removal was not always accurately recorded and sometimes records were later destroyed. In practice, most UXB were probably removed and only a much smaller number were actually registered as officially abandoned bombs.

Figure 4 is a map showing the approximate locations of bomb impacts in the vicinity of the Site. IBs shown are indicative of larger numbers of similar devices that fell within the given area. The map has been compiled from a number of different sources, including air raid incident reports, bomb census maps and historical aerial photographs.

Note that air raid incident reports did not always record precise locations, often only indicating on which street, area or farm a bomb fell.

Figure 4	Compiled bomb impact map for the vicinity of the Site

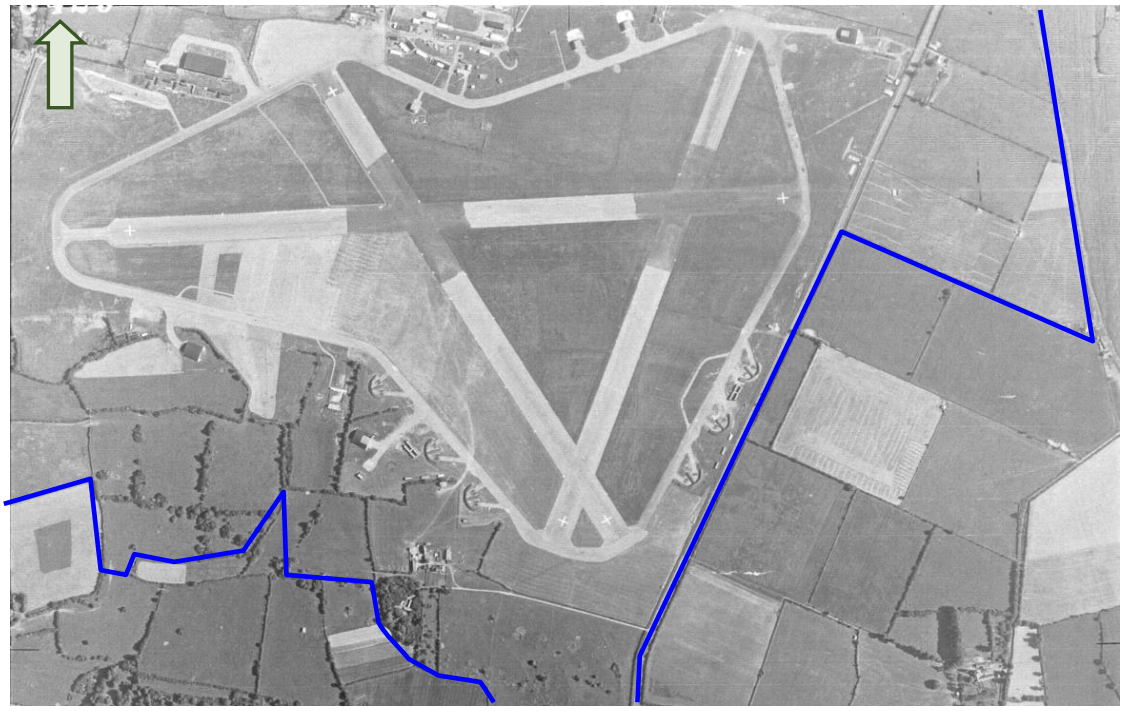


Source: © Crown Copyright 2018. Reproduced by permission of Ordnance Survey *Not to Scale*

Legend	Site boundary	UXB	IBs	Type unspecified

Plate 4 is an aerial photograph dated the 12th July 1946. No bomb damage has been identified on the Site or in the surrounding area.

Plate 4	Aerial photograph, 12th July 1946

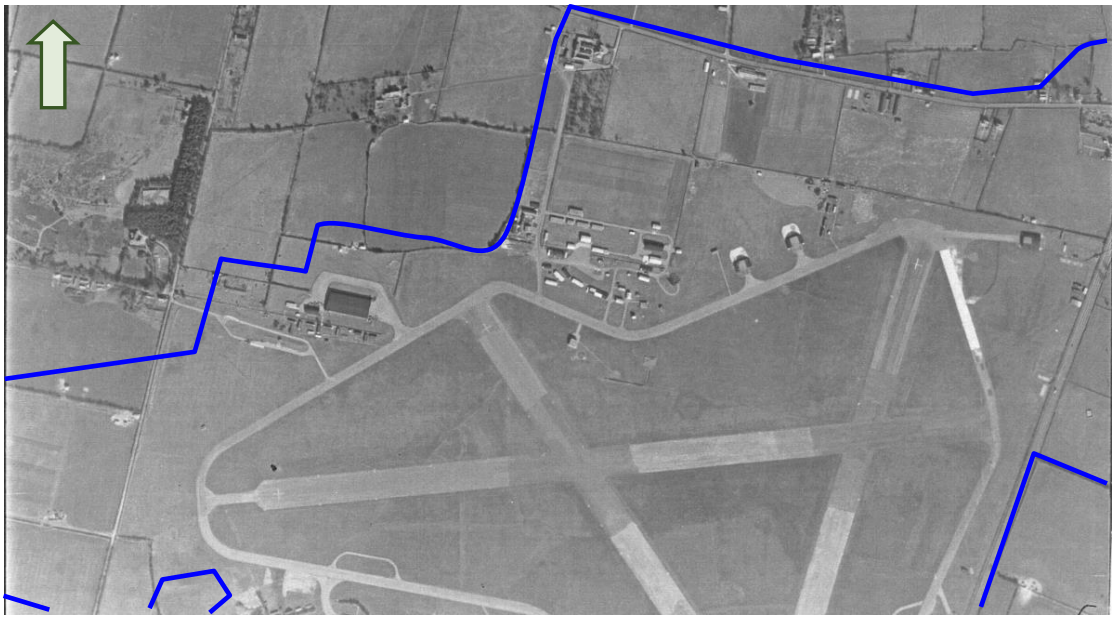


Source: Historic England *Not to Scale*

Legend	Site boundary

Plate 5 is an aerial photograph dated the 9th March 1948. No bomb damage has been identified on the Site or in the surrounding area.

Plate 5	Aerial photograph, 9th March 1948



Source: Historic England *Not to Scale*

Legend	Site boundary

Potential UXO Hazard

No records have been found indicating that the Site was bombed and no bomb damage has been identified on the Site on historical aerial photography.

IBs are recorded falling on the Site. IBs had a very small HE content and were not designed to penetrate the ground. They are considered to provide a low UXO hazard (see Appendix 2.6).

WWII bombing is not considered to provide a source of UXO hazard to the Site.

3.4 Geology and Bomb Penetration Depths

It is important to consider the geological materials present on the Site at the time that a bomb was dropped in order to establish its maximum penetration depth.

British Geological Survey (BGS) 1:50,000 Sheet 264 Bristol (Solid and Drift) and BGS borehole records were consulted.

During WWII, the geology of the Site comprised topsoil overlying Carboniferous Limestone.

Table 2 provides an estimate of average maximum bomb penetration depths assuming ground conditions during WWII of 1m of stiff clay overlying more than 50m of weak rock.

Table 2	Estimated average maximum bomb penetration depths

Estimated average bomb penetration depths for anticipated geology		
Bomb Weight	50kg	3.0m
	500kg	6.0m

The estimated bomb penetration depths given in Table 2 are from the WWII ground level and are based on the following assumptions:

a) High level release of the bomb resulting in an impact velocity of 260m/s (>5,000m altitude).

b) A strike angle of 10 to 15 degrees to the vertical.

c) That the bomb is stable, both in flight and on penetration.

d) That no retarding units are fitted to the bomb.

e) That the soil type is homogenous.

A high-altitude release of a bomb will result in ground entry at between 10^{o} and 15^{o} to the vertical with the bomb travelling on this trajectory until momentum is nearly lost. The bomb will then turn abruptly to the horizontal before coming to rest. The distance between the centre of the entry hole and the centre of the bomb at rest is known as the 'offset'. A marked lateral movement from the original line of entry is common.

Low-level attacks may have an impact angle of 45° or more, which will frequently lead to a much greater amount of offset movement during soil penetration.

4 WWII DEFENCES

4.1 Bombing Decoys

In order to draw enemy aircraft away from towns and other strategically important targets, a series of decoys were developed between 1940 and 1941.

They were estimated to have drawn at least 5% of the total weight of bombs away from their intended targets. Approximately 792No. static decoy sites were built at 593No. locations in England. In addition, numerous temporary and mobile decoys were deployed.

Several different types of decoy were devised:

- Night time dummy airfields (Q sites).
- Daytime dummy airfields (K sites).
- Diversionary fires to simulate successful bombing raids on airfields (QF sites), petroleum depots (P sites) and major towns and cities (Starfish or SF sites).
- Simulated urban lighting (QL sites).
- Dummy Heavy Anti-Aircraft (HAA) batteries, factories and buildings (C series).
- Mobile decoys representing 'hards' for troop embarkation (MQLs), tanks and other vehicles.

Machine gun emplacements and Light Anti-Aircraft (LAA) guns were used to prevent possible enemy landings at decoy airfields.

By their nature, decoy sites provide a potential risk from UXB, both within the decoy site boundary and in the surrounding areas.

The nearest recorded bombing decoy was located near Downside (ST 978659), approximately 1.3km northwest of the Site. This bombing decoy was successful on at least 4No. occasions (see Section 3.3).

Plate 6, an aerial photograph dated the 9th March 1948, shows the location of Downside bombing decoy. Possible bomb damage has been highlighted.

Plate 6	Aerial photograph showing Downton Bombing Decoy, 9th March 1948

Source: Historic England *Not to Scale*

Legend	Bombing decoy	Possible bomb damage

Bombing decoys are not considered to provide a source of UXO hazard to the Site.

4.2 Anti-Aircraft Defences

Anti-Aircraft (AA) gun batteries were targeted by the Luftwaffe. They were also a source of Unexploded AA (UXAA) shells which could land up to 27km from the firing point during WWII, although more typically fell within 10km to 15km. These could be distributed over a wide area.

AA batteries present a potential source of UXO hazard as a result of the storage, use and disposal of ordnance associated with the armaments used. They may have a risk from small caches of ammunition buried locally to them. 3No. types of AA batteries existed:

- Heavy Anti-Aircraft (HAA) batteries of large guns designed to engage high flying bomber aircraft. These tended to be relatively permanent gun emplacements.
- Light Anti-Aircraft (LAA) weaponry, designed to counter low flying aircraft. These were often mobile and were moved periodically to new locations around strategic targets such as airfields.

- Rocket batteries (ZAA) firing 3" or 3.7" AA rockets with a maximum altitude of 5,800m and a ground range of 9km were also relatively permanent emplacements.

Many AA batteries were associated with searchlights and consequently were 'visible' at night, providing clear targets to the Luftwaffe bombers and a potential for UXB.

During WWII the Site was within the range of guns deployed in the Bristol Gun Defended Area (GDA). Table 3 is a list of recorded HAA and ZAA batteries within 10km of the Site.

Table 3 WWII HAA gun and ZAA rocket batteries within 10km of the Site

Grid Reference	Serial No.	Location	Armament	Approximate Distance and Direction from Site
ST 504677	-/20	Backwell	4 x 3.7" guns	1.9km N
ST 551627	-/18	Chew	4 x 3.7" guns	4.2km SE
ST 567642	B15/-	-	Unknown	5.2km ESE
ST 501711	-/4	St George's Wharf	4 x 3.7" guns	5.4km N
ST 564695	B8/19	Reservoir	4 x 3.7" guns	6.1km NE
ST 586658	Z2	Bishopsworth	64 x UP Projectors	7.0km E
ST 564714	-	Ashton Vale	64 x UP Projectors	7.3km NE
ST 544733	Z6	Leigh Woods	64 x UP Projectors	7.9km NE
ST 542736	Z6	Abbots Leigh	64 x UP Projectors	8.6km NNE
ST 525747	B1/3	Gordano	64 x UP Projectors	8.9km N
ST 604683	B7/17	Whitchurch	4 x 3.7" guns	9.3km NE
ST 512758	Z1	Easton in Gordano	64 x UP Projectors	9.6km N

It should be noted that the lack of official records of HAA batteries or armaments cannot be taken to imply their absence because many units were mobile and were moved around as operational requirements dictated.

There are also records of LAA guns situated on the perimeter of RAF Lulsgate Bottom. These are discussed in Section 6.7.

Given the number of gun batteries in the surrounding area, the potential for a UXAA shell to have fallen unnoticed on the Site, whilst unlikely, cannot be totally discounted.

4.3 Barrage Balloons and Anti-Landing Obstacles

Balloon barrages were flown in many British towns and cities to protect against air raids. Their presence deterred low flying aircraft, making it more difficult for bombs to reach their intended targets. Barrage balloon sites can be a source of UXO as they were targeted by the Luftwaffe. They also often had a small explosive charge fitted with tilt fuzes attached approximately 50m from each end of the balloon cables and designed to detonate if the cables were hit by an aircraft.

Measures were also taken to prevent enemy aircraft landing in the event of invasion. Obstructions were constructed around airfields and on other open sites deemed fit for use as landing grounds. Solid obstructions (such as concrete blocks), posts or stakes, felled trees, haystacks, scaffolding with wire and trenching were the main measures used.

No records of any barrage balloons or anti-landing obstacles on or in close proximity to the Site have been found.

4.4 Anti-Invasion Defences

Defence structures are a potential source of UXB as they were especially targeted by low flying enemy aircraft, particularly during 'tip and run' raids which were common in industrialised regions. These defences may also be associated with small caches of UXO in the form of small arms, used by the troops manning the emplacement.

The rapid advance of German Troops into France, Holland and Belgium after the start of WWII prompted the War Office to review the vulnerability of the UK to invasion and a decision was taken to begin work on a national plan of anti-invasion defences. Static defences were built to interrupt and delay the progress of any invading force.

Coastal defences were strengthened (the 'Coastal Crust'). These defences included barbed wire entanglements and minefields, which were often combined to give defence in depth.

Inland, lines of defence structures were constructed along 'Stop Lines' in order to impede enemy progress for long enough to allow mobile defending forces to counter-attack.

Stop Lines included the fortification of key 'centres of resistance', such as river crossings and important road or rail junctions that could seriously hamper the enemy's advance across country. Bridges were mined for demolition and tank traps installed.

Stop Lines were further integrated into a network of fortified nodal points and 'Anti-Tank (AT) Islands'.

No records of any anti-invasion defences on or in close proximity to the Site have been found.

4.5 Pillboxes, Mortar and Gun Emplacements

Defences also included spigot mortar positions and gun emplacements. Spigot mortars, also known as Blacker Bombards, were used primarily in an anti-tank role at road blocks or to defend airfields. Typically, they fired a 20 pound (lb) HE mortar bomb. The fixed positions, in weapons pits with ammunition lockers, were frequently positioned near pillboxes.

Spigot mortar positions could be either fixed or mobile.

No records of any gun emplacements or spigot mortar positions on or in close proximity to the Site have been found.

Pillboxes provide a potential UXO hazard both from the storage, use and disposal of ordnance associated with them and from UXB because they were targeted by enemy aircraft.

Pillboxes were common along Stop Lines, perimeters of airfields, potential land invasion sites and around important civil sites. Several different designs existed including Seagull Trenches (semi-buried structures), Alan Williams and Tett Turrets (small prefabricated pillboxes). Fortified sites, buildings or loop-holed walls also functioned as pillboxes.

A number of pillboxes were located on the perimeter of RAF Lulsgate Down, on the Site. These would have had associated munitions stores, which would typically have been cleared post-WWII.

Pillboxes and gun emplacements are not considered to provide a source of UXO hazard to the Site.

4.6 Home Guard and Auxiliary Units

Local Defence Volunteers (LDV) units, later known as the Home Guard, were located in all cities, towns and large villages. Anti-invasion defences were to be defended by the Home Guard and regular Army troops for as long as possible in the event of an invasion. The troops were issued with 'No Withdrawal' orders.

Important elements of the ordnance supply for the use of the Home Guard included substantial supplies of Mills bombs (fragmentation grenades) and Self Igniting Phosphorus (SIP) grenades as well as machine gun and small arms ammunition.

Records of Home Guard activities and related sites are rarely preserved. Storage and disposal of munitions by the Home Guard was poorly documented and surplus supplies were either buried or dumped in lakes and ponds.

Given the irregular nature of this activity, the possibility of items of UXO being discovered at any locations occupied or used for training by the Home Guard can never be totally discounted. In addition to the regular Home Guard, Auxiliary Units existed which were made up of guerrilla troops trained in sabotage and assassination in case of invasion. Sites used by these Units were Top Secret and many locations are still unknown.

No records of any Home Guard or Auxiliary Unit activity on or in close proximity to the Site have been found.

The 7th (Long Ashton) and 13th (Axbridge) Battalion of the Somerset Home Guard were active in the region. They were tasked with patrolling local industry and transport infrastructure, and manning anti-invasion defences.

The Home Guard often took part in mock 'invasions' of airfields to test their defences. It is considered unlikely that live ammunition would have been used during these activities.

Home Guard and Auxiliary Unit activity is not considered to provide a source of UXO hazard to the Site.

4.7 Minefields and Mined Locations

Minefields were laid along the coast, in estuaries and along the banks of major rivers to deter infantry invasion. Strategic points such as bridges and gaps in cliffs were mined to impede enemy advance. Most of the mined locations in the UK have been cleared and the risk of finding UXO in these areas is considered to be low.

No records of any minefields or mined locations on or in close proximity to the Site have been found.

5 MILITARY AIRFIELDS

Military airfields offer the potential for significant UXO hazards due to the use, storage and disposal of ordnance and as a result of enemy bombing during WWI and WWII.

Airfields active during WWII were targeted by the Luftwaffe, providing a potential source of UXB on the airfield. As bombing accuracy was so poor during WWII, it is likely to find UXB in the surrounding areas. Aircraft crashes are also associated with operational airfields.

The Site encompassed RAF Lulsgate Bottom. An operational history of the airfield is given below.

5.1 RAF Lulsgate Bottom

RAF Lulsgate Bottom was situated on Broadfield Down, Lulsgate Bottom, on land requisitioned from Corner Pool Farm. Originally known as RAF Broadfield Down, it was constructed in 1940 to provide a Relief Landing Ground (RLG) for No. 10 Elementary Flying Training School (EFTS), based at RAF Weston-super-Mare.

It was initially a grass airfield with no formally laid out runways, which was suitable for the Tiger Moth training aircraft which first used the airfield.

In March 1941 a number of pillboxes were constructed around the airfield to improve security. There is evidence that units of the Kings Own Royal Regiment and the Home Guard were tasked with airfield protection, which included manning anti-aircraft defences.

In 1941, Fighter Command needed more airfields from which to operate and the RLG at Broadfield Down selected as a suitable site. On the 10th June 1941 No. 10 EFTS moved out and work began to upgrade the airfield.

The new airfield officially opened on the 15th January 1942 as RAF Lulsgate Bottom and was first occupied by No. 286 Squadron flying Lysander, Hurricane, Blenheim, Master and Oxford aircraft as a target facilities unit for training anti-aircraft gunners.

In May 1942, No. 286 Squadron departed and the airfield passed back to No. 23 Group Flying Training Command. On the 1st June 1942, RAF Lulsgate Bottom became a satellite airfield for RAF South Cerny. This was part of No. 3 (Pilots) Advance Flying Unit (AFU) operating Master and Oxford training aircraft which were probably unarmed.

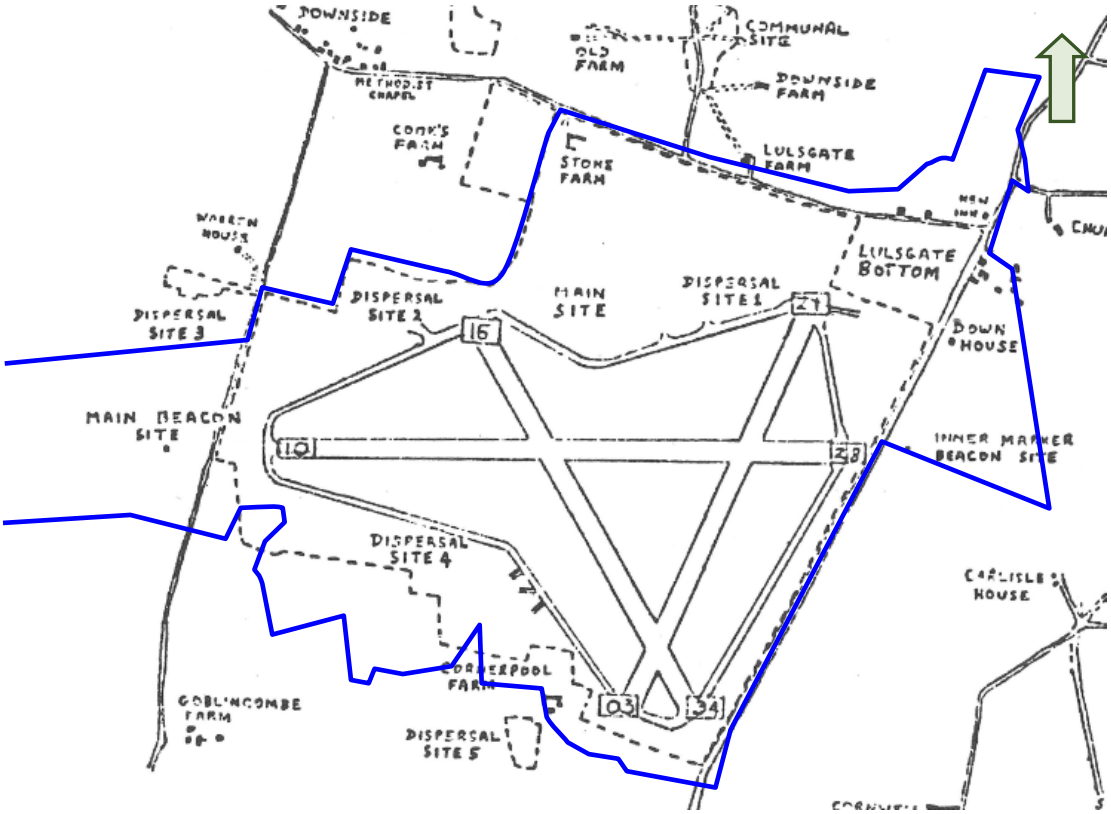
The landing facilities at RAF Lulsgate Bottom were continually upgraded and in 1943 a Drem II landing system, a lighting system that improved night landings, was operational. By 1944 a Standard Beam Approach system was being used and No. 1540 Beam Approach Flight (BAFT) were based at the airfield to monitor and operate the equipment.

The British Overseas Airways Corporation (BOAC) began using RAF Lulsgate Bottom as a diversion airfield when bad weather or congestion hampered use of their usual base, RAF Whitchurch, approximately 10km east of the Site.

In the middle of 1944 RAF Lulsgate Bottom became part of 3 Flying Instructors School (FIS) and which was equipped with Oxford training aircraft.

Figure 5 is a sketch plan of RAF Lulsgate Bottom, dating from WWII.

Figure 5	Sketch plan of RAF Lulsgate Bottom, WWII



Source: James *Not to Scale*

Legend	Approximate Site Boundary

By the middle of 1945 operations were running down and units were being transferred away from the station. However, the BOAC were still using the airfield for training purposes, particularly night flying and landing.

By 15th April 1946 all flying training had been halted and the units were redeployed to RAF Little Rissington.

In October 1946 Lulsgate Bottom was taken over by Bristol Gliding Club. The runways and perimeter tracks were also used by the Bristol Motor Cycle and Light Car Club as a race track.

In 1955 the airfield was sold to the Bristol Corporation and work commenced to convert the airfield into a new municipal airport for Bristol. It opened in 1957 as Bristol (Lulsgate Bottom) Airport. The main east-west runway was extended westwards beyond the original perimeter track to accommodate jet aircraft.

The airport continued to be developed and in March 1997 the name was changed to Bristol International Airport. By 2010 the name had changed to Bristol Airport.

Details of potential sources of UXO hazard at RAF Lulsgate Bottom are given in Section 6.

5.2 Aircraft Crashes

Aircraft crash sites are a known UXO hazard. The MoD advises that if crashed aircraft are found, the safest policy is to leave them alone where possible. Unless disturbed there is no statutory requirement for the MoD to clear such sites.

Records have been found indicating that aircraft crashes occurred on the Site during WWII. The most significant are described below.

15th October 1942

1No. Fairey Fulmar II fighter-bomber aircraft (Serial N4008) and 1No. Fairey Fulmar I fighter-bomber aircraft (Serial N4079) belonging to the Fleet Air Arm (FAA) collided over RAF Lulsgate Bottom.

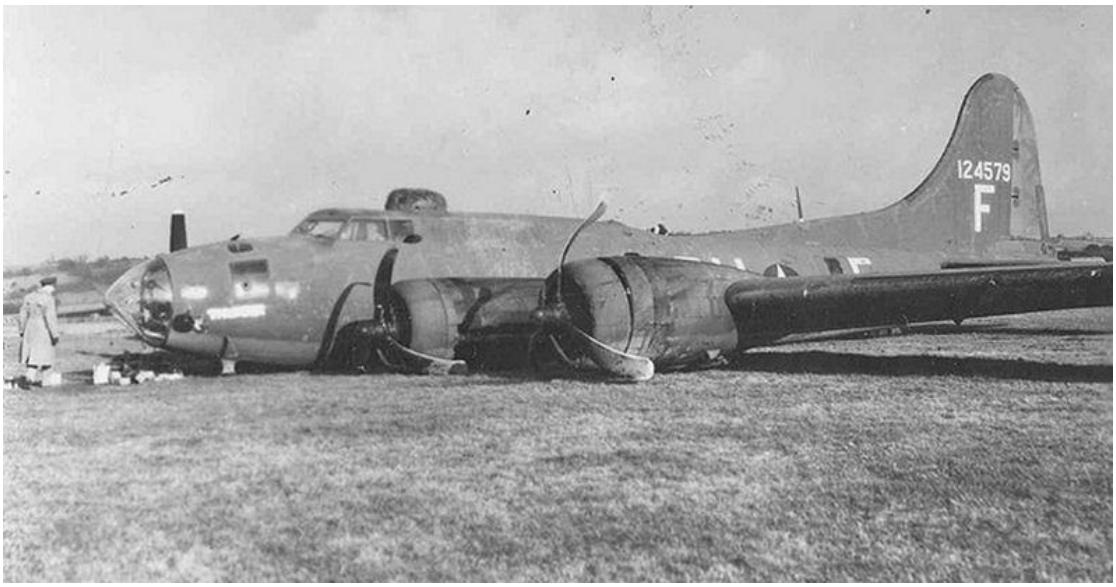
Both aircraft crashed approximately 2.5km east of the head of Cheddar Gorge, approximately 9km south of the Site.

23rd January 1943

1No. Boeing B-17F 'Flying Fortress' bomber aircraft (Serial 41-12579) crashed alongside the main runway on RAF Lulsgate Bottom.

Plate 7 is a photograph of the crashed aircraft.

Plate 7	Photograph of Boeing B-17F 'Thumper' crash, January 1943



Source: James

23rd August 1943

1No. Airspeed Oxford II training aircraft (Serial AB771) stalled and crashed on take-off at RAF Lulsgate Bottom. The aircraft appears to have been unarmed.

11th August 1944

1No. Airspeed Oxford I training aircraft (Serial P8899) crashed at RAF Lulsgate Bottom. The aircraft was unarmed.

2nd February 1945

1No. Airspeed Oxford I training aircraft (Serial EB905) crashed at RAF Lulsgate Bottom. The aircraft was unarmed.

It is considered possible that some of the crashes above could have resulted in SAA from the aircraft guns being scattered across the Site. The potential for encountering SAA cannot be totally discounted, although it is not typically considered to provide a significant UXO hazard (see Appendix 1.1).

6 AIRFIELD ACTIVITES AT RAF LULSGATE BOTTOM

Those airfields operational during WWI and WWII or with long operational histories will have the greatest potential for UXO.

Practically any operational military airfield requires an ordnance disposal facility. This is usually in the form of a burning or burial pit. The amount of ordnance disposed of naturally relates to the type and amount of activity. Other sources of UXO may have resulted from practice activities on or around the airfield. Such practice would usually take place on a designated firing or bombing range.

Operational Training Units (OTUs) would also have practiced extensively across an airfield, combining on-field and operational flights.

Pipe mines, laid beneath critical infrastructure such as runways, were designed to be detonated in the event of an invasion to prevent enemy use of the airfield. No evidence of any pipe mines at RAF Lulsgate Bottom has been found.

The following Sections describe the main areas on an airfield likely to present a source of UXO.

6.1 Pipe Mines

Pipe mines laid beneath critical infrastructure such as runways were designed to be detonated in the event of an invasion to prevent enemy use of the airfield.

No records have been found indicating that pipe mines were installed at RAF Lulsgate Bottom.

6.2 Bombs and Munitions Stores

Bomb and ammunition stores were typically constructed in a remote area of an airfield, linked to the perimeter track by a service road. Bomb Stores can often have a combination of both practice and live ordnance.

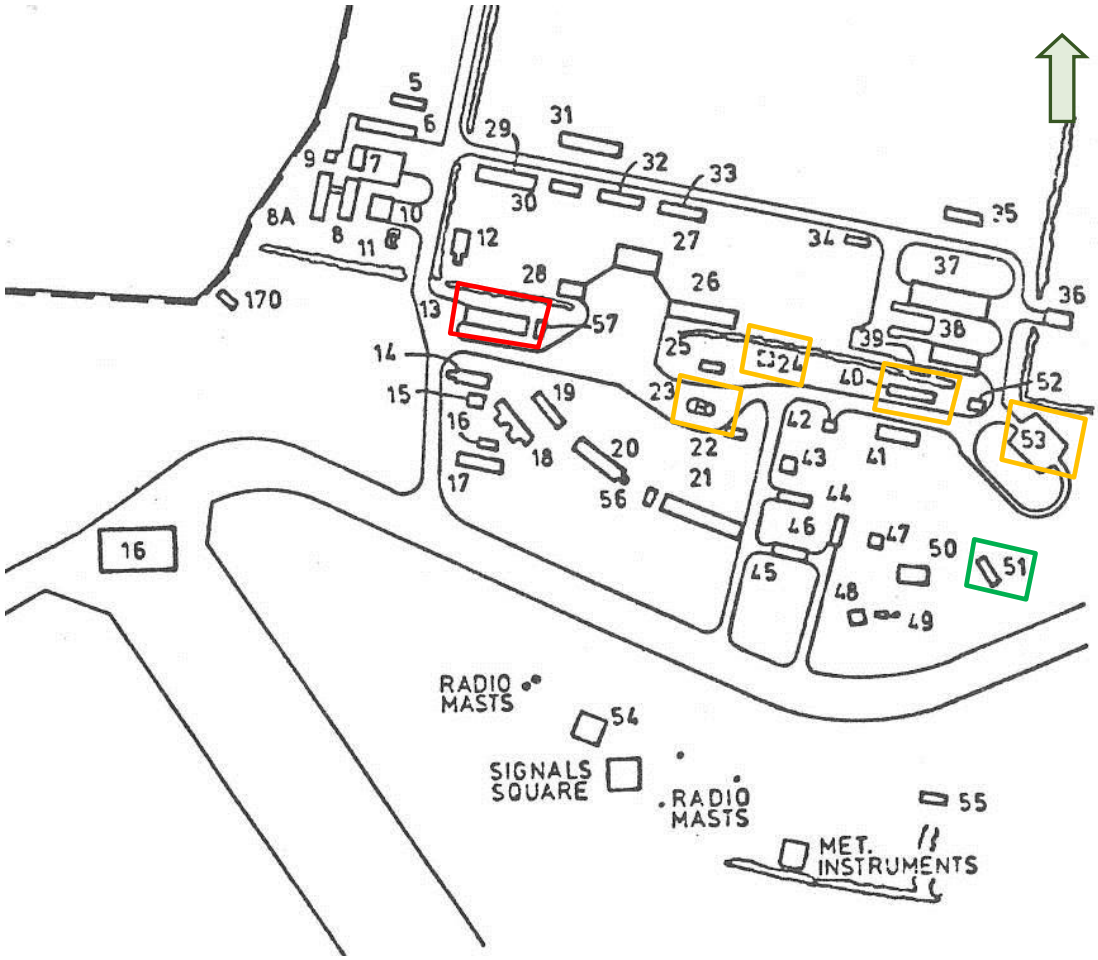
No bomb stores are recorded on the available plans of RAF Lulsgate Bottom and there is no evidence of bomb stores on aerial photographs taken just after WWII.

The absence of any bomb stores reflects the main use of RAF Lulsgate Bottom as a training station.

Pyrotechnic stores, armouries and small arms storage were present on the airfield during WWII. Most of these stores were housed within the main technical area of the airfield.

Figure 6 shows the locations of some of the munitions stores at RAF Lulsgate Bottom.

Figure 6	Plan of RAF Lulsgate Down showing munitions stores, WWII



Source: James *Not to Scale*

Legend	Fuels/lubricants	Armoury	Pyrotechnics

These stores have since been demolished and the area redeveloped as part of the main airport terminal building. This is likely to have removed any remaining UXO in the area.

Small Arms Ammunition (SAA) stores were located on the northern, eastern and southern boundaries of the airfield. All these have been redeveloped for car parking.

Munitions stores are not considered to provide a source of UXO hazard to the Site.

6.3 Machine Gun Range and Test Butts

On an airfield, the aircraft gun test butts are a designated area where aircraft test their guns prior to take off or for test firing for calibration. The butts are often at the end of access runways and incorporate a mound of Made Ground or soil usually incorporating some brick structure, which is fired into.

The cannon test butt was located close to the southern perimeter of RAF Lulsgate Bottom. Records indicate that these butts were capable of taking fire from 20mm cannons.

A machine gun and cannon range was also situated close by. These are both shown on Plate 8, an aerial photograph dated the 12th July 1946.

Plate 8	Aerial photograph showing firing ranges at RAF Lulsgate Bottom, 12th July 1946

Source: Historic England *Not to Scale*

Legend	Canon test butt	MG/Canon range	SAA store

The former machine gun and cannon range, and the canon test butt, have since been demolished and the land redeveloped for car parking.

This redevelopment is likely to have resulted in the removal of any remaining UXO at these locations.

The machine gun range and test butts are not considered to provide a source of UXO hazard to the Site.

6.4 Munitions Disposal Areas

Munitions disposal commonly took place in areas around the perimeter of an airfield away from aircraft operations.

No records of any official munitions disposal areas at RAF Lulsgate have been found.

There is no evidence on WWII aerial photography of any extensive areas of disturbed ground, which are indicative of munitions disposal, on the Site. Such disposal would usually have been carried out in remote areas of the airfield or in a destructor house.

As with any military airfield, there is always the possibility that SAA and munitions used in airfield defence were discarded or spilt during the course of operations. This would most likely occur around munitions stores or at aircraft dispersal points.

6.5 Aircraft Breaking

During and after WWII, it was common practice for aircraft considered beyond repair or no longer required to be stripped of useful and salvageable parts and disposed of in a pit or 'aircraft graveyard'. Maintenance Units (MUs) were responsible for the 'in house' maintenance, repair and scrapping of aircraft.

Aircraft graveyards were usually in areas around the perimeter of an airfield, adjacent to access tracks or near repair hangars.

Waste from aircraft disposal should be considered hazardous. It potentially contains a range of conventional contaminants and radioactive materials, such as radium from luminescent dials, particularly those from WWII aircraft.

No records have been found indicating that any dedicated aircraft breaking facilities were located at RAF Lulsgate Bottom.

Only 1No. incident of aircraft-breaking has been identified, following the crash of a Boeing B-17F 'Flying Fortress' bomber aircraft on the 23rd January 1943 at RAF Lulsgate Bottom (see Section 5.2).

Aircraft breaking is not considered to provide a source of UXO hazard to the Site.

6.6 Perimeter Defences

Several pillboxes were constructed on the perimeter of RAF Lulsgate Bottom, on the SIte, to improve defences at the airfield in March 1941. All have since been removed and their exact positions are not known.

There are also records that the ground defences at RAF Lulsgate Bottom included .303" machine gun positions for AA defence, situated within the Site boundary. These positions would have had caches of ammunition ready for use in the event of any attack.

RAF Lulsgate Bottom was defended by a garrison of Army troops that periodically changed throughout WWII. These troops manned both the LAA defences and the perimeter pillboxes and other defensive sand-bagged gun pits ringing the airfield.

The defensive positions were controlled from a hardened underground Battle Head Quarters (HQ), which was located at approximately ST 505654.

Munitions stores associated with perimeter defences were typically cleared post-WWII. The potential that localised disposal of munitions occurred at these positions, whilst unlikely, cannot be totally discounted.

Perimeter defences are not considered to provide a significant source of UXO hazard to the Site.

7 EXPLOSIVES AND MUNITIONS ESTABLISHMENTS AND DEPOTS

Explosives and munitions manufacturing or storage sites offer a particularly high risk from both explosive substances and UXO. Standard procedures of explosive/ordnance disposal through burial or burning means that explosive and UXO hazards will be present in some areas of such establishments.

In addition, UXB hazards may be present as a result of enemy bombing during WWI and WWII.

7.1 Explosives and Ordnance Factories

No records of any explosives or ordnance factories on or in close proximity to the Site have been found.

7.2 Munitions Stores

Local ammunition caches would have been present near to defended road blocks, pillboxes, HAA and LAA sites. Most of those associated with the anti-invasion sites are understood to have been cleared.

Larger stores and depots were operated by, for example, specialist Maintenance Units (MU) or the Royal Army Ordnance Corps (RAOC).

Other than those described in Section 6.2, no records of any munitions stores on or in close proximity to the Site have been found.

7.3 Informal Munitions Depots

Informal munitions depots, often made by requisitioning roadside lay-bys or parks. Other informal munitions depots were commonly located in areas of woodland or on train wagons along sidings in marshalling yards.

No records of any informal munitions depots on or in close proximity to the Site have been found.

7.4 Munitions Disposal Areas and Bomb Cemeteries

Munitions disposal areas were often made by requisitioning open areas of land, usually away from habitation. Marshland, beaches or sand dunes were frequently used for this purpose. Disposal of munitions was carried out in many different ways, ranging from destruction to burial. Full records were not necessarily maintained for these locations, and so they can potentially be a source of UXO.

No records of any munitions disposal areas or bomb cemeteries on or in close proximity to the Site been found.

8 FIRING RANGES AND MILITARY TRAINING AREAS

By their nature, firing ranges and military training areas represent a potential source of UXO due to associated training activities. The training will involve both practice and live munitions and will offer a significant risk from a very wide range of potential UXO.

8.1 Small Arms Ranges

Small arms ranges (such as rifle ranges) and close combat ranges (such as mortar and grenade ranges) are likely to provide a significant source of UXO. It should be noted that even on small arms ranges, larger munitions such as mortars or grenades cannot be discounted.

Other than those described in Section 6.3, no records of any small arms ranges on or in close proximity to the Site have been found.

8.2 Artillery Ranges

Artillery ranges will have utilised a wide range of munitions, predominantly shells, although close combat munitions such as mortars, or larger munitions such as bombs, cannot be discounted.

No records of any artillery ranges on or in close proximity to the Site have been found.

8.3 Bombing Ranges

Bombing ranges will have primarily used bombs, although other munitions such as shells and close combat munitions such as mortars cannot be totally discounted.

No records of any bombing ranges on or in close proximity to the Site have been found.

8.4 Training Areas

Training areas will have primarily used blank ammunition or practice shells in 'dry' areas, although live munitions such as shells and close combat munitions such as mortars cannot be discounted in any training area.

No records of any military training areas on or in close proximity to the Site have been found.

9 EXPLOSIVE ORDNANCE CLEARANCE ACTIVITIES

Official UK bombing statistics have been compiled from both British and German sources. There were differences in the way the figures were originally reported and collated which has led to discrepancies in the summary data.

Based on data from 1939 to 1945, War Office statistics indicate that 200,195No. HE bombs exploded within Great Britain. Additionally, 25,195No. HE bombs (representing 11%) were recorded as UXBs. However, records from the Royal Engineers who were responsible for bomb disposal at the time indicate that as of 27th February 1946 upwards of 45,000No. UXBs were disposed of.

On average 8.5% UXBs later self-exploded. In some cases the bombs had delayed action fuzes or were never intended to explode, their purpose being to cause inconvenience and fear.

Given the discrepancy in records and the fact that UXBs are still being found unexpectedly, it is clear that the original figures are understated and provide only an approximation of the number of potential UXBs in the UK.

War Office statistics also show that between October 1940 and May 1941 most of the UXBs (93%) were either 50kg or 250kg. It should be noted that details of the recovery and the size of the UXB were not always accurately reported.

The larger WWII UXBs are often difficult to recover due to both penetration depths and the presence of two or more fuzes, combined with more sensitive fillings of explosive mixtures including Amatol and Trialen.

9.1 Abandoned Bombs

No records of any officially abandoned bombs on the Site have been found.

9.2 EOC Tasks

Zetica Ltd holds no records of post-WWII EOC task being undertaken in the vicinity of the Site.

Post-WWII, the munitions stores and other facilities at RAF Lulsgate Bottom are likely to have been subjected to an EOC operation conducted by a detachment from the RAF's Bomb Disposal Unit (BDU).

Such clearance of airfield munitions storage areas was limited, typically consisting of a visual search and basic magnetic detection to depths of approximately 0.5m.

The MoD has provided no additional information of any EOC tasks on the Site.

10 UXO HAZARD ASSESSMENT

10.1 UXO Hazard Level

The definitions for the levels of UXO hazard are provided below.

Definitions of UXO Hazard Level for a Site	
Hazard Level	**Definition**
Very Low	There is positive evidence that UXO is not present, e.g. through physical constraints or removal.
Low	There is no positive evidence that UXO is present, but its occurrence cannot be totally discounted.
Moderate	There is positive evidence that ordnance was present and that other uncharted ordnance may be present as UXO.
High	There is positive evidence that UXO is present.
Very High	As high, but requires immediate or special attention due to the potential hazard.

During WWII the Site encompassed RAF Lulsgate Bottom, which was primarily used as a training airfield. Activity at the airfield is not considered to provide a significant source of UXO hazard to the Site.

Additionally, no records of HE bombs falling on the Site have been found.

Given this, it is considered that the Site has a low UXO hazard level, as shown in Figure 7.

Figure 7 UXO hazard zone plan of the Site

Source: Bing Maps *Not to Scale*

Legend	Very Low	Low	Moderate
	High	Very High	Site boundary

It should be noted that the potential for encountering Small Arms Ammunition (SAA) across any former military airfield as a result of aircraft crashes, localised disposal or spillages cannot be totally discounted. SAA is not considered to provide a significant UXO hazard.

11 UXO RISK ASSESSMENT

11.1 UXO Risk Level

A UXO risk assessment has been undertaken for the proposed works, taking into consideration the identified UXO hazard.

Firstly, the probability of encountering UXO (PE) has been considered and rated for the different construction techniques, as detailed below.

Probability of Encounter (PE)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Secondly, the probability of detonating a UXO (PD) has been considered and rated for the different construction techniques, as detailed below.

Probability of Detonation (PD)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Next, the probability of encountering and detonating the UXO (PE x PD) have been used to generate an overall likelihood rating (P).

P = PE x PD	LIKELIHOOD of Encounter and Detonation	Rating
21 to 25	Frequent, highly likely, almost certain.	5
16 to 20	Probable, more likely to happen than not.	4
6 to 15	Occasional, increased chance or probability.	3
2 to 5	Remote, unlikely to happen but could.	2
1	Improbable, highly unlikely.	1
0	Impossible	0

P ranges from 25, a certainty of UXO being encountered and detonated on the Site by engineering activity, to 0, a certainty that UXO does not occur on the Site and will not be detonated by engineering activity.

The likelihood of encountering and detonating UXO during site works is multiplied by the severity of such an event occurring (P x S), in order to provide a risk level using the following matrix.

Severity (S)	Rating
Multiple fatalities	5
Major injury, long term health issues, single fatality.	4
Minor injury, short term health issues, no fatalities.	3
First aid case but no lost time or ill health.	2
Minor injuries, no first aid.	1
No injuries.	0

UXO Risk Matrix

		SEVERITY (S)					
		5	4	3	2	1	0
LIKELIHOOD (P)	5	25	20	15	10	5	0
	4	20	16	12	8	4	0
	3	15	12	9	6	3	0
	2	10	8	6	4	2	0
	1	5	4	3	2	1	0
	0	0	0	0	0	0	0

The final risk assessment for the Site is given in Table 4.

Table 4 UXO risk assessment for the Site

Potential UXO Hazard	Anticipated Works	PE	PD	P = PE x PD	Likelihood	Severity	Risk Rating	UXO Risk
UXB	Shallow Excavations	1	1	1	1	5	5	Low
	Deep Excavations	1	1	1	1	5	5	Low
	Piling/Boreholes	1	1	1	1	4	4	Low
Other UXO	Shallow Excavations	1	1	1	1	4	4	Low
	Deep Excavations	1	1	1	1	4	4	Low
	Piling/Boreholes	1	1	1	1	3	3	Low
SAA	Shallow Excavations	3	1	3	2	2	4	Low
	Deep Excavations	3	1	3	2	2	4	Low
	Piling/Boreholes	2	1	2	2	2	4	Low

PE (Probability of Encounter), PD (Probability of Detonation), P (Overall Probability)

Shallow Excavations defined as <1.0m below ground level (bgl).

UXO Risk	Matrix Rating	Definition
Very Low	0-1	Little action is required by the client provided that suitable records and procedures are in place to ensure appropriate action is undertaken should the UXO risk level change.
Low	2-5	Tolerable to the client as engineering activity need not alter if UXO related procedures and controls are strictly adhered to.
Moderate	6-15	May be tolerable for the client, but it is prudent to reduce the risk where cost effective and reasonably practicable.
High	16-20	Tolerable to the client only where further risk reduction is impracticable or disproportionate to the risk involved. Essential that all practicable measures are taken to reduce the level of risk.
Very High	21-25	Unacceptable to the client except in extraordinary circumstances. Imperative that all control measures are taken.

11.2 Risk Mitigation Recommendations

To ensure that the UXO risk is reduced to As Low As Reasonably Practicable (ALARP) the following mitigation is advised:

Where a low risk of UXO encounter is anticipated, industry good practice is to raise the awareness of those involved in excavations so that in the unlikely event that a suspect item is discovered, appropriate action is taken. This can be achieved through UXO awareness briefings to site staff.

Clearance certification for borehole or pile locations is considered prudent only if a zero tolerance to risk is adopted. Zero tolerance is commonly adopted for sites that have safety critical infrastructure such as nuclear establishments and oil refineries.

Table 5 gives recommended actions in relation to the potential UXO risk level and the anticipated Site activity.

Further advice on the mitigation methods can be provided by Zetica on request.

Table 5	Risk mitigation for assumed Site activities			
Risk Level	**Typical Future Activity on the Site**			
	None	**Shallow Excavations (<1.0m)**	**Deep Excavations (>1.0m)**	**Boreholes or Pile Construction**
Very low	Ensure suitable records and procedures are in place to highlight the risk should future development be planned.	Ensure site staff, are informed as part of the site safety induction that the potential presence of UXO cannot be discounted. Appropriate action is required to be detailed within site procedures.	Ensure site staff, are informed as part of the site safety induction that the potential presence of UXO cannot be discounted. Appropriate action is required to be detailed within site procedures.	Ensure site staff, are informed as part of the site safety induction that the potential presence of UXO cannot be discounted. Appropriate action is required to be detailed within site procedures.
Low	**As very low.**	**As very low.** **+ It is considered prudent to include some UXO awareness training in site inductions.**	**As very low.** **+ It is considered prudent to include some UXO awareness training in site inductions.**	**As very low.** **+Clearance certification for borehole or pile locations would be considered prudent only if a zero tolerance to risk is adopted.** **Zero tolerance is commonly adopted for sites that have safety critical infrastructure such as nuclear establishments and oil refineries.**
Moderate	As very low.	As low. +Non-intrusive investigation methods considered prudent where practical. +Alternatively, EOC Engineer supervision is considered prudent.	As low. +Non-intrusive investigation methods considered prudent where practical. +Alternatively, EOC Engineer supervision is considered prudent.	As low. +Clearance certification for borehole or pile locations is considered essential.
High	As very low.	As moderate. +Non-intrusive investigation methods considered essential where practical. + Alternatively, EOC Engineer supervision is considered essential.	As moderate. +Non-intrusive investigation methods considered essential where practical. + Alternatively, EOC Engineer supervision is considered essential.	As moderate.
Very High	Requires immediate or special attention.	Requires immediate or special attention.	Requires immediate or special attention.	Requires immediate or special attention.
The above table is for guidance only.				

APPENDICES

Appendix 1 UXO Hazard and Ordnance Types

When assessing the risk from UXO including UXB, it is important to be aware of ordnance type and function. The following Section briefly describes the more common types of UXO. More data on these can be found at http://zeticauxo.com/downloads-and-resources/ordnance-data-sheets/.

A1.1 Small Arms Ammunition

Small Arms Ammunition (SAA) is one of the more recognisable categories of ordnance which is primarily designed for anti-personnel use. SAA include items such as bullets, generally up to a calibre (diameter) of 20mm.

Larger calibre small arms munitions can contain fuze mechanisms and high explosives or pyrotechnic fillings and may have been used for anti-aircraft or anti-vehicle purposes.

Generally small arms ordnance has a relatively low risk as UXO, although the larger calibre categories may have the same detonation risk as larger high explosive ordnance. SAA is often associated with discarded ammunition boxes around firing practice ranges. The Plate below illustrates some common SAA.

Plate	Photograph of typical WWII small arms ammunition

Source: Google Images

A1.2 Hand Grenades

Hand grenades can be filled with explosives or chemicals and have 3No. main parts, a body, a fuze with a pull ring and a safety-clip assembly. Fragmentation grenades are the most common and have a metal or plastic body filled with an explosive. Most use a burning delay fuze that functions for 3 to 5 seconds after the safety lever is released.

Some, such as smoke grenades, are activated instantly when the lever is released. The Plate below illustrates the typical character and condition of No. 36 hand grenades (Mills Bombs) that have been excavated from a site.

Plate	Photographs of a typical and an excavated WWII No. 36 hand grenades

Source: Google Images

Source: Zetica Ltd

A1.3 Projected Grenades

Projected grenades are among the most commonly found UXO items, particularly the 40mm type. These contain high explosives and use a variety of fuzes, including some of the most sensitive internal impact-fuzing systems. They are extremely dangerous and can explode if moved or handled.

A1.4 Mortars

A mortar is a short tube designed to fire a projectile at a steep angle. Mortars can range from approximately 50mm to 280mm in diameter and can be filled with explosives, toxic chemicals, white phosphorous or illumination flares. They generally have a thinner metal casing than projectiles, but use the same types of fuzing and stabilisation.

During WWII there are records that the target areas of RAF practice bombing ranges were occasionally used for mortar training.

The Plate below shows a typical 2-inch mortar bomb found (left) and a demonstration 3-inch mortar bomb (right).

Plate	Photographs of WWII 2-inch and 3-inch mortars

Source: Daily Mail

Source: Zetica Ltd

A1.5 Shells

Shells are a projectile containing an explosive charge designed to burst the casing that can contain High Explosives, pyrotechnic compounds or other chemicals.

Shells can be found in a range of sizes, from <20mm to several times this size. The most likely shells to be found on the Site are Small Arms Ammunition (SAA) or UXAA shells that have fallen back to the ground unexploded.

Most commonly used anti-aircraft shells were 2" and 3.7" HE shells.

If fired and found as UXO, shells can offer a particular hazard from accidental detonation as they can have sensitive fuze mechanisms. A fuze is a device which incorporates mechanical, electrical, chemical or hydrostatic components to initiate a train of fire or detonation.

The Plate below is a photograph of a 3.7" UXAA shell found in Camberwell, London.

Plate	Photograph of a recently excavated 3.7" AA shell

Source: Zetica Ltd

A1.6 Incendiary Bombs

Incendiary Bombs (IBs) ranged from small 1kg and 2kg thermite filled, magnesium bodied bombs to a 250kg 'Oil Bomb' (OB) and a 500kg 'C300' IB. The C300 bombs were similar in appearance to 500kg HE bombs.

In some cases the IBs were fitted with a very small High Explosive (HE) bursting charge. This exploded after the bomb had been alight for a few minutes causing burning debris to be scattered over a greater area.

By far the most common air dropped incendiary devices across the UK during WWII were small Brandbomben 1kg Elektron (B-1E) IBs.

B1-E IBs consisted of a cylinder of magnesium alloy (Elektron) with an incendiary filling of 680 grammes (g) of thermite, an incendiary mixture of 24% aluminium and 76% iron (III) oxide, occasionally with additional barium nitrate or boric acid. The thermite was ignited by a very small percussion charge in the nose which fired on impact.

Later B-1E Zusatz (B-1E Z) versions with an explosive charge in the nose or tail were introduced in the bomb loads. The explosive charge, ignited by heat (B-1E ZA) or a small delayed action device (B-1E ZB), usually consisted of small amounts, typically less than 15g, of Penta-erythritol-tetranitrate (Nitropenta or PETN).

Later, the 2.2kg steel nosed B-2E was deployed. Note that the 2kg B-2E steel nosed IB was not introduced until 1944.

In most cases the B-1E IBs, which actually weighed approximately 0.83kg and were 50mm in diameter and 350mm long, were unlikely to have penetrated more than 0.5m.

The small amount of HE and the almost negligible potential for B-1E or B-1EZ IBs to remain active after more than 70 years in the ground means that these items have very little prospect of causing damage. In the majority of cases if IBs are found in the ground, the incendiary materials have deteriorated to such an extent that they are considered to provide a low UXO hazard level.

However, since magnesium and phosphorus were common components in IBs, some localised chemical contamination may occur where the contents have leached out of the IB into the surrounding soil.

The Plate below shows a typical variety of fragmentary remains of IBs and IBs recovered by the Civil Defence during WWII, along with a photograph of 4No. spent IBs found in Hertfordshire in January 2017 (lower right).

Plate	Photographs of an intact IB and typical fragmentary remains of IBs.

Source: ZeticaUXO

A1.7 German High Explosive Bombs

Probably the most common and certainly most publicised UXOs to be found in the UK are bombs. Air dropped bombs, as a result of WWII enemy action, are found on a relatively frequent basis as UXO. They tend to be highly publicised (at least on a local basis) due to the common disruption where an evacuation of the potentially affected area is put in place.

The amount of High Explosive and the potential for a fuze to still be activated means that these devices have the prospect of causing some of the most widespread damage. WWII bombs were particularly sophisticated for their time, with anti-tamper fuzes.

Many German bombs were designed to not explode on impact and instead to cause disruption as a UXB. Some fuzes were set with a delay time of over 70 hours. During this time, an anti-tamper fuze could also be activated to detonate should it be disturbed.

The most commonly used bombs during WWII were the 50kg and 250kg sized general purpose bombs. Less frequently, the 500kg bomb was also used. Larger bombs were used, but so infrequently that any assessment of hazard is more typically based on bombs ranging up to 500kg only.

It should be noted that the June 2008 find of a 1000kg bomb in London, does demonstrate that larger bombs can be found and any risk mitigation measures should consider this.

The Plate below shows the variety of UXB recovered by the Civil Defence during WWII.

Plate	Photograph of a variety of UXB recovered by the Civil Defence during WWII

Source: Imperial War Museum

A1.8 Detonators, Gaines and Fuzes

Bomb components such as detonators, gaines and fuzes were stored at operational airfields during WWII and typically contained some type of explosive charge to initiate the detonation of a munition.

A wide variety of these components were used and examples of some common fuzes are shown in the Plate below.

Plate	Photographs showing examples of WWII fuzes

Source: Zetica Ltd

A1.9 Land Mines

Wartime activities provide numerous sources of UXO within the land environment. Whilst efforts have been made to clear the known British minefields, it was common for mines to become lost for a variety of reasons and so not recovered. Additionally, such munitions might have been disposed of on an unofficial basis and so no records were kept.

Most of the mined beaches and other land areas in the UK have been cleared by the MoD. Occasionally, wave action or activities such as bombing caused mines to become displaced and these were missed as part of any past clearance activities.

The Plate below is a photograph of a typical WWII land mine used on the land area, beaches and cliffs around Britain. This example was found at Gatwick Airport formerly RAF Gatwick.

Plate	Photographs of original and recently excavated WWII land mines

Source: Google Images

Source: Zetica Ltd

A1.10 Home Guard Weapons

Initially, the Home Guard's armoury was largely second-hand and much of it was of WWI vintage. Personal weapons (such as shotguns) and home-made devices were also employed.

By the end of WWII, some units were well equipped with a wide variety of small arms and munitions.

These included .32, .38 and .455 revolvers, .303 P14, .300 P17 and .303 Canadian Ross rifles, anti-tank rifles and a variety of Sub- Machine Guns (SMG) such as the .45 Thompson and 9mm Sten Guns.

Other heavier Machine Guns (MG) at their disposal included Browning, Hotchkiss, Lewis, Vickers and Marlin MG. Sub-artillery weapons were developed for them, including grenade throwers (the Northover Projector) and spigot mortars (the Blacker Bombard). 2-pdr anti-tank guns and Projector, Infantry Anti Tank (PIAT) weapons were in circulation amongst some units, and the Home Guard also manned AA guns later in WWII.

Explosives were available to some Home Guard units and were used and stored by all Auxiliary Unit patrols. As well as the flame fougasse and hand grenades detailed in this Appendix, the Home Guard had stocks of Molotov Cocktails, Sticky Bombs and SIP grenades.

In October 2006 a cache of 76No. SIP grenades was found in a garden at Seend, Wiltshire. In October 2008, a further 26No. SIP grenades were discovered in a garden in Wimborne, Dorset. Similar caches were discovered in October 2009 in Hove, Sussex and during May 2010 in Halesowen in the West Midlands, and a further cache of 20No. was uncovered on a construction site at Birdlip, Gloucestershire, in July 2010.

Also in July 2010, a box of 24No. SIP grenades was found on Cogden Beach, Dorset. In April 2012, more than 8No. SIP grenades were found on a construction site in Banbury and destroyed by members of the Army Royal Logistic Corps (RLC).

In March 2015, 80No. SIP grenades were found at a building site in Eastbourne, some of which exploded before they could be made safe by a Bomb Disposal unit.

Most recently, in May 2016, 1No. No. 76 SIP grenade was found during excavation at Chapel Point, Lincolnshire forcing works to be delayed. During WWII, the site was occupied by a pillbox and gun emplacement associated with the heavily-defended 'Coastal Crust', manned by Home Guard units. The device was removed safely.

In January 2017, a cache of 24No. SIP grenades was discovered at Derriford, Plymouth and made safe by a Royal Navy Bomb Disposal Unit.

Between December 2017 and February 2018, at least 194No. SIP grenades were found on a building site in Cambridgeshire.

The Plate below is a photograph of a No. 76 SIP grenade (LHS) with an explanatory leaflet produced by ZeticaUXO for site staff (RHS).

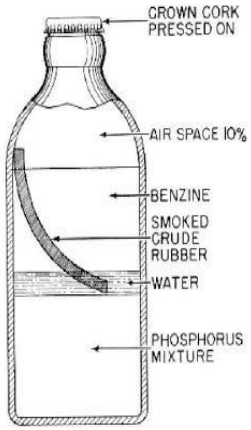
Plate	Photographs of No. 76 SIP grenades

zeticaUXO

Information Data Sheet

Category Grenades
Type No. 76 Self-Igniting Phosphorus Grenade

Variants	-
Dimensions	152.4mm x 63.5mm (6" x 2.5")
Weight	1lb
Fuze	Self-igniting upon breakage
Material	Glass
Description	Glass bottle filled with white phosphorus, benzene, water and crude rubber.
Function	Introduced as an emergency anti-tank measure for the Home Guard early in WWII. Intended to ignite the engine compartment of advancing tanks.



Source: Zetica Ltd

Given the irregular nature of Home Guard activity, the possibility of items of UXO or weapons being discovered at any locations occupied or used for training by them can never be totally discounted.

A1.11 UXO Migration

It is possible for explosive material, UXO or ordnance scrap to migrate to a site during landfill or dredging operations or other ground works which import Made Ground or natural materials already containing UXO. It is important to understand the nature and age of such landfill or dredging operations when assessing the potential UXO hazard level on the site.

A1.12 Effects and Consequences

There have been a limited number of recorded incidents in the UK since WWII where bombs have detonated during engineering works, though a significant number of bombs have been discovered. Incidents involving smaller ordnance are, however, relatively common in the UK.

In the UK, there are no recorded incidents since the decade after WWII, of a UXB accidentally detonating. In recent years, bombs have been found that have fuze mechanisms that have started to operate indicating that given the right conditions a UXB may still function.

In June 2008 the UXB uncovered in the Lea Valley caused difficulty to No. 33 Regiment (Explosive Ordnance Disposal) Royal Engineers because the fuze mechanism started to operate.

The 1,000kg 'Hermann' bomb, the first of this size to be found in over 30 years, took 5 days to deactivate. This demonstrates that larger bombs can be found and any risk mitigation measures should provide the option to deal with this size of device. Since WWII, UXBs have been found on a regular basis in London.

Since WWII, UXBs have been found on a regular basis throughout Britain. Some of the most recent cases are described below.

In May 2009 1No. 50kg WWII bomb was found on a building site in Bexhill-on-Sea, Sussex, and on the 16th August 2009, 1No. 250kg WWII bomb was found near Ebberston, North Yorkshire. Both of these were destroyed in controlled explosions by Bomb Disposal Units.

On the 8th March 2010 1No. 500kg WWII bomb was found at Bowers Marsh in Essex by Zetica EOC operatives following a Zetica desk study concluding a high risk of UXB on the site. The bomb was demolished in situ by members of the Army Royal Logistics Corps (RLC).

The Plate below is a photograph of the bomb in situ.

Plate	Photograph of the 500kg WWII UXB at Bowers Marsh, 8th March 2010

Source: Zetica Ltd

On the 23rd February 2011, 1No. WWII UXB was found on a building site in Notte Street in Plymouth City centre. The bomb was removed by EOD personnel and demolished at sea.

On the 22nd July 2012, a landslip in the cliffs at Mappleton in the East Riding of Yorkshire exposed over 1,000No. UXO items, including practice bombs, mortars, rockets, shells and grenades. The cliff was part of a former bombing and artillery range, used during WWII and until the 1970s.

UXO items were removed by Explosive Ordnance Disposal (EOD) officers from Catterick and MoD staff from Leconfield. 15No. controlled explosions were undertaken by the Royal Engineers (RE) to detonate the more volatile items in situ, while other less hazardous UXO devices were left in place to be dealt with at a later date.

1No. WWI bomb was found on the Isle of Sheppey on the 2nd August 2012 during a geophysical survey following desk study research by Zetica Ltd which had established that a previously unknown WWI bombing range existed on the site. A further WWI bomb was found in the same location in August 2015.

On the 23rd March 2015, 1No. WWII 500kg UXB was found on a building site in The Grange, Bermondsey. The bomb was made safe by EOD personnel and removed for demolition.

On the 21st May 2015, 1No. 50kg UXB was found on a building site near Wembley Stadium, London Borough of Brent. The bomb was made safe by EOD personnel and removed for demolition.

On the 10th August 2015, 1No. 250kg UXB was found under the basement of a building site at Bethnal Green, London Borough of Tower Hamlets. It was made safe and removed by an EOD team from the RLC.

On the 21st September 2015, 1No. UXB was uncovered on a construction site in Cheylesmore, Coventry, by the operator of a mechanical digger. It was destroyed in situ by an EOD team from the RLC.

In January 2016, Zetica discovered 3No. 500lb British UXB at a former airfield in Cambridgeshire. These were destroyed in controlled explosions. The Plate below is a photograph of one of the bombs.

Plate	Photograph of a recently excavated WWII British 500lb GP bomb

Source: Zetica Ltd

On the 12th May 2016, 1No. 250kg UXB was found on a building site in Bath. It was made safe and then taken to a local quarry for demolition.

In September 2016 1No. 500kg UXB and 1No. torpedo were discovered during dredging works in Portsmouth Harbour. An additional 250kg HE bomb was discovered on the 16th November 2016. These devices were towed out to sea and destroyed in controlled explosions.

On the 19th January 2017, 1No. 50kg UXB was found during dredging works along the River Thames Victoria Embankment in Central London. The device was towed to Tilbury in Essex where it was destroyed in a controlled explosion.

On the 25th January 2017, 1No. 500lb British UXB and 1No. mortar shell were found in King's Forest, Thetford. They were destroyed in a controlled explosion.

On the 2nd March 2017, 1No. 250kg German UXB was found on a building site in Brondesbury Park in the London Borough of Brent. It was defuzed by an EOD team and removed to a safe location where it was destroyed in a controlled explosion.

On the 15th May 2017, 1No. suspected 250kg German UXB was found on a building site in Aston, Birmingham. Due to the corrosion of the fuzes, the UXB was destroyed in situ on the 17th May 2017.

On the 31st August 2017, 1No. 50kg German UXB was found in a quarry in Kings Hill, West Malling, Kent. It was destroyed in a controlled explosion.

During October and November 2017, approximately 150No. canisters of Mustard Gas were found in a lake and adjacent woodland near the former WWII military airfield RAF Woodhall Spa, Lincolnshire. The canisters were removed to the DSTL at Porton Down for safe disposal.

On the 11th February 2018, 1No. 500kg UXB was found in King George V Dock, adjacent to London City Airport, during construction work. The airport was closed for two days while the UXB was made safe by an EOD team from the Royal Navy. It was removed and destroyed in a controlled explosion off Shoesburyness on the 14th February 2018.

On the 26th February 2018, an EOD team destroyed numerous items of ordnance including shells and 20mm ammunition which had been exposed by storms on Selsey Beach.

On the 3rd April 2018, 1No. WWI shell was found in Steeton near Bradford. It was destroyed in a controlled explosion after being made safe and moved to a nearby field.

Overseas

There is a long list of incidents during construction work in Europe (particularly Germany) that in some cases have led to casualties.

On the 4th September 2017, 1No. 4,000lb High Capacity UXB was discovered during construction work in Frankfurt. Following the evacuation of more than 60,000No. people from inside a 1.5km exclusion zone the bomb was defuzed by an EOD team. A similar evacuation took place in Koblenz the following day after the discovery of an American UXB.

In June 2010, 3No. members of a bomb disposal team were killed, and 6No. others injured, whilst attempting to defuze an unexploded WWII bomb in Goettingen, Central Germany.

The bomb, the second found in Goettingen in the space of a few days, was unearthed at a depth of 7.5m during excavations for a sports stadium.

In September 2008, 17No. people were injured and considerable damage occurred to adjacent buildings when a bomb exploded on a construction site in Hattingen, Germany.

In October 2006 during road works on a motorway near Aschaffenburg in Bavaria, southern Germany, a bomb was struck by a machine and detonated. The plant driver was killed and 5No. others injured, including passing motorists.

In a similar incident in October 2004 in Linz, Austria a bomb exploded injuring 3No. workers and causing considerable damage to plant. In the same month, a WWII bomb under a back garden in Vienna, Austria, was detonated without warning by a minor earth tremor, after remaining undiscovered for over 60 years.

Further details of similar finds can be found at http://zeticauxo.com/news/.

The effects of a partial or full detonation of ordnance are usually shock, blast, heat and shrapnel damage. A 50kg buried bomb can damage brick / concrete structures up to a distance of approximately 16m away. Unprotected personnel on the surface up to 70m away from the blast could also be seriously injured. Larger ordnance would obviously be more destructive.

Explosives rarely lose effectiveness with age, although over time mechanisms such as fuzes and gaines can become more sensitive and therefore more prone to detonation, regardless of whether the device has been submersed in water or embedded in silt, clay or similar materials.

The effects of a detonation of explosive ordnance are usually extremely fast, often catastrophic and invariably traumatic to any personnel involved.

Appendix 2 Abbreviations	
AA	Anti-Aircraft
ACPO	Association of Chief Police Officers
AFU	Advance Flying Unit
ALARP	As Low As Reasonably Practicable
ARP	Air Raid Precaution
ASACS	Air Surveillance and Control System
AXO	Abandoned Explosive Ordnance
BAFT	Beam Approach Flight
BD	Bomb Disposal
BDO	Bomb Disposal Officer
BDU	Bomb Disposal Unit
BOAC	British Overseas Airways Corporation
CBRN	Chemical, Biological, Radiological and Nuclear
CMD	Conventional Munitions Disposal
CWA	Chemical Warfare Agent(s)
DCLG	Department of Communities and Local Government
DSTL	Defence Science and Technology Laboratory (Porton Down)
ELG	Emergency Landing Ground
EO	Explosive Ordnance
EOC	Explosive Ordnance Clearance
EOR	Explosive Ordnance Reconnaissance
ERW	Explosive Remnants of War
ESA	Explosive Substances and Articles
FFE	Free From Explosives

FIS	Flying Instructors School
HAA	Heavy Anti-Aircraft
HE	High Explosive
HSE	Health and Safety Executive
JSEODOC	Joint Services EOD Operations Centre
IB	Incendiary Bomb
IED	Improvised Explosive Device
IEDD	Improvised Explosive Device Disposal
LAA	Light Anti-Aircraft
MoD	Ministry of Defence
PUCA	Pick Up and Carry Away
RAF	Royal Air Force
RLG	Relief Landing Ground
SAA	Small Arms Ammunition
SIP	Self-Igniting Phosphorous
TEP	Time Expired Pyrotechnics
USAAF	United States Army Air Forces
UXB	Unexploded Bomb
UXO	Unexploded Ordnance

Appendix 3 Glossary & Definitions	
Abandoned Explosive Ordnance (AXO)	Abandoned Explosive Ordnance is explosive ordnance that has not been used during an armed conflict, that has been left behind or disposed of by a party to an armed conflict, and which is no longer under control of that party. Abandoned explosive ordnance may or may not have been primed, fuzed, armed or otherwise prepared for use.
Camouflet	The type of cavity produced when a charge explodes underground without breaking the surface of the earth to form a crater.
Demil	Derived from the term 'Demilitarisation', it refers to the break down and the recycling or disposal of ordnance components.
Detonation	The high-speed chemical breakdown of an energetic material producing heat, pressure, flame and a shock wave.
Device	This term is used for any component, sub-assembly or completed ordnance, which may or may not have an explosive risk. It can apply to detonators, primers, gaines, fuzes, shells or bombs.
Explosive	The term explosive refers to compounds forming energetic materials that under certain conditions chemically react, rapidly producing gas, heat and pressure. Obviously, these are extremely dangerous and should only be handled by qualified professionals.
Explosive Ordnance (EO)	Explosive Ordnance is all munitions containing explosives, nuclear fission or fusion materials and biological and chemical agents. This includes bombs and warheads, guided and ballistic missiles, artillery, mortar, rocket, small arms ammunition, mines, torpedoes, depth charges, pyrotechnics, cluster bombs & dispensers, cartridge & propellant actuated devices, electro-explosive devices, clandestine & improvised explosive devices, and all similar or related items or components explosive in nature.
Explosive Ordnance Clearance (EOC)	Explosive Ordnance Clearance is a term used to describe the operation of ordnance detection, investigation, identification and removal, with EOD being a separate operation.
Explosive Ordnance Disposal (EOD)	Explosive Ordnance Disposal is the detection, identification, on-site evaluation, rendering safe, recovery and final disposal of unexploded explosive ordnance.
Explosive Ordnance Reconnaissance (EOR)	Explosive Ordnance Reconnaissance is the detection, identification and on-site evaluation of unexploded explosive ordnance before Explosive Ordnance Disposal.

Explosive Remnants of War (ERW)	Explosive Remnants of War are Unexploded Ordnance (UXO) and Abandoned Explosive Ordnance (AXO), excluding landmines.
Explosive Substances and Articles (ESA)	Explosive substance are solid or liquid substance (or a mixture of substances), which is either: • capable by chemical reaction in itself of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. • designed to produce an effect by heat, light, sound, gas or smoke, or a combination of these as a result of a non-detonative, self-sustaining, exothermic reaction. Explosive article is an article containing one or more explosive substances.
Fuze	A fuze is the part of an explosive device that initiates the main explosive charge to function. In common usage, the word fuze is used indiscriminately, but when being specific (and in particular in a military context), fuze is used to mean a more complicated device, such as a device within military ordnance.
Gaine	Small explosive charge that is sometimes placed between the detonator and the main charge to ensure ignition.
High Explosive	Secondary explosives (commonly known as High Explosives (HE)) make up the main charge or filling of an ordnance device. They are usually less sensitive than primary explosives. Examples of secondary explosives are: Nitro glycerine (NG), Trinitrotoluene (TNT), AMATOL (Ammonia nitrate + TNT), Gunpowder (GP), and Cyclotrimethylenetrinitramine (RDX).
Munition	Munition is the complete device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological or chemical material for use in military operations, including demolitions. This includes those munitions that have been suitably modified for use in training, ceremonial or non-operational purposes. These fall into three distinct categories:- • inert - contain no explosives whatsoever. • live - contain explosives and have not been fired. • blind - have fired but failed to function as intended.
Primary Explosive	Primary explosives are usually extremely sensitive to friction, heat, and pressure. These are used to initiate less sensitive explosives. Examples of primary explosives are: Lead Azide, Lead Styphnate, and Mercury Fulminate. Primary explosive are commonly found in detonators.

Propellants	Propellants provide ordnance with the ability to travel in a controlled manner and deliver the ordnance to a predetermined target. Propellants burn rapidly producing gas, pressure and flame. Although usually in solid form they can be produced in liquid form. Examples of propellants are: Ballistite often found in a flake form and Cordite used in small arms ammunition.
Pyrotechnic	A pyrotechnic is an explosive article or substance designed to produce an effect by heat, light, sound, gas or smoke, or a combination of any of these, as a result of non-detonative, self-sustaining, exothermic chemical reactions.
Small Arms Ammunition (SAA)	SAA includes projectiles around 12mm or less in calibre and no longer than approximately 100mm. They are fired from a variety of weapons, including rifles, pistols, shotguns and machine guns.
Unexploded Anti-Aircraft (UXAA) Shell	UXAA shells are army ordnance commonly containing HE, though they can also contain pyrotechnic compounds that produce smoke. Most commonly, these were 3.7" and 4.5" HE shells, although they ranged from 2" to 5.25" calibre.
Unexploded Bomb (UXB)	UXB is a common term for unexploded air-dropped munitions.
Unexploded Ordnance (UXO)	UXO is explosive ordnance that has been either primed, fuzed, armed or prepared for use and has been subsequently fired, dropped, launched, projected or placed in such a manner as to present a hazard to operations, persons or objects and remains unexploded either by malfunction or design.
V1	The Vergeltungswaffe-1, V-1, also designated Fieseler Fi 103/FZG-76, known colloquially in English as the Flying Bomb, Buzz Bomb or Doodlebug, was the first guided missile used in WWII and the forerunner of today's cruise missile.
V2	The Vergeltungswaffe 2 (V-2) ('Reprisal Weapon 2') was the first ballistic missile. It was used by the German Army primarily against Belgian and British targets during the later stages of WWII. The V-2 was the first manmade object launched into space, during test flights that reached an altitude of 189km (117 miles) in 1944.

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Established for over 27 years, Zetica's services include

- ☑ Desk studies
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- ☑ Utility services detection
- ☑ Environmental and engineering geophysical surveys
- ☑ Transport infrastructure surveys
- ☑ Pipeline & cable route surveys
- ☑ Intrusive ground investigations

More details are available at

www.zetica.com


zeticauxo

Appendix D
North Somerset Council Correspondence

Munden, Laurence

From: Richard Allard <Richard.Allard@n-somerset.gov.uk>
Sent: 06 September 2018 15:09
To: Munden, Laurence
Subject: RE: NSC Bristol airport data request

Hi Laurence

Thank you for your email below.

To confirm my response of 2011 still remains valid. I have also searched our records and can confirm that we do not hold any information on current or historical contaminated land or pollution incidents on or in the vicinity of the airport. In addition we do not hold any records of any unexploded ordnance or radioactive contamination.

I trust this information is of use, however please do not hesitate to contact me should you require any further information.

Kind regards

Richard

From: Munden, Laurence [mailto:laurence.munden@woodplc.com]
Sent: Tuesday, August 28, 2018 4:23 PM
To: Richard Allard <Richard.Allard@n-somerset.gov.uk>
Subject: FW: NSC Bristol airport data request

Dear Richard,

I understand that you have been in contact with my colleague regarding Bristol Airport and nearby private water supplies / abstractions (to which you have confirmed that North Somerset Council (NSC) do not have records of any within 1km of the airport boundary).

I am involved with the land quality element of the EIA for Bristol Airport's proposed expansion and we would be grateful if you could provide any current and historical information that you may hold associated with contaminated land and pollution incidents both at the airport and within the surrounding area (and also to confirm where you do not have any records).

You previously provided similar information for the airport in 2011 (attached for reference). We would be grateful if you could also include details of any records that you may hold associated with any unexploded ordnance and radioactive contamination at the airport and surrounding area – We do not anticipate such contamination associated with the proposed development, but would like to check for completeness.

I understand that there is an existing planning performance agreement between Bristol Airport and North Somerset Council to cover such matters. Please contact me should you require any further information.

We look forward to your reply and would be very grateful if you could confirm your turnaround time to be able to provide this information.

Kind regards,
Laurence

Date: 31 Janaury 2011
My ref: RJA/249946
Your ref:
Contact: Richard Allard
Direct dial: 01275 884798
Email: richard.allard@n-somerset.gov.uk

North Somerset COUNCIL

Development and Environment
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Tomos Kidd
Entec
155 Aztec West
Almondsbury
Bristol
BS32 4UB

Dear Tomos

Re: Environmental Data Request - Bristol International Airport

With reference to your email received 24 January 2011, please find below the information you require.

1. There are no known current or closed landfills within 500m of the subject site.

2. The only current potentially contaminated land use in the vicinity of the site is a petrol filling station located approx 1250m at ST495 661.

3. There are no other contaminated land issues with the site identified under our Part IIA Inspection Strategy.

4. We do not hold any regulatory authorisations for the above site,

5. The subject site is located within a Source Protection Zone. We do not have any records of any other nearby sensitive land uses.

6. We do not hold any other data relating to contaminated land.

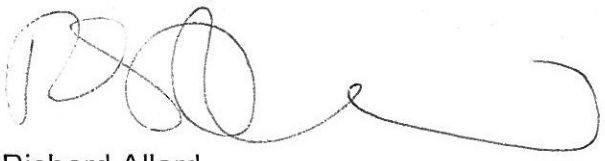
7. As far as I am aware there are no planning liaison or development control issues.

Please note that the information provided should not prejudice any further enquiries with other Authorities and is based on that currently available to North Somerset Council. The Council does not guarantee the validity or accuracy of the information and accepts no liability for any loss or damage, costs or claims arising either directly or indirectly from its use or interpretation.

There is a fee of £63.25 + VAT for this search. An invoice will follow later.

I trust that this information meets your requirements, however if you have any queries please do not hesitate to contact me via the above details.

Yours sincerely



Richard Allard
Contaminated Land Officer

Appendix E
Environmental Risk Assessment Methodology

The environmental risk assessment aims to assess the significance of each potential contaminant linkage. Each potential linkage is qualitatively assessed using the following criteria:

- potential consequence of contaminant – receptor linkage;
- likelihood of contaminant – receptor linkage; and
- risk classification.

The definitions for the qualitative risk assessment have been taken from "Guidance for the Safe Development of Housing on Land Affected by Contamination" Annex 4 R&D Publication 66: 2008 Volume 2.

The Likelihood Probability Classifications of SPR Linkage being realised is presented in Table E.1.

Table E.1 Likelihood Probability Classifications of SPR Linkage being realised

Classification	Definition	Examples
Unlikely	There is pollutant linkage, but circumstances are such that it is improbable that an event would occur even in the very long-term.	a) Elevated concentrations of toxic contaminants are present below hardstanding. b) Light industrial unit <10 years old containing a double skinned UST with annual integrity testing results available.
Low Likelihood	There is pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place and is less likely in the shorter term.	a) Elevated concentrations of toxic contaminants are present in soils at depths >1m in a residential garden, or 0.5-1.0m in public open space. b) Ground/groundwater contamination could be present on a light industrial unit constructed in the 1990s containing a UST in operation over the last 10 years – the tank is double skinned but there is no integrity testing or evidence of leakage.
Likely	There is pollutant linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	a) Elevated concentrations of toxic contaminants are present in soils at depths of 0.5-1.0m in a residential garden, or the top 0.5m in public open space. b) Ground/ groundwater contamination could be present from an industrial site containing a UST present between 1970 and 1990. The tank is known to be single skin. There is no evidence of leakage although there are no records of integrity tests.
High Likelihood	There is pollutant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution	a) Elevated concentrations of toxic contaminants are present in soils in the top 0.5m in a residential garden. b) Ground/groundwater contamination could be present from chemical works, containing a number of USTs, having been in operation on the same site for over 50 years.

"Potential Consequence of Contaminant Linkage" gives an indication of the sensitivity of a given receptor to a particular source or contaminant of concern under consideration. It is based on full exposure via the particular linkage being examined. The classification of consequence is presented in Table E.2.

Table E.2 Outline of Hazard Consequence Classifications for Receptor Types from Contamination Impact:

Classification	Human Health	Controlled Water	Ecology	Property Structures/ Crops and animals	Examples
Severe	Highly elevated concentrations likely to result in "significant harm" to human health as defined by the EPA 1990, Part 2A, if exposure occurs.	Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce.	Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population.	Catastrophic damage to crops, buildings or property.	Significant harm to humans is defined in circular 01/2006 as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Major fish kill in surface water from large spillage of contaminants from site. Highly elevated concentrations of Hazardous or priority substances present in groundwater close to small potable abstraction (high sensitivity). Explosion, causing building collapse (can also equate to immediate human health risk if buildings are occupied).
Medium	Elevated concentrations which could result in "significant harm" to human health as defined by the EPA 1990, Part 2A if exposure occurs.	Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce.	Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population.	Significant damage to crops, buildings or property.	Significant harm to humans is defined in circular 01/2006 as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Damage to building rendering it unsafe to occupy e.g. foundation damage resulting in instability. Ingress of contaminants through plastic potable water pipes.

Classification	Human Health	Controlled Water	Ecology	Property Structures/ Crops and animals	Examples
Mild	Exposure to human health unlikely to lead to "significant harm".	Equivalent to EA Category 3 pollution incident including minimal or short-lived effect on water quality; marginal effect on amenity value, agriculture or commerce.	Minor or short-lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population.	Minor damage to crops, buildings or property.	Exposure could lead to slight short-term effects (e.g. mild skin rash). Surface spalling of concrete.
Minor	No measurable effects on humans	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Repairable effects of damage to buildings, structures and services.	The loss of plants in a landscaping scheme. Discoloration of concrete.

The risk matrix to link the likelihood and consequence is shown in Table E.3.

Table E.3 Risk Matrix

Likelihood: / Potential Consequence:	Unlikely	Low Likelihood	Likely	High Likelihood
Severe	Low to Moderate	Moderate Risk	High Risk	Very High Risk
Medium	Low	Low to Moderate	Moderate Risk	High Risk
Mild	Very low risk	Low Risk	Low to Moderate	Moderate Risk
Minor	Very low risk	Very low risk	Low Risk	Low Risk

The overall risk definitions are summarised in Table E.4

Table E.4 Risk Definitions

Very Low	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.
Low	It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.
High	Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.

Appendix 10B
Agricultural Land Classification

Soil Environment Services Ltd

AGRICULTURAL LAND CLASSIFICATION

Wood PLC

Cogloop, Bristol Airport

Soil Environment Services Ltd
September 2018

Our Ref: SES/WPLC/CBA/#1 **Date: 17th September 2018**

Client:

Wood PLC
Partnership House
Regent Farm Road
Gosforth
Newcastle upon Tyne
NE3 3AF

AGRICULTURAL LAND CLASSIFICATION

Cogloop, Bristol Airport

A report prepared on behalf of ***Soil Environment Services*** by:

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DRAWINGS

ALC/1 Borehole Locations and Soil Types
ALC/2 ALC Grade

APPENDIX A Climatological data for agricultural land classification

APPENDIX B Survey profile data sheet

INFORMATION SOURCES

1. INTRODUCTION

An Agricultural Land Classification (ALC)[1,2] has been carried out on 5.4 ha of land known as the Cogloop at Bristol Airport, Bristol (Drawing ALC/1). The site is centred on OS Grid Ref. 350000, 164599.

Agricultural land is classified into the following grades according to the 1988 guidelines[1] and the 1996 draft guidelines[2]:

Grade	Description
1	**Excellent quality agricultural land** with no or very minor limitations to agricultural use.
2	**Very good quality agricultural land** with minor limitations which affect crop yield, cultivation or harvesting.
3a	**Good quality agricultural land** capable of producing moderate to high yields of a narrow range of arable crops or moderate yields of a wider range of crops.
3b	**Moderate quality agricultural land** capable of producing moderate yields of a narrow range of crops or lower yields of a wider range of crops.
4	**Poor quality agricultural land** with severe limitations which significantly restrict the range of crops and/or level of yields.
5	**Very poor quality agricultural land** with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

The survey was conducted on the 4th September 2018 and classifies the land into one or more of the above grades.

On the survey date the site was in rough grassland for grazing livestock.

2. METHODOLOGY

The classification includes an initial desktop investigation to examine previously mapped soil types and to note the drift and solid geology. This included consultation from:

Soil Survey of England and Wales 1:250 000[5]
British Geological Survey 1:50 000 solid and drift map[9]

The field survey consisted of a number of hand auger borings to a depth of 1.2 m (where possible) to examine soil profiles, using standard soil survey methods[3]. Pit excavations were conducted to determine sub soil structure where necessary. This data was used to map the principal soil types for determining the ALC. The soil removed during augering and pit excavations was examined in accordance with:

Soil Survey Field Handbook[3]
Describing and Sampling Soil Profiles
Soil Survey of England and Wales, Technical Monograph No. 5, 1976

Soil Classification for Soil Survey[10]
Monographs on Soil Survey
Butler, B E (1980) Clarendon Press, Oxford

Climatological data[4] was used to determine the overriding site limitation and for interaction with soil parameters (Appendix A). The above information was cross referenced with geological surveys[9], previous soil surveys[11] and the national 1:250 000 series ALC survey[5] relevant for this site to substantiate the findings. The ALC grade was then determined for this site and for the current survey and is detailed on Drawing ALC/2.

Other factors used for ALC grading, but which give no limitation at this site, are not discussed.

3. BASELINE CONDITIONS

3.1. Climate and flooding

The climatological data (Table 1) indicates slightly below average temperature, average rainfall and an average number of field capacity days for the region.

Table 1
Climatological information[4]

Factor	Units	Value
Altitude AOD	m	182
Accumulated temperature	day°C (Jan-June)	1345.4
Average Annual Rainfall	mm	897.7
Field Capacity Days	days	199.1
Moisture Deficit Wheat	mm	70.4
Moisture Deficit Potatoes	mm	53.4

The site is not mapped within a flood risk area[8].

3.2. Soils, geology and topography

3.2.1. Soils

The site has previously been mapped as having soils of the *Nordrach and Crwbin Associations* [5, 6].

One general soil type was noted for the purposes of ALC grading.

This study has identified the soils to be shallow clay loams over limestone bedrock.

3.2.2. Geology[9]

Superficial Geology

None recorded.

Bedrock Geology

1:50 000 scale bedrock geology description: *Black Rock Limestone Subgroup - Limestone. Sedimentary Bedrock formed approximately 345 to 359 million years ago in the Carboniferous Period. Local environment previously dominated by shallow carbonate seas.*

1:50 000 scale bedrock geology description: *Westbury Formation and Cotham Member (undifferentiated) - Mudstone and Limestone, Interbedded. Sedimentary Bedrock formed approximately 201 to 210 million years ago in the Triassic Period. Local environment previously dominated by shallow seas.*

1:50 000 scale bedrock geology description: *Brockley Down Limestone - Limestone. Sedimentary Bedrock formed approximately 199 to 210 million years ago in the Jurassic and Triassic Periods. Local environment previously dominated by shorelines.*

3.2.3. Topography

The site has a measured slope of 5-7° towards the south and hence gradient will not limit the ALC Grade for the site.

4. FIELDWORK RESULTS

4.1. Descriptions of soil types

The soils across the site were noted as shallow clay loams over limestone bedrock (Table 2). Full profile data is listed in Appendix B.

A summary of the features of the soil type/s are listed in Table 2 and locations are shown within Drawings ALC/1 and ALC/2.

Table 2. Soil Type descriptions

Profile Description	Soil types		
	Type 1	**Type 2**	**Type 3**
Horizon 1 (topsoil)	0-40 cm Brown (7.5YR 4/3) moderately stony clay loam, no mottles; weak fine subangular blocky structure.	0-13 cm Brown (10YR 4/4) very slightly stony clay loam, no mottles; weak fine subangular blocky structure.	0-25 cm Brown (10YR 4/4) very slightly stony clay loam, no mottles; weak fine subangular blocky structure.
Horizon 2 (subsoil 1)	40 cm Weathered limestone.	13-40 cm Brown (7.5YR 4/3) slightly stony clay loam, no mottles; weak medium subangular blocky structure.	25-53 cm Brown (7.5YR 4/3) slightly stony clay loam, no mottles; weak medium subangular blocky structure.
Horizon 3 (subsoil 2)		40 cm Weathered limestone.	53-70 cm Strong brown (10YR 4/6) slightly to moderately stony silty clay loam, few fine ochreous mottles; weak medium angular blocky structure.
Horizon 4 (subsoil 3)			70 cm Weathered limestone.
Survey points (Drawing ALC/1) and soil types: BHs/ TPs Type 1 soil = 1,2, 4 and 5 Type 2 soil = 3 Type 3 soil = 6 Notes:			

4.2. Field study photographs

Photo 1. Trial Pit 1 – Soil Type 1

Photo 2. Structure of Topsoil – Trial Pit 1

Photo 3. Trial Pit 2 – Soil Type 1

Photo 4. Borehole 3 – Soil Type 2*

Photo 5. Borehole 4 – Soil Type 1*

Photo 6. Borehole 5 – Soil Type 1*

Photo 7. Borehole 6 – Soil Type 3*

*NB Borehole photographs are included for an illustration of horizons, to verify profile depth and provide an indication of colour but are not intended to verify any structure.

Photo 8. Borehole 6 – Subsoil 2, Soil Type 3

4.3. In-field wetness class assessment

An in-field wetness assessment was conducted for the soil type (Table 3).

Table 3. In-field Wetness Class Assessment

Soil Type	Feature	Parameters	Findings	WC
1	Site conditions	Undisturbed/ disturbed	Undisturbed	I
		FCD	199.1	
	Potential Slowly Permeable Layer (SPL)	Horizon depth (cm)	0-40	
		Texture	CL	
		Structure	WFSAB	
		Biopores > 0.5 mm (%)	>0.5	
		Evidence of wetness	None	
	Potential Gleyed Horizon	Matrix colour	Pale/Brownish – 7.5R 4/3	
		Ped faces colour	Pale/Brownish – 7.5R 4/3	
		Mottles	None	
		Depth to gleying (cm)	>40	
	Figure reference in ALC guidelines – 6			
2	Site conditions	Undisturbed/ disturbed	Undisturbed	I
		FCD	199.1	
	Potential Slowly Permeable Layer (SPL)	Horizon depth (cm)	13-40	
		Texture	CL	
		Structure	WMSAB	
		Biopores > 0.5 mm (%)	>0.5	
		Evidence of wetness	None	
	Potential Gleyed Horizon	Matrix colour	Pale/Brownish – 7.5R 4/3	
		Ped faces colour	Pale/Brownish – 7.5R 4/3	
		Mottles	None	
		Depth to gleying (cm)	>40	
	Figure reference in ALC guidelines – 6			

Key
FCD – Field Capacity Days
WC – Wetness Class
WFSAB – Weak Fine Subangular Blocky
CL - Clay Loam
WMSAB – Weak Medium Subangular Blocky

Notes:

Table 3. In-field Wetness Class Assessment				
Soil Type	**Feature**	**Parameters**	**Findings**	**WC**
3	Site conditions	Undisturbed/ disturbed	Undisturbed	III
		FCD	199.1	
	Potential Slowly Permeable Layer (SPL)	Horizon depth (cm)	53-70	
		Texture	ZCL	
		Structure	WMAB	
		Biopores > 0.5 mm (%)	>0.5	
		Evidence of wetness	Mottles	
	Potential Gleyed Horizon	Matrix colour	Pale – 10YR 4/4	
		Ped faces colour	Ochreous – 10YR 4/6	
		Mottles	Ochreous – 10YR 5/6	
		Depth to gleying (cm)	53	
	Figure reference in ALC guidelines – 8			

Key
FCD – Field Capacity Days
WC – Wetness Class
CL - Clay Loam
WMAB – Weak Medium Angular Blocky

Notes:

5. AGRICULTURAL LAND CLASSIFICATION

5.1. National 1:250 000 map grading

Grading on the MAFF (1983) 1: 250 000 map[7] indicated the site was mapped as **Grade 3**.

5.2. Current grading

This survey has resulted in an Agricultural Land Classification of the following grades (Drawing ALC/2):

Table 4. ALC gradings and limitations

Grade	Area (ha)	Limitation
1		
2		
3a	3.2	Type 1 Soils – Depth (TP1, BH5) Type 2 Soils – Depth (BH3) Type 3 Soils – Wetness (BH6)
3b	2.2	Type 1 Soils – Depth (TP2, BH4)
4		
5		
Non-agricultural land		

Type 1 soils – Depth limitation (TP1, BH5)
The depth to limestone bedrock (between 30 and 40 cm) results in **ALC Grade 3a** for Type 1 soils (TP1, BH5).

Type 1 soils – Depth limitation (TP2, BH4)
The depth to limestone bedrock (between 20 and 30 cm) results in **ALC Grade 3b** for Type 1 soils (TP2, BH4).

Type 2 soils – Depth limitation
The depth to limestone bedrock (between 30 and 40 cm) results in **ALC Grade 3a** for Type 2 soils.

Type 3 soils – Wetness limitation

The combination of the topsoil texture (clay loam), Wetness Class (III) and the number of Field Capacity Days (199.1) results in **ALC Grade 3a** for Type 3 soils.

DRAWING ALC/1

Borehole Locations and Soil Types

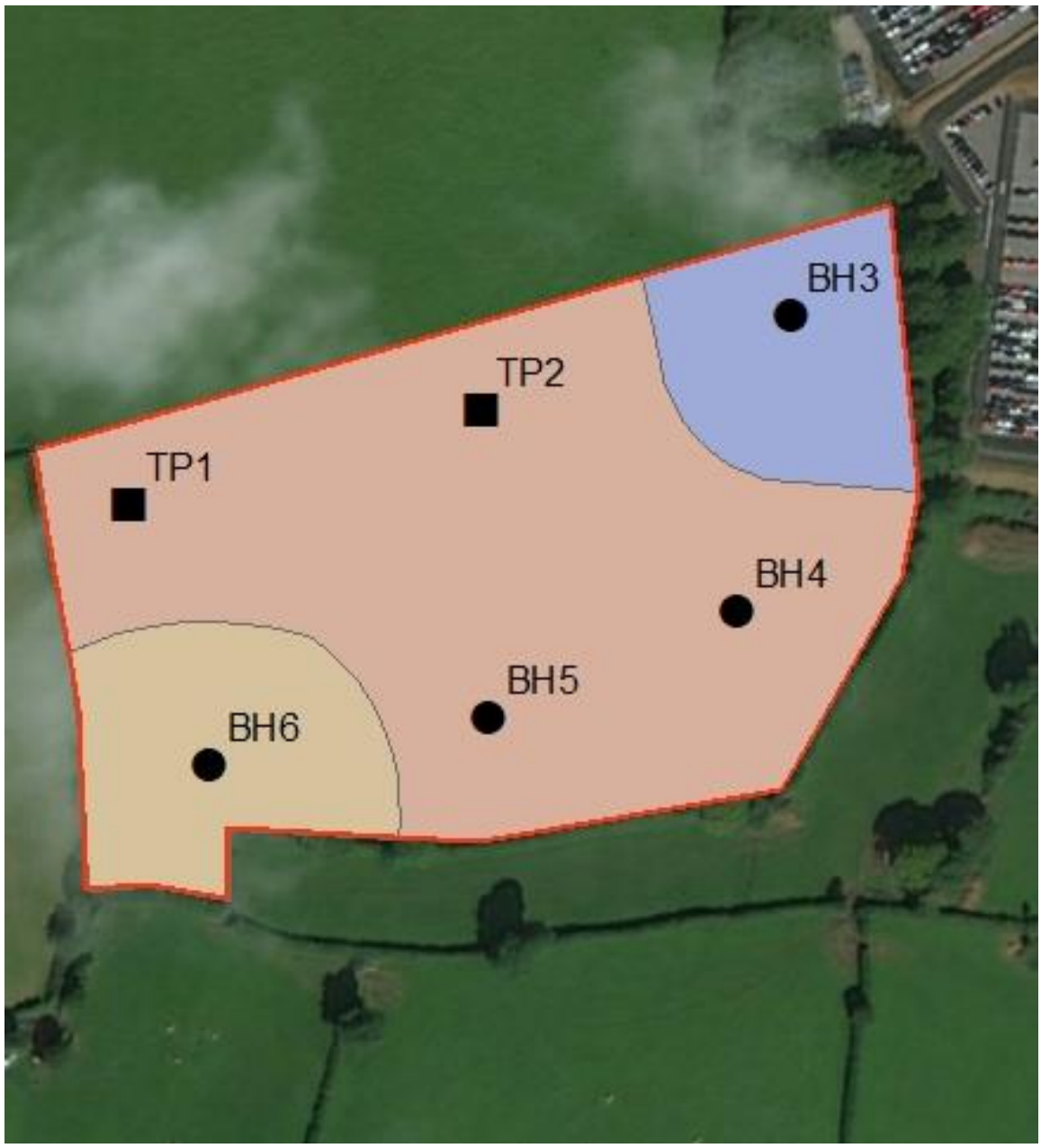
Key

- Soil Type 1
- Soil Type 2
- Soil Type 3
- Borehole Location
- Trial Pit Location

Soil Environment Services

Drawing Title: Borehole Locations and Soil Types	Drawing No.: ALC/1
Scale: 1: 2765	Date: 04/09/2018

N



DRAWING ALC/2

ALC Grade

Key

- Good quality – 3a
- Moderate quality – 3b
- Borehole Location
- Trial Pit Location

Soil Environment Services

Drawing Title: ALC Grade	Drawing No.: ALC/2
Scale: 1: 2765	Date: 04/09/2018

N

APPENDIX A

Climatological data for

Agricultural Land Classification

Agricultural Land Classification - Met. Information & droughtiness

Data and adjustment calculations from: The Met. Office, *Climatological Data for Agricultural Land Classification* 1989.
Input data in box cells only, results in shaded cells.

Site name	Cogloop, Bristol Airport	
Site altitude =	184	m
Site GR	3500	1645

Meteorological information for surrounding national grid reference points

	Easting	Northing	ALT	AAR	LR_AAR	ATO	MDMWHT	MDMPOT	FCD
NW	3500	1650	187	897	0.4	1342	74	57	199
NE	3500	1650	187	897	0.4	1342	74	57	199
SW	3500	1600	42	980	0.5	1509	86	75	210
SE	3500	1600	42	980	0.5	1509	86	75	210

Altitude adjustment of surrounding meteorological information with respect to site.

Adjusted surounding points

	AAR	ATO	FCD
NW	895.8	1345.4	198.8
NE	895.8	1345.4	198.8
SW	1051.0	1347.1	220.3
SE	1051.0	1347.1	220.3

Site adjusted meteorological information

		1 Dsg	2 Wg	Wp
NW		5	0.040000	0.493902
NE		5	0.040000	0.493902
SW		45	0.000494	0.006098
SE		45	0.000494	0.006098
	Sum		0.080988	

Site	**AAR**	**ATO**	**FCD**
	897.7	1345.4	199.1

ALC according to climate

Grade **2**

Soil wetness class (drained)

Type 1	**I**
Type 2	**I**
Type 3	**III**

ALC according to wetness/climate texture

Type 1	**2**
Type 2	**2**
Type 3	**3a**

Soil moisture deficit of surrounding points

	Cw	Cp	Adjusted	
NW	-19.5392	-25.8156	66.4608	49.18
NE	0.392	0.5184	74.3918	57.52
SW	0.392	0.518	74.3918	57.52
SE	-19.5392	-25.8156	66.4608	49.18

Site results for soil moisture deficit

MDMW	MDMPOT
70.4	53.4

Adjustment data for stone type and content

	Soil Type 1			Soil Type 2			Soil Type 3		
	Top	Sub1	Sub2	Top	Sub1	Sub2	Top	Sub1	Sub2
% volume	35	100	na	5	15	100	5	10	25
TAv for stone type	4	4	na	4	4	4	4	4	4
EAv for stone type	3	3	na	3	3	3	3	3	3
	Sub 3			Sub 3			Sub 3		
% volume	na	na	na	na	na	na	100	na	na
TAv for stone type	na	na	na	na	na	na	4	na	na
EAv for stone type	na	na	na	na	na	na	3	na	na

Droughtiness (moisture balance) determination for each soil type and restored profile

Moisture availability data for each texture from MAFF ALC Guidelines 1988

Moisture Balance (MB) = AP - MD for wheat and potatoes (adjusted for stones)

Horizon		Type 1 texture	Type 1 water	Type 2 texture	Type 2 water	Type 3 texture	Type 3 water
TAvt - Topsoil water available (mm)		CL	13.10	CL	17.30	CL	17.30
LTt - Topsoil thickness (cm)		0	40.00	0	13.00	0	25.00
TAvs - Subsoil total available	1	LST	4.00	CL	14.20	CL	14.80
	2	0	0.00	LST	4.00	ZCL	13.75
	3	0	0.00	0	0.00	LST	4.00
EAvs -	1	LST	3.00	CL	8.95	CL	9.30
Subsoil (SS) easily available	2	0	0.00	LST	3.00	ZCL	8.25
	3	0	0.00	0	0.00	LST	3.00
LT50 -	1	LST	10.00	CL	27.00	CL	25.00
Thickness ss layers to 50cm	2	0	0.00	LST	10.00	ZCL	0.00
	3	0	0.00	0	0.00	LST	0.00
LT120 -	1	LST	70.00	CL	0.00	CL	3.00
Thickness ss layers 50 to 120cm	2	0	0.00	LST	70.00	ZCL	17.00
	3	0	0.00	0	0.00	LST	50.00
LT0 -	1	LST	30.00	CL	27.00	CL	28.00
Thickness ss layers to 70cm	2	0	0.00	LST	30.00	ZCL	17.00
	3	0	0.00	0	0.00	LST	0.00
Total profile thickness for soil type cm		0	120		120	0	120

SOIL **Droughtiness** (moisture balance) results

Type 1

Results		Grade
AP wheat =	77.4	
Moisture balance wheat =	7.0	2
AP potatoes =	64.4	
Moisture balance potatoes =	11.0	1

Type 2

Results		Grade
AP wheat =	85.8	
Moisture balance wheat =	15.4	2
AP potatoes =	103.4	
Moisture balance potatoes =	50.1	1

Type 3

Results		Grade
AP wheat =	112.1	
Moisture balance wheat =	41.6	1
AP potatoes =	109.9	
Moisture balance potatoes =	56.5	1

Notes

ALC Grade	Moisture Balance Limits wheat	potatoes
1	30	10
2	5	-10
3a	-20	-30
3b	-50	-55
4	<-50	<-55

APPENDIX B

Site Survey Field Notes

Soil Environment Services Ltd **Tel 01661 844 827**

ALC Survey Profile Data Sheet **Site:** **Cogloop, Bristol Airport**

	Topsoil						Subsoil 1						Subsoil 2						Subsoil 3					
BH/TP no.	Depth (cm)	Texture	Colour (Munsell)	Stoniness (%)	Mottles	Structure	Depth (cm)	Texture	Colour (Munsell)	Stoniness (%)	Mottles	Structure	Depth (cm)	Texture	Colour (Munsell)	Stoniness (%)	Mottles	Structure	Depth (cm)	Texture	Colour (Munsell)	Stoniness (%)	Mottles	Structure
1	0-40	CL	7.5YR 4/3	35	No	WFSAB	40	Terminated on Limestone																
2	0-20	CL	7.5YR 4/3	35	No	WFSAB	20	Terminated on Limestone																
3	0-13	CL	10YR 4/4	5	No	WFSAB	13-40	CL	7.5YR 4/3	15	No	WMSAB	40	Terminated on Limestone										
4	0-27	CL	7.5YR 4/3	35	No	WFSAB	27	Terminated on Limestone																
5	0-30	CL	7.5YR 4/3	35	No	WFSAB	30	Terminated on Limestone																
6	0-25	CL	10YR 4/4	5	No	WFSAB	25-53	CL	7.5YR 4/3	10	No	WMSAB	53-70	ZCL	10YR 4/6	25	FFO	WMAB	70	Terminated on Limestone				

Key:

CL -Clay Loam
ZCL - Silty Clay Loam

WFSAB - Weak Fine Subangular Blocky
WMSAB - Weak Medium Subangular Blocky
WMAB - Weak Medium Angular Blocky

FFO - Few Fine Ochreous

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