

Remediation Strategy & Verification Plan

15 March 2024

Proposed Goitre Primary School. Land north of Goitre Lane, Gurnos, Merthyr Tydfil, CF47 9SA

Morgan Sindall Construction & Infrastructure Limited



Document Control

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Morgan Sindall Construction & Infrastructure Limited

Phil Davies

1 Introduction

1.1 Terms of Reference

Ashfield Solutions Limited ("Ashfield"), have been commissioned by Morgan Sindall Construction & Infrastructure Limited ("Morgan Sindall" or the "Client"), to develop a Remediation Strategy in relation to the proposed Goitre Primary School located at land north of Goitre Lane, Gurnos, Merthyr Tydfil, CF47 9SA ("the site").

Ashfield understands that the current project comprises the development of a new primary school building, located approximately within the centre of the site with associated hardstanding, access roads, footpaths and car parking to the west. A Multi-use Games Area ("MUGA") and sports pitch are proposed in the southeast of the site. We understand that the development has been submitted to planning (ref. P/24/0034) but as of the time of writing no formal conditions pertaining to the site are available.

The school will accommodate approximately 420 pupils with additional nursery, pre-school, Learning Resource Base classrooms and Community Facilities. The site location can be seen in Appendix A. The whole site illustrative masterplan for the proposed development is included as Appendix B.

The overall objective of this document is to outline the appropriate form(s) of remediation necessary to remove unacceptable land contamination risks to end users to ensure safe development. This shall ensure that, following redevelopment, the site does not qualify as 'contaminated land' under Part 2A of the Environmental Protection Act 1990 in relation to the intended use. This document is intended for approval by Merthyr Tydfil County Borough Council ("MTCBC") as the relevant Local Planning Authority ("LPA").

1.2 Planning Context & Objectives

A planning application for the development was submitted in February 2024 and is currently pending consideration by Merthyr Tydfil County Borough Council, under Planning Application (Ref. P/24/0034), for the *"Construction of a new Primary School including access, landscaping, play / sports pitches, parking, external works, swale, plant and associated works | Land To The North Of Goitre Lane Gurnos Merthyr Tydfil"*.

At the time of writing, the planning conditions pertaining to the site have yet to be formalised. However, we understand that these will be included as part of any future grant of planning consent for the scheme. Therefore, to provide the context for this report and its objectives, the expected conditions and associated requirements are broadly presented below:

- Submission of remediation scheme including an assessment of feasible remedial options.
- Implementation and verification of remediation scheme.
- Provisions for unexpected contamination.

The principal objective of this Remediation Strategy document, is to provide details on the works required to address land quality related risks, as identified in the Intégral Géotechnique (Wales) Limited Site investigation Report (Appendix D), to support a planning application associated with redeveloping the site.

This shall ensure that, following redevelopment, the site does not qualify as 'contaminated land' under Part 2A of the Environmental Protection Act 1990 in relation to the intended use. All work and submissions carried

were conducted in accordance with Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency's 'Land contamination risk management'¹ (LCRM) and the Welsh Local Government Association (WLGA)/ Welsh Government (WG) / Natural Resources Wales (NRW) guidance document 'Land Contamination: A guide for Developers' (2017)².

1.3 Sources of Information

In preparing this Remediation Strategy and Verification Plan the following documents were consulted:

Table 1 - Key Sources of Information and Description

Reference	Description
Lawray Architects. Design & Access Statement, New Goetre Primary School, Merthyr Tydfil Cf47.	Outlines the development proposals, timeline and design elements.
Intégral Géotechnique (Wales) Limited, Goetre Primary School, Merthyr Tydfil, Site Investigation. Report Ref: 14209/FG/23/SI/Rev.A	Combined Geotechnical and Geo-environmental investigation of the Block A area. Investigation comprised hand excavated pits, rotary cored boreholes and dynamic (window) sample boreholes. Geochemical sampling was undertaken.
Cambria Civil & Structural Engineers Limited, Goetre Primary School, Cut/Fill analysis Existing Stripped Proposed Formation drawing. Ref CC2538 CAM XX XX DR 1200	This Cut/Fill produced by Cambria indicates the preliminary cut and fill analysis from existing stripped levels to the proposed formation level. This outlines the areas that are to be subjected to significant cut and/or fill.
Ashfield Solution, Indicative Cut and Fill Site Strip to Formation Levels (Ref. SK01-183023). January 2024	This Cut/Fill produced by Ashfield Solutions indicates the indicative cut and fill analysis from existing stripped levels to the proposed formation level.
Cambria Civil & Structural Engineers Limited, Goetre Primary School, Proposed site Plan Layout. Ref GPS-LAW0X-X-DR-A-069001 P04	This site layout plan shows the anticipated final layout plan of the new school building and associated vehicle parking, 'MUGA' sports pitches, hard and soft landscaping.
Ecological Services Limited, Updated Preliminary Ecological Assessment, goitre Field School dated 16th August 2023	This preliminary ecological assessment outlines all of the ecological work undertaken at the site since 2021, this includes previous ecological, reptile, invertebrate surveys and ecological appraisals.

The detailed site history and land contamination assessments are provided in the documents listed above. This document provides relevant summary information from the sources listed above and we recommend the reader refers to the source documents for further detailed site information.

Important: Ashfield understands that additional site investigation is being undertaken to further determine site condition and inform design parameters. Should new information significantly change the Conceptual Site Model (CSM) presented within the Intégral site investigation report this strategy will need to be amended to reflect this.

¹ Land Contamination: Risk Management Environmental Agency (EA), 2020.

²

1.4 Scope

To provide a Remedial Strategy and Verification Plan in accordance with the principles and requirements of the Environment Agency's *Land Contamination: Risk Management* (2020), the *National Planning Policy Framework* and DEFRA's *'Contaminated Land Statutory Guidance'*. This report provides the following:

- Summary of background information and site environmental setting;
- Summary of the results of the risk assessment and final conceptual model adopted for the site;
- Identification of feasible remediation options; and
- Methodology and verification requirements for remediation works.

1.5 Report Limitations

This report has been prepared with reasonable due care and diligence in accordance with industry best practice and guidance. This remedial strategy has been presented based upon the findings of investigations carried out by others. Third party information, including site investigation reports, have been relied upon in good faith, but Ashfield cannot guarantee the validity of third-party data. No investigation method is capable of completely identifying all ground conditions that might be present in soil or groundwater under a site and there is always a risk that unidentified contamination may be encountered during ground works.

This report has been prepared for the exclusive benefit of the Client and those parties designated by them for the purpose of providing information on the remediation and validation works to be undertaken during the enabling works and construction phases of the development. The conclusions presented in this report represent Ashfield's best professional judgement based upon the information available and conditions existing as of the date of this report and with due regard to the limitations of third-party data.

This report does not provide a geotechnical appraisal of ground conditions with respect to suitability of foundations or future structures, nor does it intend to identify a need for any associated geotechnical ground improvement works.

2 Background Information

2.1 Context

This section presents a summary of the environmental setting of the site as determined by previous assessments. The reader is referred to these reports for further details.

2.2 Site Location and Current Land Use

The site is located to the northeast of Goitre Lane, situated at National Grid Reference of 305020, 208310. The site is of an irregular shape and occupies an area of approximately 9.3 hectares. The site elevation ranges from an approximate minimum elevation of 286m Above Ordnance Datum ("AOD") in the southern corner to an approximate maximum elevation of 307m AOD within the northeast corner. The site currently has a surface covering of vegetation with areas of Japanese Knotweed growth but is currently undeveloped.

2.3 Site History

The historical use of the site has been summarised within the Intégral Géotechnique Geo-Environmental Site Investigation Report. In brief, the site and the immediate surrounding areas have remained relatively unchanged between the 1990's and the present day. However, critically the south of the site was formally known as Goitre Pond and is understood to have been infilled around 1965.

2.4 Hydrology

The environmental third-party data searches within the Intégral site investigation report indicate that the nearest surface water features are located on-site. The OS water Network line map indicates an unnamed water feature to flow from the northeast corner of the site. The features appear to sink underground to issue within the southeast corner before flowing off-site to the southeast. It is likely that this feature is culverted beneath the site. the nearest named feature is recorded as Nant Morlais which is located approximately 516m to the southeast. No other water features with the potential to be impacted by the site or development/remediation works have been identified.

2.5 Geology and Physical Ground Conditions

The generalised geological sequence below the site is described as follows:

Table 1 - Proven geological sequence

Horizon	Depth	Description
Topsoil	To depths between 0.20 and 0.30m	Grass over soft brown and black silty slightly gravelly organic rich CLAY with frequent rootles.
Made Ground	To depths between 0.80 and 4.10m	Varying densities/consistencies of very soft to stiff brown, grey and black, silty, sometimes sandy, gravelly CLAY/SILT And Loose to medium dense grey and black sometimes clayey, sandy GRAVEL/ gravelly SAND.

Horizon	Depth	Description
	To depths between 1.90 and 4.50	Soft blackish brown spongy fibrous PEAT (suspected base of former pond).
Natural Soils	To depths between >2.30 and >10.0m	Typically soft to form, locally very soft and stiff brown, grey and greyish brown silty, locally sandy gravelly CLAY/SILT And Medium dense sandy GRAVEL.

2.6 Hydrogeology and Groundwater

The Natural Resources Wales groundwater vulnerability map and aquifer database classifies the superficial deposits beneath the site as Secondary Aquifer-Undifferentiated. This classification is assigned in cases where it has not been possible to attribute either category A or B to a soil type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the material.

The Natural Resources Wales groundwater vulnerability map and aquifer database classifies the bedrock beneath the site as a Secondary 'A' Aquifer. Secondary 'A' Aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

The site is not located within a groundwater source protection zone and there are no recorded potable groundwater abstractions likely to be impacted by the site.

Groundwater observed during the initial investigation is considered to likely represent perched water bodies, predominately within the made ground on site. Groundwater was encountered during exploratory hole advancement at depths of between 0.2 and 4.70m bgl in both trail pits and boreholes. Subsequent monitoring (undertaken in May to November 2023) recorded groundwater within the monitoring borehole at depths between 0.00 and 1.64m bgl.

3 Risk Assessment Summary

3.1 Previous Assessments

As discussed in 1.3, the site has been subjected to a previous geo-environmental investigation. The following document were submitted to MTCBC in support of the planning consent for the new school:

- Intégral Géotechnique (Wales) Limited, Goitre Primary School, Merthyr Tydfil, Site Investigation. Report Ref: 14209/FG/23/SI/Rev.A

The key outputs from the above assessment, specifically the final Conceptual Site Model ("CSM"), and Relevant Pollutant Linkages ("RPLs"), form the basis of the remediation strategy presented herein.

3.2 Contamination Assessment

Soil contamination

To assess the significance of contaminant concentrations identified in soil, Intégral undertook the screening of analytical results against published, conservative, Generic Assessment Criteria (GAC). The GAC adopted by Intégral comprised those for a residential without homegrown produce scenario reflective of the proposed end use as a school.

The geo-environmental soil tests revealed the presence of metal, hydrocarbon and asbestos contamination within the Made Ground beneath the site, associated with the historical infilling of Goitre Pond. This contamination is limited to localised areas to the east of the site. The contamination is present in the form of exceedances of beryllium and several Polycyclic Aromatic Hydrocarbons (PAH) compounds (Benzo(a)pyrene, Benzo(b)fluoranthene, and Dibenzo(ah)anthracene) against the selected 'residential without plant uptake' end-use criteria. Furthermore, trace amounts of chrysotile and amosite asbestos was also detected within sample WS05 within the made ground.

Based on the investigation data, the contamination is identified predominately within the made ground between the depths of 0.4m bgl to 1.00m bgl. Made ground material below one meter depth was not tested and as such the maximum vertical extent of the contamination was not proven. However, the underlying natural materials that were encountered did not display any visual or olfactory contamination during the investigation in addition to not displaying any exceedances against the adopted screening criteria.

Although Intégral has identified contamination to be present within the made ground material present on the site, this is limited to localised areas. Intégral concluded that it would be necessary to break the pollutant linages in order to remove the potential risk.

Controlled Waters

Localised elevated concentrations of beryllium and three PAH compounds (benzo(a)pyrene, benzo(b)fluoranthene and dibenzo(ah)anthracene) were encountered within the made ground soils samples located beneath the site. The underlying natural ground comprised of generally cohesive glacial deposits, although perched ground incidences were recorded in the made ground and natural soils.

3.3 Ground Gas

A ground gas assessment is presented in the Intégral 2023 report, which states the following:

"The results show a maximum methane concentration of 2.2% and a maximum carbon dioxide concentration of 3.6%. A maximum gas flow rate of <0.3l/hr was measured during the gas monitoring programme. In accordance with CIRIA Report C665 a Gas Screening Value (GSV) of 0.0108/hour has been calculated. This GSV corresponds to gas Characteristic Situation 1 (CS1), which does not require any special gas protective measures. However, due to the significant thickness of made ground, methane concentrations above 1% and the presence of significantly thick organic cohesive soils underlying the site, it would be prudent to increase the gas Characteristic Situation to Situation 2 (CS2)."

Although the data suggest a CS1 classification, CS2 has been adopted as the precautionary principal due to the material present (such as peat and made ground) beneath the site which have the potential for ground gas generation and the sensitivity of the end-users.

3.4 Concrete Design

A buried concrete design class assessment is presented in the Intégral 2023 report, which states the following:

" A summary of the laboratory chemical test results for the chemicals monohydric phenol, sulphur, total sulphate, water soluble sulphate, sulphide, and pH, which may adversely affect the durability of building materials is presented in Appendix G. Evidence to date does not indicate any specifically aggressive conditions, but it would be reasonable to expect a degree of sulphate and acidic aggressiveness from the made ground.

Made Ground

In accordance with BRE Digest SD1:2005 and adopting the assessment procedure specified therein for brownfield sites, the laboratory chemical test results indicate a characteristic value (taking the highest test result) for water soluble sulphate within the made ground of 410mg/l. Using Table C2 of BRE Digest SD1:2005, this characteristic value corresponds to Design Sulphate Class DS-1. The groundwater regime of the site has been assessed as 'mobile' and a characteristic pH value within the made ground of 7.0 has been determined (adopting the lowest test result). The Design Sulphate Class has been modified to give a site ACEC class of AC-1 for concrete structures constructed within the made ground.

Natural Soils

In accordance with BRE Digest SD1:2005 and adopting the assessment procedure specified therein for brownfield sites, the laboratory chemical test result (based on one sample of natural soil) indicate a characteristic value for water soluble sulphate within the natural soil of 17mg/l. Using Table C2 of BRE Digest SD1:2005, this characteristic value corresponds to Design Sulphate Class DS-1. The groundwater regime of the site has been assessed as 'mobile' and a characteristic pH value within the made ground of 5.8 has been determined (adopting the mean of the lowest 20% of the test results). The Design Sulphate Class has been modified to give a site ACEC class of AC-2Z for concrete structures constructed within the natural soils. "

3.5 Conceptual Site Model

A risk can be defined as: 'a combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequence of the occurrence'. The LCRM states that a risk can be identified through the use of a 'Source Pathway Receptor approach' whereby:

- **Source** – represents a contaminant or pollutant that is in, on or under the land and that has the potential to cause harm or pollution.
- **Pathway** – represents a route by which a receptor is or could be affected by a contaminant.
- **Receptor** – represents something that could be adversely affected by a contaminant, for example a person, controlled waters, an organism, an ecosystem, or Part 2A receptors such as buildings, crops, or animals.

Based upon the conclusions of Intégral's assessment, the final CSM for the site in the context of the proposed development is presented in Table 3. The table highlights the Relevant Pollutant Linkages requiring risk mitigation.

This remediation strategy seeks to provide protection to end users based upon all final land uses through sufficient mitigation measures such as a capping layer and robust verification testing.

Table 2 - Summary of Identified RPLs Requiring Mitigation

RPL Ref.	On site source material	End-use / Averaging Area	Substances / hazards	Relevant pathways	Mitigation (as detailed in later sections)
Human Receptors (Human Health / Nuisance) Soft Cover Areas & Hard Surfaced External Areas					
RPL-1	Made Ground	Soft Surfacing Areas: including planted and landscaped areas.	Metals PAHs Asbestos	Ingestion, dermal, dust & outdoor vapour inhalation	Adoptions of a cover system comprising suitably verified soil layer and appropriate geotextile marker layer. Appropriate specification / verification of shallow soils in landscaped areas. Adopt protective Human Health Generic Criteria. All shallow soils to meet the relevant landscaping requirements with respect to chemical, physical, structural suitability and required thickness. In the event that such materials are encountered, the placement of marginally impacted soils not suitable for use in soft cover areas beneath areas of buildings / hardstanding. A set of appropriate Human Health Protective Criteria will be adopted for soils placed beneath hardstanding / buildings and at depth. Good personal hygiene should be practiced on site at all times. Localised soils potentially containing trace concentrations of asbestos are likely to be disturbed during site development and dust suppression mitigation measures are recommended.
Built Environment Receptors (Buildings / Structures)					
RPL-2	Made Ground / soils along water supply corridors	Water Mains / Drinking Water Supply	PAHs	Potable Water Pipe Systems Integrity / performance / durability	Agreement with water supply providers.
RPL-3	Made Ground	Buildings	Ground Gas (CH ₄ /CO ₂)	Ground Gas entry into buildings	Appropriate gas protection measures (CS2) to overcome Grade 3.5 Gas Score in accordance with BS8485 as recommended within the Intégral 2023 report, are required within buildings.

RPL-4	Made Ground / soils	Buildings / Structures	Aggressive ground conditions	Concrete / buried structure performance / durability	Appropriate buried concrete design class in accordance with BRE Special Digest 1 (2005) as recommended within the Intégral 2022 report.
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With regard to RPL-1, this remediation strategy proposes that areas of soft landscaping be appropriately filled with clean imported material. Confirmatory validation testing of soils generated during the work will be undertaken. If encountered, soils deemed as unsuitable for use in shallow soft cover areas, maybe suitable for retention on site beneath areas of hardstandings (e.g. buildings, carparking) and deeper fill areas, where exposure pathways with end users will be broken. This approach is regarded as sustainable, tried and tested and in line with industry best practice.

With regard to RPLs 2, the specification of below ground infrastructure, foundations and underground service corridors, associated materials should be suitable for the chemical quality of the ground at the site. Any required measures to protect site utilities and services, including potable water pipes, should be agreed at the appropriate time between the development team and Building Control and any relevant utility providers. Confirmation of the mitigation to be adopted for these RPLs will be captured within the verification report(s).

With regard to RPL-3, the requirement for mitigation measures for ground gas should be discussed and agreed separately by the development team with the Council and Building Control at the appropriate time. Notwithstanding the above, the following sections outline the provisions which should be considered to mitigate end users from Ground Gas risks.

With regard to RPL-4, the buried concrete design sulphate class is identified as part of the Intégral 2023 report. Design classes differ as to the location of the concrete/structure and the material in which it contacts. The appointed contractor shall familiarise themselves with the findings of the Intégral 2023 report.

4 Remedial Options Appraisal

4.1 Introduction

The primary aim of any remediation scheme is to reduce risks associated with each contaminant linkage to a level that is acceptable in the context of the proposed development. These are the 'technical objectives' and, to a greater extent, determine the methods of remediation.

It is also necessary to consider the wider 'management objectives' to ensure that the remediation scheme is compatible with viable development of the site, and having regard for financial, commercial, legal, and societal factors. Having identified the objectives of the remediation, the next stage is to translate these into measures against which compliance against the objectives can be assessed, these are termed 'remediation criteria'.

4.2 Remediation Objectives

The management objectives of the remediation (i.e. the required remediation outcome) are as follows:

- Demonstrate that the site is suitable for use to the MTCBC (as statutory consultee), and discharge all relevant anticipated land contamination planning conditions;
- Avoid long-term monitoring or maintenance obligations;
- Maximise environmental sustainability, in particular by minimising waste production, favouring waste reuse and recycling, minimising importing of materials, minimising vehicle movements, and minimising energy use; and,
- Avoid unacceptable health and safety risks during remediation, earthworks, and subsequent construction, to both site workers and neighbours.

In addition to the management objectives, the following technical objectives are relevant:

- Adopt a scope of remediation works that is compatible with the required earthworks levels and to maximise the sustainable on-site retention of excavated materials;
- Ensure that site-won soils generated by the necessary earthworks (and in-situ soils) are chemically suitable for reuse within the development, in accordance with a Materials Management Plan in-line with the CL: AIRE DoWCoP, specifically, within a simple cover layer to be applied in areas of soft cover (i.e. allotment areas/communal gardens / landscaped areas); and
- Take full advantage of the earthworks to visually inspect the subsurface ground conditions across the site with the appropriate management of any "unexpected contamination" that may be encountered via a "discovery strategy".

4.3 Options Appraisal

Remedial strategies for contaminated land are focused on modifying or controlling contaminant linkages. This can be achieved by action on one or more of the components of each contaminant linkage depending upon the circumstances of the situation under consideration. These components are:

- **Source Control:** remove or in some way treat the source of contamination.

- **Pathway Control:** reduce the ability of a given contaminant source to pose a threat to receptors by controlling the pathway through modification of its characteristics.
- **Receptor Control:** modify the likelihood of receptors coming into contact with the contaminants, e.g. by removing the receptor, restricting access of receptors to the site, altering site layouts, changing land use.

4.4 Feasibility Remediation Options

In accordance with LCRM, a remediation options appraisal has been undertaken as included in Appendix C. However, it is important to recognise that the range of potential options that can be applied on the site is restricted by the following:

- The historical infilling of the “Goitre Pond” has led to a significant quantity of Made Ground being present at the south of the site.
- The intrusive investigation has identified localised areas of metal, PAH and asbestos contamination to be present within the Made Ground across the site. It is unlikely to be feasible in terms of cost and sustainability to remove all of the Made Ground material off-site.

5 Remediation Strategy

5.1 Introduction

The appointed earthworks contractor shall prepare a method statement describing how the requirements of the remediation strategy will be implemented. The following documentation will be required:

Site Specific Earthworks / Remediation Method Statement – This document will set out the contractor's methodology for delivering the works and requirements for gathering data to demonstrate the effectiveness of the remediation.

Verification Report – A verification report will provide a complete record of the remediation activities undertaken at the site, verification data collected and proof of compliance with remediation objectives and criteria. It will also include descriptions of the works with associated 'as built' drawings and details of any unforeseen conditions encountered during the works and how they were dealt with.

This remediation strategy provides the principles for ensuring the suitability of soils generated during the development from a contamination perspective and identifies end-uses where materials may be placed, based upon contaminant concentrations and proposed land uses.

Contamination criteria represent just one form of suitability criteria important in the reuse of soils on new developments. In addition to this strategy, the appointed Contractor shall also take into consideration the suitability criteria as provided within the Landscape and Geotechnical / Earthworks specifications when deciding the final depth and location of any site won soils.

5.2 Outline Scope of Works

The works will comprise, but will not necessarily be restricted to, the following key tasks:

Earthworks / Remediation Implementation (Section 5) - Comprising cut and fill earthworks to adjust site levels in conjunction with measures to address the RPLs and associated potentially unacceptable land contamination risks to human health. Envisaged to include the following tasks:

- [i]. Reduced level digs to appropriate formation level, dictated by development layout.
- [ii]. Appropriate storage / management of excavated materials.
- [iii]. Placement of site won "suitable for use soils" in areas and depths appropriate to contaminant concentrations, engineering and physical properties.
- [iv]. Importation of topsoil, subsoil and engineering fills from approved sources.
- [v]. Installation of Ground Gas protection measures.
- [vi]. Appropriate concrete design and mitigation of aggressive ground conditions.
- [vii]. Installation of appropriate pipe for potable water supplies.
- [viii]. Clean service corridors / buried service protection.

Verification Plan (Section 6) – Comprising the gathering of information to confirm the effectiveness of remediation and preparation of the Verification Report.

- [i]. Testing of site won materials for suitability for use.

- [ii]. Testing of imported materials for suitability for use.
- [iii]. Characterisation of any unsuitable materials (as determined by chemical / geotechnical testing) for appropriate off-site disposal.
- [iv]. Validation of Ground Gas protection measures.

6 Remediation & Earthworks Implementation

6.1 Reduced Level Dig to Formation Level

It is anticipated the reduction of site levels shall be undertaken in a phased manner with timings to be determined by the construction programme.

The extent of excavation will be set out to guide the excavator operators. A watching brief will be stationed throughout the operation to direct the excavation and assess the ground for visual evidence of the following:

- Deleterious materials such as accumulations of organic / vegetative matter.
- Any visual evidence of ground contamination e.g. hydrocarbon staining of soil, ACMs.
- General waste materials (plastic, domestic and construction wastes).

In general, the above are considered unsuitable for reuse in the development and shall be segregated by the contractor and placed in a dedicated area pending characterisation and appropriate off-site disposal.

6.2 Asbestos in Soils Contamination

The assessments undertaken have identified that asbestos is likely present very sporadically within the made-ground present on site and it is not unreasonable to expect that asbestos may also be detected during excavation.

In the absence of any definitive and current government advice relating to asbestos in soils, the sector has developed a range of partially overlapping guidance and information documents:

- CIRIA C733 (2014) – Asbestos in soil and made ground: a guide to understanding and managing risks. ISBN 978-0-86017-737-1.
- CL: AIRE (2016) - CAR-SOIL™ Control of Asbestos Regulations 2012 - Interpretation for Managing and working with Asbestos in Soil and Construction and Demolition Materials. ISBN 978-1-905046-30-0.
- JIWG (2017) - Work Category Decision Support Tool for the Qualitative Risk Ranking of Work Activities and Receptors Involved in or Exposed to Asbestos in Soil and Construction & Demolition Materials. Version 2.1
- CIRIA C765 (2017) – Asbestos in soil and made ground good practice site guide. ISBN 978-0-86017- 780-7.
- SoBRA (2017) – Discussion Paper on Guidelines for Airborne Concentrations of Asbestos Fibres in Ambient Air: Implications for Quantitative Risk Assessment.

During the earthworks operation, all excavated soils and the formation level shall be inspected for incidental suspect visible ACM and, if encountered, any visible ACM will be handpicked and disposed of by a suitably qualified contractor. All contractor(s) will need to determine the appropriate CAR-2012 licensing status of their work activities potentially involving asbestos.

The groundworks Contractor shall develop an appropriate protocol to mitigate exposure of the workforce and general public should be in place with due respect to their duties under the Control of Asbestos Regulations

2012 and with reference to the Joint Industry Working Group Asbestos in Soil and Construction & Demolition (C&D) Materials guidance (published by CL:AIRE) titled “Control of Asbestos Regulations 2012: Interpretation for Managing and Working with Asbestos in Soil and Construction & Demolition materials: Industry Guidance” (shortened name CAR-SOILTM). Standard industry practices, in accordance with CIRIA C765 (2017) “Asbestos in soil and made ground good practice site guide”.

The Contractor will need to prepare a risk assessment which identifies a safe system of work to handle any asbestos containing soils which is likely to include asbestos awareness training, a protocol for unexpected finds (should gross asbestos material be identified) as well as safe working procedures such as damping down of excavations and stockpiles in line with general dust generation mitigation.

The Contractor should determine the need for appropriate levels of PPE and/or RPE and any associated air monitoring as required.

6.3 Placement of Cover Layer

A key aspect of the remediation works is the filling to final levels with soils verified as chemically and physically suitable for their intended usage with maximum reuse of existing soils. This is to include the placement of a robustly verified cover layer in all areas of softcover, including playing fields, soft landscaping and planted areas.

All cover layer materials will be obtained from a certified source and subject to an appropriate sampling frequency (Section 7.2). Topsoil imported to the site must be of a suitable specification complying with British Standards (“BS”) BS:3882 Specification for Topsoil³ and WLGA document 'Requirements for the Chemical Testing of Imported Materials for Various End Uses and Validation of Cover Systems 2013 (Appendix E).

Cover system Overview

Table 3 below presents the cover system and excavation depths to be applied for soft cover areas.

Table 3 - Cover System Overview

Planted, landscaped and high-usage learning areas predominately to the west of main school buildings.	All other soft cover areas are predominately in the east of the site.
Proven minimum of 600mm total thickness comprising: Upper 150mm thickness of verified site won topsoil and/or imported verified soil if necessary.	Proven minimum of 300mm total thickness comprising:
Lower 350mm thickness of verified site won soil, and/or imported verified soil if necessary.	Upper 150mm of verified site won topsoil and/or imported verified soil if necessary.
A geotextile basal marker layer, with the sole purpose of warning future users and acting as a physical barrier to prevent mixing of the capping layer with underlying materials, shall be designed and installed at a depth of 600mm in accordance with BS 8661.	Basal 150mm of verified site won soil.
Soil to meet chemical and physical requirements of this document and any quality requirements of other applicable specifications e.g. Landscape Architect's specification.	Soil to meet chemical and physical requirements of this document and any quality requirements of other applicable specifications e.g. Landscape Architect's specification.
	For areas of proposed trees, pits to be excavated and additional depth of subsoil provided or as per the Landscape Architect's specification for tree pits.

³ BS 3882:2007 British Standard Specification For Topsoil And Requirements For Use ICS 13.080.01

For areas of proposed trees, pits to be excavated and additional depth of subsoil provided. Any membrane to be installed, shall be designed to consider root resistance for the design life of the school, the specification of which, is to be provided and agreed with the landscape architect. All details to be provided to the LPA for agreement and all records of installation provided in the final verification report.

Marker layer to be permeable in order to avoid the possibility of any incidental gaseous build-up beneath.

Geotextiles shall be specified with regard to BS 8661 – “Geotextiles, Guidance for specification for basic separation and filtration functions”. An appropriate design life to be achieved should also be specified.

The cover layer installation should be undertaken in the following steps:

- Establish the finished ground levels over the site and from this determine the required level of the underside of the cover layer.
- Excavate to required depth of base of cover layer.
- Ground levels of base of cover layer dig to be accurately recorded for verification purposes.
- In areas where trees are planned as part of the landscaping, the cover layer may require to be extended to allow for the root ball in accordance with the requirements of any landscaping specification.
- Installation of geotextile separator layer at the base of soft landscaped areas.
- Place the required depth of verified imported sub/topsoil in accordance with the landscaping specification.

6.4 Soils Management and Stockpiling

Appropriate soil management procedures shall be adopted by the appointed contractor. As necessary, site-won soils imported soils and potentially contaminated soils should be stockpiled separately in dedicated areas of the site.

Potentially contaminated soils should be stockpiled on areas of hardstanding or polythene sheeting and protected from surface water ponding to prevent cross-contamination of underlying ground, pending testing to determine appropriate off-site disposal.

6.5 Sourcing of Material

Imported soils and engineering fill material should be ‘fit for purpose’ and should be sourced from well-established ‘reputable’ local/national traceable supplier(s) and conform to relevant standards as provided in this strategy, landscaping strategy and earthworks specifications. Alternatively, clean and naturally occurring soils may be imported adopting the Contaminated Land: Application In Real Environments - The Definition of Waste: Development Industry Code of Practice⁴ (CL:AIRE DoWCoP) following the specific requirements of a Materials Management Plan.

⁴ The Definition of Waste: Development Industry Code of Practice, Version 2. March 2011.

Materials shall be imported via adopting the WLGA document 'Requirements for the Chemical Testing of Imported Materials for Various End Uses and Validation of Cover Systems 2013. Appropriate sampling shall be undertaken and, prior to import, notification to the Local Planning Authority via completion of the Imported Materials Declaration Form shall be undertaken. Any imported soils for use in soft cover areas should be from an "as-dug" greenfield source, and not expected to be contaminated.

Prior to importation of topsoil or subsoil from a commercial supplier, certification should be obtained from the supplier detailing the source site, its previous and current land use and relevant test results. A copy of this should be forwarded to the appointed geo-environmental consultant for review and comparison against the applicable criteria.

If the proposed source is not from a commercial supplier, the source shall be tested prior to import to confirm it is appropriate for use within the cover system. Following import to site (regardless of the source), chemical testing of the imported soils will be required to confirm the soils imported are the same as those sampled at the source site. Material which is imported and subsequently found to fail the criteria will need to be removed from site to an appropriate facility.

As required under Duty of Care, the import of materials between two sites is required to be supported by appropriate tracking documentation (such as transfer/delivery notes).

Records relating to the importation of capping materials shall be provided in the verification report (Section 7). This shall confirm that the materials used in the cover system are certified free from contamination and that the origin of the capping material is suitable for its intended use.

6.6 Physical Requirements of Fill Materials

All soils to be used in the development (both site-won soils and imported soils) shall conform to the requirements of this strategy and also any particular requirements of the Landscape Architect's Specification.

Imported soils and engineering fills (e.g. sub base) should be free of asbestos, metal, plastic, wood, glass, tarmac, brick, paper, concrete or other potentially hazardous foreign material which could cause injury. In addition, all materials must be free from aggressive / invasive weeds (especially Japanese Knotweed and Giant Hogweed) and bulk vegetative growth, in order to ensure negligible risk of subsequent weed problems.

The physical properties of all imported engineering fill (e.g. Type 1/6F5/6F2 etc.) for use beneath buildings, roads, utility corridors shall comply with the appropriate engineering specification(s).

6.7 Discovery Strategy / Unexpected Contamination

This strategy allows for the management of contamination not previously identified should it be encountered as the redevelopment works proceed.

MTCBC will be notified in writing of any discoveries of significant unexpected contamination i.e. contamination that alters the final CSM for the site and requires further consideration of risk mitigation to that presented in this strategy.

Examples of such contamination could include:

- Significant accumulations of buried drums / containers suspected of containing hazardous materials.
- Widespread accumulations of potentially flammable materials.
- Potential sources of significant VOC / TPH vapours.
- Evidence of the potential for significant contamination of groundwater e.g. by free-phase hydrocarbons.

The following measures would be expected to be adopted by the contractor with regard to encountering any unexpected contamination (in agreement with the planning authority):

- In the event the material contains visual/olfactory evidence of contamination (e.g. hydrocarbon contamination, asbestos contaminated soils, these materials shall be excavated until uncontaminated ground is reached as determined by the watching brief. As this stage, verification sampling shall be undertaken of the base and sides of excavation in accordance with the Verification Plan (Section 6), and the process repeated for any failures.
- Excavated contaminated materials shall be segregated and appropriately stockpiled upon the site to allow appropriate characterisation to determine the appropriate off-site disposal route.
- Where further contamination is encountered the following information shall be recorded:
 - Material type and location, recorded with surveyed co-ordinates to local grid.
 - A description of the materials physical form, consistency, composition, colour, odour, and likely behaviour etc.
 - The extent and depth of any required excavations and locations of verification samples, surveyed to local grid.
 - Photographic records of excavations and excavated materials.

6.8 Approach to Waste Disposal

Unsuitable and/or surplus construction & demolition materials (C&DM), excavated made ground and soil materials should be removed from site and appropriately disposed/recycled at a suitably licensed facility or facilities.

Control, testing and documentation of the disposal of these materials should be undertaken by the contractor(s) under the relevant legal duty-of-care waste disposal/recycling controls. Appropriate records of estimated volumes/tonnage and dates should be maintained by the contractor(s) in a site diary (or equivalent) and relevant/necessary duty of care documentation/tickets. It is the responsibility of the appointed contractor to ensure their compliance with the relevant waste regulations.

These details/records should be retained by the developer/contractor(s) and should be provided as part of Verification Reporting.

6.9 Ground Gas Mitigation

Intégral reporting provides considerations to be taken forward by the appointed specialist in their detailed design of the required radon and ground gas mitigation, to which the reader is referred. A summary of key matters is presented below.

Intégral reporting has identified the site as being classified as Characteristic Situation 2 (CS2), or a low to moderate risk as per BS8485:2015+A1:2019. For a school development this will require a gas protection score

of 3.5 points (type B building) and will require ground gas protection incorporated into the final building designs as noted in the Intégral report, and summarised below:

- The installation of Grade 2-2.5 waterproofing of floor slabs and walls, and/or;
- The installation of passive ventilation including passive sub-floor dispersal layer of polystyrene or geo-composite, or a gravel layer with gas drains, or;
- The installation of an active dispersal layer (using fans, suction or subfloor dilution layer with a geo-composite or polystyrene void former), or;
- The installation of a completely ventilated / partial undercroft space such as parking levels.

Additionally, the contractor should ensure the following is undertaken:

- The appointed ground gas specialist shall prepare a detailed ground gas protection design and ground gas verification plan for submission to the client.
- All service penetrations through the slab must be effectively sealed to prevent preferential gas ingress points.
- The ground gas protection design must also consider all ancillary buildings, such as utility enclosures or enclosed infrastructure, as necessary.

6.10 Requirements for Buried Concrete

The structural engineers for the scheme will provide the specification for the required concrete Design Sulphate Class and Aggressive Chemical Environment for Concrete Classification (ACEC) for the development based on the information obtained during the previous site investigations.

The appointed contractor shall provide evidence demonstrating that all subsurface concrete (e.g. for piles and other structural elements in contact with ground) meets the required specification to the appointed structural engineer prior to use.

6.11 Installation of Pipe for Potable Water Supplies

Water supply pipes will need to be protected from any contamination present within the ground. In particular, the presence of organic contaminants (such as PAH) should be addressed when selecting pipe materials. It is recommended that the local water undertaker is consulted by the Client prior to ordering and placement of pipes in order to specify their specific requirements. It is likely that a more detailed assessment based on proposed water supply routes will be needed to satisfy the requirements of the local water supplier.

6.12 Service Trenches / Clean Service Corridors

Services and utility corridors should be backfilled with either suitable site-won soils, or, imported materials (e.g. granular pipe bedding) as per the specific requirements of the applicable engineering specification. Soils should be proven as suitable for use by comparison to the criteria presented in Table 4.

Service trenches are to be over-excavated by the groundworks contractor, 300mm either side and 300mm below the edge of the service being installed.

7 Verification Plan

7.1 General

This section represents the Verification Plan as required by LCRM Stage 3 “Remediation and Verification”. The following sets out the information to be collected and provided within the Verification Report to demonstrate the effectiveness of the remediation. In summary, confirmatory soil sampling shall be undertaken to ensure that:

- Site won materials are suitable for their intended use; and,
- Imported materials (e.g. topsoil / engineering fill) are suitable for use.

The following sets out the requirements for sampling and the assessment criteria to be adopted to ensure the suitability of soils from a contamination perspective.

7.2 Chemical Requirements of Fill Materials

Testing Requirements - Soils

The following sets out the validation requirement of soils for use with the development:

- **Site won material** - these should be tested at a rate of one test per 250m³ prior to use.
- **Imported soils** - certification from the commercial supplier should be reviewed prior to import, or if not a commercial supplier, then the soils should be tested at source prior to import to site for review against the criteria. Chemical testing will then be required once the material arrives at site. Testing should be undertaken at a rate of 4 test per 250m³ as per WLGA guidance (however where significant volumes of subsoil/topsoil are required an appropriate sampling scheme should be agreed with the CLO/EHO to reduce costs).

Depending on the source or variability of imported material, the appointed geo-environmental consultant may, at their discretion, request additional testing to be undertaken. The results of chemical testing of all materials are to be compared with the criteria presented in Section 7.3. If the criteria are exceeded, the material may be considered as unsuitable and may require disposal off-site.

Testing Requirements - Engineering Fill

Imported engineering fill (e.g. Type 1/6F5/6F2 etc.) for use beneath buildings, roads, within utility corridors etc are shall only be sourced from well-established ‘reputable’ local/national traceable supplier(s), conform to relevant standards **and shall be asbestos free**.

Where materials are derived from natural aggregates (e.g. quarry), upon provision of appropriate testing / certification from the supplier no further independent testing shall be required.

Recycled aggregates may be acceptable for use in the scheme. However, these shall require acceptable certification from the supplier and testing once the material arrives at site. Testing should be undertaken at a rate of one test per 500m³. The use of recycled aggregates shall be as approved by the Client and appointed geo-environmental consultant.

Sampling General

All samples are to be taken in accordance with relevant guidance and best practice (including BS 10175). The contractor shall prepare a soil sampling method statement to ensure the collection of representative samples, for approval by the Client.

All samples shall be scheduled on Chain of Custody forms prior to being dispatched to the UKAS accredited laboratory for analysis. All testing will be MCERTS accredited where available. The specific collection, storage and QA/QC requirements of the appointed laboratory shall be strictly followed with deviating samples rejected.

The results of all laboratory analysis shall be compiled by the contractor and a summary spreadsheet of all results maintained and updated on a weekly basis. The summary spreadsheet shall include the results of all verification soils testing as compared against the applicable soil thresholds, thus clearly demonstrating that soils used within the scheme are suitable for their intended use on the site and where failures of the criteria have been detected. This shall be provided to the Client as requested.

7.3 Site Validation Testing and Criteria

All analysis of imported soils shall be screened against the Soils Assessment Criteria presented in Table 4 on the following pages to determine their final placement within the development. The adopted SACs are to provide the protection of health of users of the development.

The following tables present stringent SAC for soft cover areas where the potential for exposure to contamination is greatest and less stringent criteria suitable for soils beneath hardcover and buildings. This provides scope for retention of soils within the development and reflects the varying forms of ground cover which comprise the development. Wherever the contractor is in any doubt as to the most suitable criteria to apply then the candidate set for soft-landscaped areas should be adopted initially.

Table 4 - SACs for soils in mg/kg (unless stated)

Substance	Soils beneath Soft Cover Areas	Soils beneath Building Footprints / Hard Cover Areas
Arsenic	40	170
Cadmium	11 ⁽¹⁾	50 ⁽¹⁾
Chromium	910	1,000 ⁽¹⁾
Copper	1,000 ⁽¹⁾	1,000 ⁽¹⁾
Lead	310	1,000 ⁽¹⁾
Mercury	10 ⁽¹⁾	50 ⁽¹⁾
Nickel	180	800
Selenium	430	1,000 ⁽¹⁾
Zinc	1,000 ⁽¹⁾	2,000 ⁽¹⁾
Total Cyanide	24	200 ⁽²⁾

Substance	Soils beneath Soft Cover Areas	Soils beneath Building Footprints / Hard Cover Areas
Asbestos	Not Present Via: Visual assessment AND Stage 1 Screen/ID	Ideally no ACMs visually present Stage 2 results (chrysotile only) at <0.01%.
Sum TPH Fractions	500 ⁽²⁾	750 ⁽²⁾
TPH (C5 - C8)	50	50
TPH (C8 - C10)	30	30
TPH (C10 - C12)	130	130
TPH (C12 - C35)	Via Sum	Via Sum
Benzene	0.1	0.1
Sum TEX	1 ⁽¹⁾	1 ⁽¹⁾
Sum 16-PAH	250 ⁽²⁾	250 ⁽²⁾
Naphthalene	2.3	2.3
BaP 'Coal Tar'	5.3	25 ⁽²⁾
Other 16-PAHs	Via Sum	Via Sum
Total Phenols	10 ⁽¹⁾	10 ⁽¹⁾
Soil pH (Potential skin irritant)	pH 6 to 9	-
Deleterious, noxious & odorous materials	Qualitative 'absence'	-
Notes: (1) Lowered from published criteria (2) Included to provide a pragmatic limiting value		

7.4 Ground Gas Mitigation

The gas protection system will need to be fully verified in accordance with CIRIA C735 and BS8485:2015 by a suitably competent ground gas specialist. The ground gas specialist undertaking the verification shall provide a Ground Gas Mitigation Verification Report with evidence including:

- Photographs of the installed vapour protection measures;
- Evidence of the suitability and preparation of the layer/material upon which the membrane is laid;
- The specifications for the membrane used;
- Evidence of post installation/pre slab pour quality checks of the membrane and evidence of any repairs required.
- Evidence of the competency of the installers and the independent verification engineer.

7.5 Sulphate Resistant Concrete

Evidence of the use of sulphate resistant concrete shall be included within the verification report if this is required during the development. This shall include provision of delivery tickets and correspondence from the concrete supplier confirming the appropriate specification has been delivered to site. Details will be included within the Verification Report.

7.6 Barrier Pipework

Where upgraded pipework ("Protectaline" or similar) is required to be installed, the earthworks contractor will validate by the provision of order and delivery tickets showing that upgraded pipework has been delivered to site. Photographic proof of the installation of upgraded pipework shall be provided to the Client and the appointed geo-environmental consultant. Details of upgraded pipework will be included within the Verification Report.

7.7 Over-excavation of service trenches

Where protection of services is required, the Contractor will provide detailed survey drawings showing the location of clean service corridors and photographic proof of over-excavation of service trenches to the Client and the geo-environmental consultant for validation purposes. Details will be included within the Verification Report.

7.8 Verification Report

A verification report will be produced upon completion of the remediation works. The report will detail all works undertaken and will provide a complete record to demonstrate that the remediation has been implemented and verified and that the use of materials was in accordance with the strategy and Materials Management Plan.

The verification report will fulfil the requirements of LCRM and the anticipated relevant planning condition(s) and will be submitted to MTCBC upon the completion of works. The report shall include the following minimum information:

- Purpose and aims of the report, including author credentials;
- Site details, including summary review of all previous investigation data;
- Correspondence documentation relating to Regulatory liaison;
- Information outlined from this document, including:
 - Ground conditions, hydrogeology and hydrology.
 - Remediation objectives.
 - Remediation methodology.
- Details of remedial works undertaken and by whom, with justification for any changes from the original strategy;
- Results of verification, validation, performance testing and monitoring as specified, including:
 - Soils verification and evidence of compliance with chemical / physical requirements
 - Cover System verification
 - Ground gas / VOC Vapour Verification Report
- Evidence of built environment mitigation
- Annotated site plans.

- Details of any relevant permits, licenses, waste management documentation (including Hazardous Waste Transfer notes and Duty of Care notes to demonstrate compliance).
- Delivery tickets for all imported soils.
- Confirmation of any special requirements for building materials and water pipes.
- Findings of the Water Quality Monitoring Strategy.
- Records of unforeseen contamination and any remediation undertaken.
- Description of final site condition at completion;
- Confirmation that remediation objectives have been met and confirmation of any post-completion maintenance requirements.

WLGA and NRW 'Land Affected by Contamination: A Guide for Developers'⁵ outlines in section 2.2.4 that *"Upon completion of the remediation works, a verification report must be submitted to the LPA consultees for review and approval. The verification report should provide a full record of all remediation activities conducted at the site and demonstrate that the agreed remediation criteria and objectives have been achieved. Only upon approval of the verification can construction works take place."*

Ashfield shall compile the final Verification Report will shall be submitted to the local planning authority to support the final discharge of all relevant planning conditions.

⁵ Welsh Local Government Association & Environment Agency Wales guidance document 'Development of Land Affected by Contamination: A Guide for Developers (2017)'.

8 Environmental Management

8.1 Environmental Controls

The contractor shall outline the requirements for environmental protection during the works within a earthworks-specific Construction Environment Management Plan ("CEMP"). The CEMP will include:

- Pollution prevention and control, including the measures and controls to be employed to protect surface water and groundwater from pollution during the works e.g. from fuel spills, release of silt laden surface waters etc.
- The measures and controls to mitigate potential nuisance issues to the local residents from dust, noise, odours, soiling of roads etc.

8.2 Control of Dust and Noise

Incidental dust is almost inevitable when excavating in dry conditions or when processing soil. Unacceptable dust will generally be controlled by the application of light water spray to the site surface, excavations and stockpiles. Consideration to the covering of stockpiles should also be given. Risks associated with the transport of soils that potentially contain asbestos fibres, such as dust emission, should be appropriately managed and the appointed contractor should confirm any requirements for airborne asbestos monitoring.

Site roads will be scraped or brushed to prevent an excessive build-up of mud. It is unlikely that mud and debris will spread beyond the Site boundary on roads. A wheel wash facility will be established at the main gate (or elsewhere), if necessary.

Noise is not expected to be a significant issue due to the remote location of the Site and operations within the boundary. All work will be conducted within reasonable normal working hours and in accordance with the planning consent.

8.3 Materials Management Plan

The re-use of materials shall be undertaken in accordance with the requirements of the CL:AIRE DoWCoP or other appropriate control mechanism. This shall involve the production of a MMP and completion and submission of a declaration by an independent⁶ QP, if the information provided is satisfactory, to CL:AIRE. Records documenting materials re-use should be kept for inclusion in the final MMP verification report. In accordance with Sections 3.29, 3.30 and 3.31 of the DowCoP, the following information shall be maintained:

- Appropriate site plans;
- Experience and qualifications of the person preparing the report in relation to the specific project;
- Description of the project;
- Description of how the use of materials links with the Remediation Strategy or Design Statement (if required);
- Reference to site investigation data;
- Reference to risk assessments (including qualitative risk assessments);
- Reference to the MMP and associated tracking system, including alterations made and why;

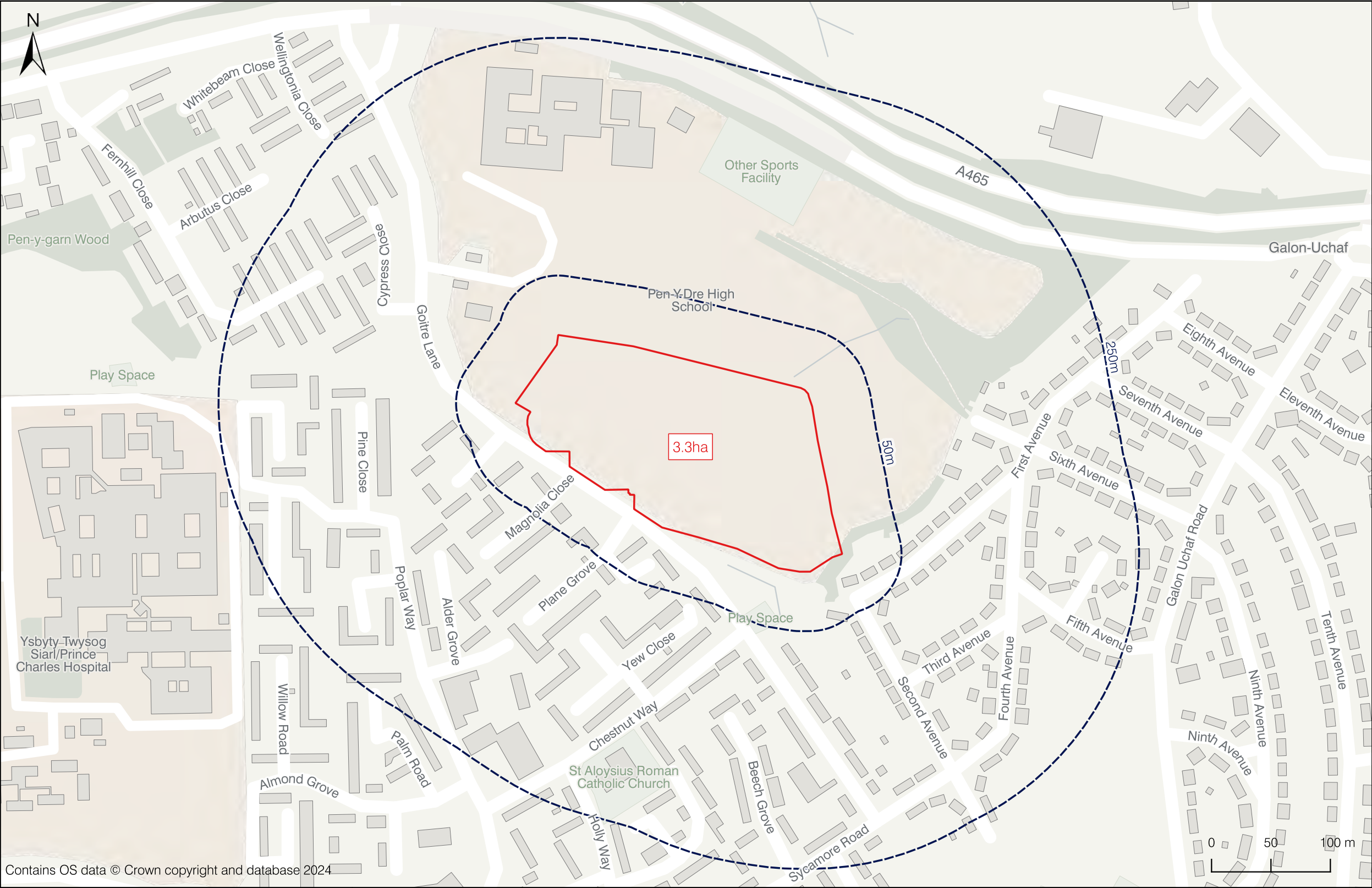
⁶ The Qualified Person must be totally independent to the project and have no prior knowledge.

- Suitable for use criteria;
- Treatment records (if required);
- Laboratory analysis (if required);
- Reference to waste transfer documentation, including return loads (this may not be applicable to the use of materials within the Site of Origin scenario);
- Signed delivery tickets (possibly as an annex or alternatively there must be a clear reference out to them – this may not be applicable to the use of materials within the Site of Origin scenario);
- Record of contingency arrangement(s) that had to be implemented;
- Record of quantity of materials used; and,
- Copies of signed Declaration(s) by Qualified Person(s).

Appendices

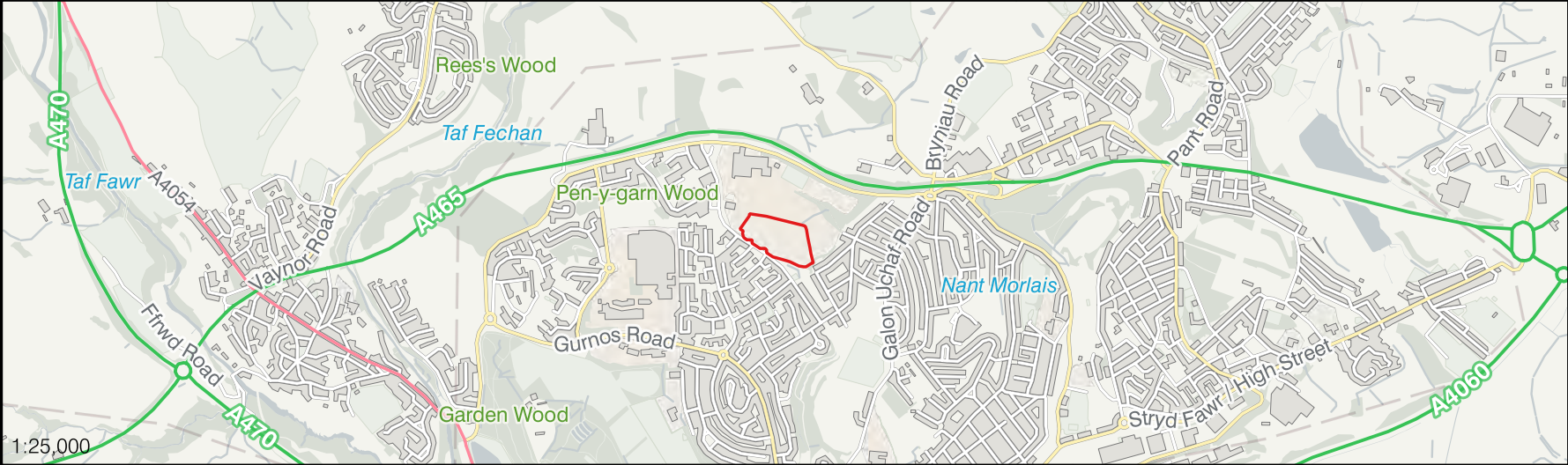
Appendix A

Site Location



- Legend
- Indicative Site Boundary
 - Site Location

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Client
Morgan Sindall Construction & Infrastructure Limited

Project
Goitre Lane, Gurnos, Merthyr Tydfil CF47 9SA

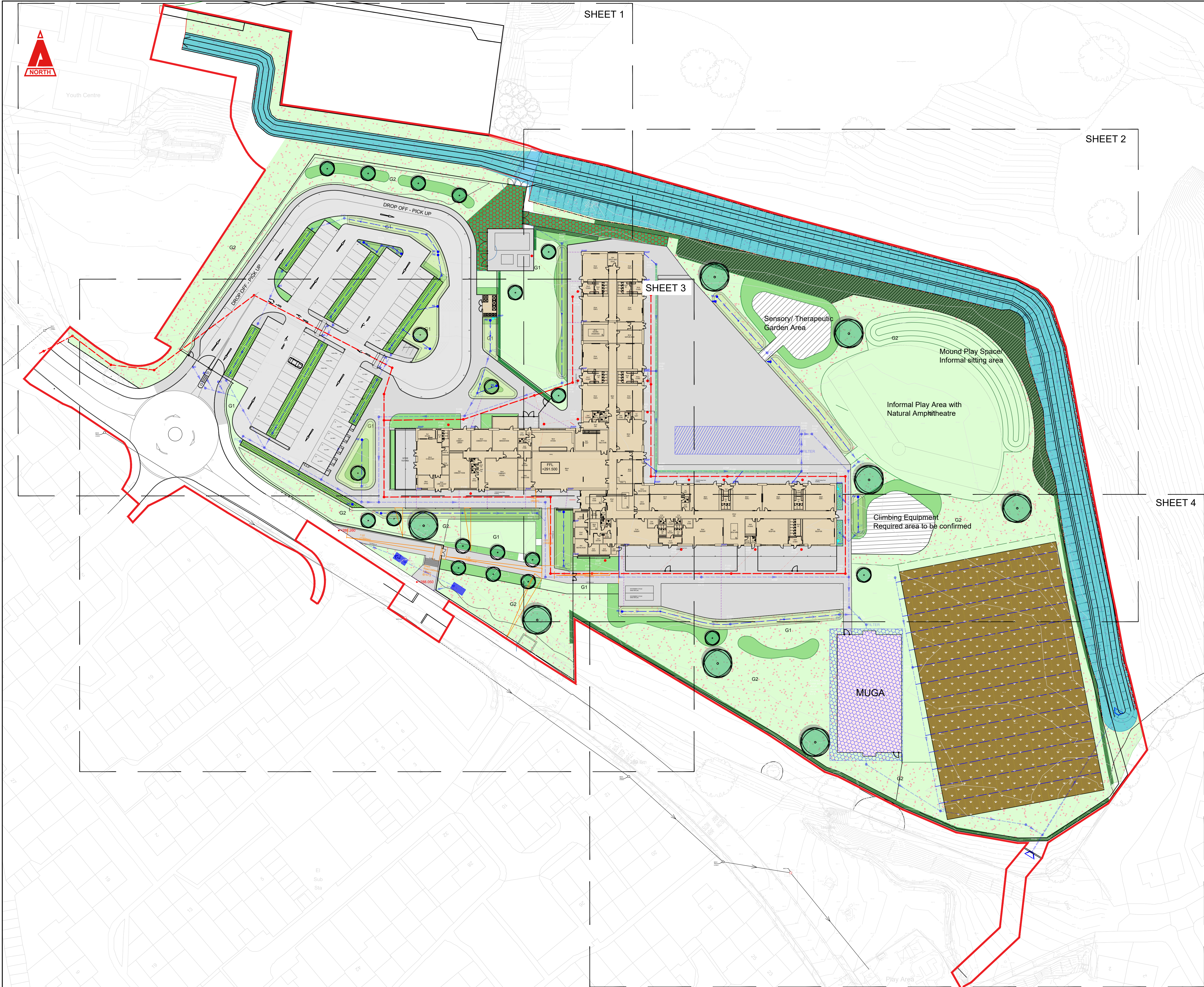
Title
Site Location Plan

Report No. 183023-S01	Drawing No. 01	Revision -
Scale 1:3,500	Date 15/03/2024	Frame Size A3
Produced by LC	Drawn by LC	Approved by DS

ASHFIELD
— SOLUTIONS GROUP —

Appendix B

Illustrative Masterplan

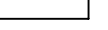


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CONTRACTORS MUST CHECK ALL DIMENSIONS ON SITE.
ONLY FIGURED DIMENSIONS ARE TO BE WORKED FROM.
DISCREPANCIES MUST BE REPORTED IMMEDIATELY TO
CAMBRIA CONSULTING LIMITED BEFORE PROCEEDING.

THE CONTRACTOR IS TO REFER TO THE SPECIFICATION,
FULL SCHEDULE OF RESIDUAL RISKS IN THE CONTRACT
DOCUMENTATION AND ALSO TO INFORMATION FROM OTHER
DESIGNERS, IN PARTICULAR THE M&E CONSULTANT
REGARDING EXISTING LIVE SERVICES.

 THIS SYMBOL IS USED TO HIGHLIGHT INSTANCES
OF RISK WITHIN THE CONSTRUCTION PROCESS.
ALWAYS CHECK FOR LATER REVISIONS OF THIS DRAWING.

- KEY:
-  SURFACE WATER DRAINAGE
 -  PERFORATED SURFACE WATER DRAINAGE
 -  FOUL WATER DRAINAGE
 -  OVERFLOW GULLY
 -  CHANNEL DRAIN
 -  RAINWATER HARVESTING FEED
 -  RAINGARDEN INLET
 -  RAINGARDEN / BIORETENTION AREA
 -  SOAKAWAY
 -  PERMEABLE ASPHALT MUGA
 -  PERMEABLE BOD PAVE 85
 -  RAINWATER HARVESTING TANK
 -  CELLULAR ATTENUATION TANK
 -  SPORTS PITCH
 -  PEN-Y-DRE SWALE
 -  ROAD CONSTRUCTION
 -  FOOTPATH CONSTRUCTION
 -  RAISED PLANTER
 -  ORIFICE FLOW CONTROL CHAMBER WITH
WIER WALL AND MESH GUARD (PLASTIC)
 -  HYDROBRAKE FLOW CONTROL CHAMBER
WITH LEVEL OVERFLOW
 -  SURFACE WATER CULVERT HEADWALL

- NOTES:
- DRAINAGE STRATEGY SUBJECT TO CONSULTATION WITH
SAB.
 - DRAINAGE RATES, ATTENUATION STORAGE EXTENT OF
ABOVE GROUND SUDS SUBJECT TO SAB APPROVAL.
 - ASSUME FOR COSTING ALL LEVEL THRESHOLD TO HAVE
THRESHOLD CHANNELS.

P01	PLANNING APPLICATION SUBMISSION.	LW	RJ	BW
Rev.	Description	By	Chk	App

Client:

**MORGAN
SINDALL**

Project:

**GOETRE PRIMARY SCHOOL
CC2538**

Drawing Title:

**GENERAL ARRANGEMENT
PLAN**

Drawing No.

26CB01 CAM 52 XX D C 0002

Project	Originator	Function	Spatial	Form	Disc.	Number
		B'down				

Status	Revision:	Scale @A1:	Rev.
S4	PLANNING	1:500	P01

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Appendix C

Options Appraisal

Remedial Activity	Effective for contamination present	Relative cost	Relative Operation Time	Comments (Practicality / Sustainability / durability)	Feasibility
Soil contamination					
Cover system	YES	£	Weeks	Will prevent contact between future site users and shallow soil and break S-P-R linkage.	YES
Excavation and Disposal	YES	£££	Weeks	Will effectively remove the source of the contamination but is much less sustainable compared to other feasible options (cost, take up of landfill space, transport issues, need to replace with clean material)	YES
Ex-situ soil Remediation	NO	£££	Months	Ex-situ soil remediation via excavation and processing for reuse may be effective to remove contaminants. However, loose fibres would likely remain in the soil. Low concentrations of asbestos fibres would be difficult to treat. This method is labour intensive, slow and expensive and unlikely to be feasible.	YES
Materials Management (Excavation and Re-use of Suitable Materials)	YES	££	Weeks	Will effectively remove the source of the contamination and place it below hardstanding cover to break the pathway. Would need to be undertaken in association with a Materials Management Plan (MMP) prepared in accordance with the CL:AIRE: Definition of Waste Code of Practice (DowCop) and signed off by a Qualified Person.	YES
Excavation and disposal of ground gas source materials	YES	£££	Weeks	This would remove the source of the ground gas risk present on site and avert the need for gas protection. Due to the estimated amount of potential ground gas source material this would not be practical or sustainable.	NO
Ground Gas membrane in buildings	YES	£	Weeks	This would sever S-P-R from the ground gas risk. The receptor at the site cannot be changed. Tried and tested method.	YES

Appendix D

Intégral Géotechnique (Wales) Limited, Goetre
Primary School, Merthyr Tydfil, Site Investigation
Report. Ref: 14209/FG/23/SI/Rev.A

Morgan Sindall Construction & Infrastructure Ltd

GOETRE PRIMARY SCHOOL, MERTHYR TYDFIL

Site Investigation Report

14209/FG/23/SI/Rev.A

CLIENT: Morgan Sindall Construction & Infrastructure Ltd

PROJECT: Goetre Primary School, Merthyr Tydfil

TITLE: Site Investigation Report

JOB NO: 14209

DOCUMENT REF: 14209/FG/23/SI/Rev.A

Revision	Purpose Description	Originated	Reviewed	Authorised	Date
0	Final	FG	HP	RB	August 2023
A	Final Includes full ground gas monitoring results	FG	HP	RB	November 2023

Geotechnical Engineers:

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Tel: 029 2080 7991

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1.0 INTRODUCTION

1.1 GENERAL

Morgan Sindall Construction & Infrastructure Ltd are proposing to develop a site in Merthyr Tydfil for an educational end-use.

Cambria Consulting are the appointed Consulting Civil and Structural Engineers for the scheme.

Intégral Géotechnique (Wales) Limited have been appointed as the Geotechnical Engineers to undertake an intrusive site investigation to enable a geotechnical and geoenvironmental appraisal of the educational end use area of the site and provide a basis for design.

This report presents the findings of the intrusive site investigation and gives recommendations for the design of foundations, floor slabs and other geotechnical and geoenvironmental aspects of the project.

This report (including all appendices to it and any subsequent addendums or correspondence) has been prepared for the sole benefit, use and information of Morgan Sindall Construction & Infrastructure Ltd and no third party is entitled or permitted to rely on it. This report may not be used, reproduced, or circulated (in whole or part) for any purpose without the written consent of Intégral Géotechnique (Wales) Limited. Intégral Géotechnique (Wales) Limited shall not be liable to any third party who does not have such express written permission to rely on the report for any losses they may suffer.

1.2 PROPOSED DEVELOPMENT

The development proposals include the construction of a new school building with associated external play areas, access roads, and areas of car parking. At the time of writing, the final proposed development layout and engineering levels had not been confirmed.

Additionally, it is understood that a solar array farm has been proposed to the east of the school development, and a future LDP housing zone has been allocated to the south of the school development.

It should be noted that the recommendations outlined in this report relate to the proposed school development area only.

1.2 PROPOSED DEVELOPMENT (CONTINUED)

The following recommendations should be reviewed and revised accordingly once the final proposed layout and engineering levels have been confirmed.

1.3 SCOPE OF WORKS

The work instructed included a desk study of available information, site reconnaissance and intrusive investigation. This was followed by laboratory testing, on site monitoring and geotechnical and geoenvironmental reporting.

The desk study comprised a review of:

- An Envirocheck Report obtained for the site,
- Old Ordnance Survey maps covering the site, included within the Envirocheck Report,
- A Landmark Geodata Radon Information Map,
- A Consultants Coal Mining Report obtained from the Coal Authority,
- Geological maps of the area provided by the British Geological Survey,
- the Natural Resources Wales groundwater vulnerability map and aquifer database for the area,
- Existing site investigation data (if available).

The desk study information was used to make an initial assessment of the site and to design an investigation to be carried out by Intégral Géotechnique. The site investigation was designed in accordance with BS 5930:2015+A1:2020, the Code of Practice for Site Investigations, BS10175:2011+A2:2017, the code of practice for investigation of potentially contaminated sites, and 'Development of Land Affected by Contamination: A Guide for Developers' prepared by Welsh Local Government Association (WLGA)/Natural Resources Wales (NRW) Land Contamination Working Group, 2017.

The approximate locations of the exploratory hole positions were provided by Cambria Consulting.

The site investigation included:

- An intrusive investigation carried out during 18th to 23rd May and 7th to 16th June 2023 comprising the excavation of fifteen trial pits with seven soil infiltration tests, the drilling of ten windowless sample boreholes and six shell and auger boreholes,
- Sampling of soil/fill for laboratory chemical testing,

1.3 SCOPE OF WORKS (CONTINUED)

- Sampling of soil/fill for laboratory geotechnical testing,
- Monitoring for concentrations of methane, carbon dioxide, oxygen, hydrocarbon vapours and gas flow.

1.4 LIMITATIONS

This document is intended to be a working document for further development in discussion with all concerned including the Local Planning Authority and Natural Resources Wales, and the Building Control Authority as considered appropriate.

“Contamination” is taken throughout the report to mean the “presence of one or more potentially harmful substances as a result of human activity”. The use of the term in this way does not imply that harm is being or might be caused by the contamination. It should be noted that “contamination” can have different meanings under different regulatory regimes, for example, planning, building control and Part IIA of the Environmental Protection Act 1990. Naturally elevated concentrations of potentially harmful substances may also be of concern and the significance of any that have been found is also evaluated in this report.

It is important to recognise that there may be areas of contamination that have not been found, or that contaminants are present at concentrations above those that have been found. It is also important to recognise that contamination may be localised and that no investigation, however comprehensive, is capable of finding such occurrences other than by chance.

It should also be noted that vertical and lateral changes in ground conditions may be present between exploratory hole locations.

Access for the intrusive site investigation was generally available across the site. The densely vegetated areas of the site and other inaccessible areas are as shown in Figure 2, were not investigated as part of this site investigation.

2.0 THE SITE

2.1 SITE LOCATION AND DESCRIPTION

The site is located to the northeast of Goetre Lane approximately 2km north of Merthyr Tydfil at a National Grid Reference of 305020, 208310, see Figure 1.

The site is irregular in shape and occupies an area of approximately 9.3 hectares. A site plan is presented in Figure 2.

The site is situated on ground which typically rises to the northeast from an approximate minimum elevation of 286m AOD within the southern corner to an approximate maximum elevation of 307m AOD within the northeast corner.

The boundaries of the site are defined by Goetre Lane and residential housing to the south, residential housing to the east and the Pen-Y-Dre High School Playing fields to the north. Goitre Lane and the Pen-Y-Dre High school share the western boundary. The site is laid to a surface covering of vegetation and grass with sloping embankments to the north and east, also laid to vegetation.

Pockets of dense vegetation are seen along the site's northern embankment. The vegetation includes mature and semi mature trees. Suspected Japanese knotweed was also identified within these pockets of dense vegetation. The location of suspected Japanese Knotweed is also identified on Figure 2.

Access to the site is afforded from several footpaths along the site's southern boundary. During the site investigation formal access for machinery was afforded through Pen-Y-Dre High School in the sites north-western corner. A footpath extends from the site's western boundary, along the foot of the northern embankment before extending up the site's western embankment. Manholes for presumed water / foul drainage were encountered along the footpath.

2.2 SITE OPERATIONS

The site is currently undeveloped land primarily utilised for the grazing of horses and public dog walking.

2.3 SURROUNDING LAND USE

The surrounding areas are mainly developed for residential use to the southwest and southeast and the school with playing fields/sports pitches located to the northwest and northeast.

2.4 AVAILABLE SITE INVESTIGATION DATA

There is no available site investigation data to our knowledge.

2.5 CONSULTATIONS WITH REGULATORS

Applicable regulators have not been contacted at this stage.

3.0 SITE HISTORY

The recent history of the site has been traced with the aid of an Envirocheck Report, a copy of which is included in Appendix A. The Envirocheck Report includes the following scaled historical maps:

Map Scale	Dates
1:2,500	1875, 1887, 1900, 1904, 1919, 1963-1964, 1964, 1986
1:1,250	1956-1974, 1956-1957, 1963-1972, 1975, 1963-1988, 1988-1989, 1981-1990, 1990, 1993, 2001 (aerial photo)
1:10,560	1884, 1901, 1905, 1922, 1938-1951, 1945 (aerial photo)
1:10,000	1965, 1977-1979, 1983, 1992, 1999, 2006, 2022

The earliest edition of the map dated 1875 indicated the southern area of the site to be occupied by Goitre Pond. Two existing surface water features flowed across the site towards the pond from the north and the east. The path of the surface water features was indicated to be vegetated. The western area of the site, to the north of the pond, was also indicated to be covered with scrub vegetation. A sluice was indicated on the southern edge of the pond on the embankment which was indicated to form the southern edge. A tramway encroached across the western boundary of the site and formed the southern edge at the base of the embankment. The tramway accessed an existing coal and ironstone level located approximately 310m to the southeast. The surrounding areas were typically undeveloped apart from potential farm buildings including Galon-Uchaf located approximately 110m to the west, Garn approximately 180m to the northeast and Ty-Newydd-ar-y-Bryn approximately 250m to the southeast. Additional individual buildings were indicated further beyond including Pen-y-Bryn Water Works located approximately 500m to the southeast.

The edition of the map dated 1900 indicated less vegetation along the surface water features and with a slightly reduced vegetated area to the north of the pond. A small boat house had been constructed on the southern edge of the pond. The tramway was no longer evident along the southern boundary of the site, but the path of the tramway was still evident.

The 1919 edition of the map indicated no significant changes to the site or the surrounding area apart from the removal of the boat house from the southern edge of the pond. The immediate surrounding areas remained unchanged.

3.0 SITE HISTORY (CONTINUED)

The edition of the map dated 1956-1974 indicated the pond within the site had been infilled but a small surface water feature, spreads, collects, sinks and areas of marshy ground remained. It is understood that the pond was infilled circa 1965. Evidence of earthworks was noted within the western corner of the site in order to construct a subway access from the site beneath the new road, Goitre Lane, constructed along the western and southern edge of the site. Significant mainly residential development had been constructed to the west, southwest and southeast of the site and with a youth centre constructed to the north of the western area of the site.

The edition of the map dated 1963-1988 indicated the former pond area was now being used as school playing fields associated with Pen-y-Dre High School which had been constructed to the north of the site. Surface water features were still present within the eastern area of the site. A footpath was also indicated across the northern and north-eastern area of the site. Additional games courts and playing fields were constructed to the northeast of the site and the new Heads of the Valley Road had been constructed beyond the playing field approximately 100m to the northeast.

The 1981-1990 edition of the map indicated the site to have remained relatively unchanged with playing fields across the former pond area and with surface water features still evident within the eastern and south-eastern areas. Localised marshy ground was also indicated in the vicinity of the surface water features. The former surface water feature which flowed towards the pond from the northern corner of the site was no longer evident. Additional earthworks were indicated off-site to construct three sports pitches to the south of the main school building and to the west of the site. The earthworks associated with the construction encroached across the western boundary of the site. Playing fields remained to the northeast of the site and with residential development up to the south-western and south eastern boundaries.

The site and the immediate surrounding areas have remained relatively unchanged between the 1990's and the present day. The aerial photos indicate the site to be grass covered and with more heavy vegetation within the northern area of the site and with trees along the southern edge.

4.0 SITE ENVIRONMENTAL SETTING

4.1 PHYSICAL SETTING

The site is located within a mainly residential setting on the northern edge of Merthyr Tydfil with Pen-y-Dre High School located to the northwest of the site.

The site is situated on ground which typically rises to the northeast from an approximate minimum elevation of 286m AOD within the southern corner to an approximate maximum elevation of 307m AOD within the northeast corner.

An existing surface water feature flows across the northeast area of the site before sinking below ground to re-issue within the southeast corner of the site. This feature may potentially be culverted across the site area.

4.2 GEOLOGY

The 1:50,000 and 1:10,560 (Sheet No. SO 00 NE and SO 00 NW) scale geological maps of the area indicate the majority of the site to be underlain by the South Wales Lower Coal Measures Formation of the Carboniferous period. The solid strata typically comprise grey productive coal-bearing mudstones/siltstones, with seatearths and minor sandstones. The western corner of the site is indicated to be underlain by Bishopston Mudstone Formation of the Carboniferous period. This bedrock typically comprises mid to dark grey mudstones, with some beds of mid grey siltstone and beds of interbedded siltstone and mudstone. Sporadic, minor pale grey quartzitic sandstones and rare thin coals are also present.

The geology map indicates two approximately northwest to southeast trending faults in the vicinity of the site. The Gyrnos Fault which downthrows to the northeast crosses the western corner of the site and the Dowlais Fault which downthrows to the southwest is indicated approximately 10m to the east.

There are no strata dips indicated in the vicinity of the site but dips to the northwest are indicated to be 8° to 18° to the south. The Generalised Vertical Section (GVS) would also indicate a southerly strata dip.

The nearest conjectural coal outcrop according to the geology map is the Gellideg seam which is located approximately 1.3km to the southeast of the site. Due to the southerly strata dips this seam would not underlie the site. The next seam below the Gellideg in the sequence according to the GVS is the Garw seam. It is considered that this seam would also conjecturally outcrop to the southeast of the site and would therefore not underlie the site.

4.2 GEOLOGY (CONTINUED)

A sequence of ironstones is known to be located in between the Gellideg and the Garw seams and the Rosser Ironstone Veins are known to be located beneath the Garw seam. It is considered that these ironstones would not affect the site.

Superficial deposits of Devensian Till of the Quaternary period area indicated to overlie the solid strata. These deposits are typically poorly sorted and variable in nature comprising clays, sands, and gravel.

A variable thickness of made ground is anticipated above the superficial deposits across the site. Thicker made ground would be anticipated in the vicinity of the former pond and also in the vicinity of any infilled surface water features. Disturbed ground or reworked material would also be anticipated along the western edge of the site at the boundary of the existing school sports pitches where earthworks were required as part of their construction. Topsoil/subsoil would be anticipated within any previously undeveloped areas.

A summary of the anticipated geological succession is given below in Table 1.

Table 1 : Summary of Anticipated Site Geology		
Geological unit	Horizon	Description
Recent	Made ground and/or topsoil/subsoil	Various materials
Quaternary	Devensian Till	Sands and gravels with varying matrix
Carboniferous	South Wales Lower Coal Measures Formation	Grey productive coal-bearing mudstones/siltstones, with seatearths and minor sandstones
	Bishopston Mudstone Formation	Mid to dark grey mudstones, with some beds of mid grey siltstone and beds of interbedded siltstone and mudstone. Sporadic, minor pale grey quartzitic sandstones and rare thin coals are also present.

4.3 RADON

Information with regard to Radon Protective Measures is provided within the Envirocheck Report and the Landmark Geodata Radon Information Map as presented in Appendices A and B. The report and map state that the site is located within a lower to intermediate probability area, as less than 1% and 1% to 3% of properties are above action level, and that therefore no radon protective measures would be necessary in the construction of new buildings within the site.

4.4 MINING

The site is located within a coal mining reporting area and therefore a Consultants Coal Mining Report has been obtained from the Coal Authority and a copy is included in Appendix C.

The Coal Authority states that there is *“no past mining recorded”*.

The Coal Authority state that probable unrecorded workings is “none”. However, this does not mean that shallow unrecorded workings do not exist, but rather any information to support this has not come into the possession of the Coal Authority. However, it should be noted that there are no conjectural coal outcrops indicated in the vicinity of the site with the nearest conjectural outcrop on the geology map indicated to be the Gellideg seam located approximately 1.3km to the southeast. The conjectural outcrop of the Garw seam would be anticipated to be nearer to the site but also located to the southeast. Due to the southerly strata dips these seams and any associated ironstone veins would not be anticipated to underlie the site.

The Coal Authority indicates that there are no mine entries recorded on site or within 100m of the site boundary.

The Coal Authority mining report confirms that there are *“No faults, fissures or breaklines recorded”*. However, the geology map does indicate two approximately northwest to southeast trending faults in the vicinity of the site. The Gyrnos Fault which downthrows to the northeast crosses the western corner of the site and the Dowlais Fault which downthrows to the southwest is indicated approximately 10m to the east.

The Coal Authority has *“not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994. There is no current Stop Notice delaying the start of remedial works or repairs to the property”*.

4.4 MINING (CONTINUED)

The Coal Authority is *“not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991”*.

The Coal Authority states that with regards to mine gas, none has been recorded within 500m of the site boundary. However, due to the site being located within a coal mining reporting area, a mine gas risk assessment should always be undertaken within coal mining areas in order to satisfy the guidelines within CL:AIRE document Good Practice for Risk Assessment for Coal Mine Gas Emissions, dated October 2021. (See Section 10.6)

Based on the information provided by the geology maps and the general knowledge of the seams in the area, the risk of unrecorded shallow workings beneath the site is considered to be low. The conjectural outcrops of the Gellideg and Garw seams are to the southeast of the site and would therefore not underlie the site. The rock strata beneath the site is known as the “Farewell Rock” which lies at the base of the coal measures. The thin Sun Vein and other thin coals are located below the Farewell Rock, but they would be thin and unviable to mine as well as being intermittent. The Farewell Rock is also known to be very hard and water bearing making any mining below difficult.

The Coal Authority interactive map indicates that the site is not located within a high-risk development area. The western half of the site located outside the coalfield consultation area.

It is therefore concluded that the risk of ground subsidence occurring as a result of past shallow recorded or unrecorded mine workings is considered to be low. No further specific coal mining related investigation would therefore be required.

4.5 HYDROLOGY, HYDROGEOLOGY AND FLOOD RISK

The Envirocheck Report indicates that the nearest surface water features are located on site. The OS Water Network Lines map indicates an unnamed surface water feature to flow from the northeast corner of the site. This feature then sinks underground to issue within the southeast corner before flowing off-site to the southeast. This feature may be culverted beneath the site. The nearest named feature is Nant Morlais located 516m to the southeast.

4.5 HYDROLOGY, HYDROGEOLOGY AND FLOOD RISK (CONTINUED)

The Natural Resources Wales groundwater vulnerability map and aquifer database classifies the bedrock beneath the site as a Secondary 'A' Aquifer. Secondary 'A' Aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

The Natural Resources Wales groundwater vulnerability map and aquifer database classifies the superficial deposits beneath the site as Secondary Aquifer-Undifferentiated. This classification is assigned in cases where it has not been possible to attribute either category A or B to a soil type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the material.

A perched water body could be encountered within the made ground. This is particularly likely due to the relatively impermeable nature of the underlying superficial deposits.

It is considered possible that the existing site drainage could act as a pathway for potential surface contaminants.

There is one discharge consent recorded within 250m of the site boundary. The consent is recorded 139m to the south where an unspecified Dwr Cymru discharge is received by Goitre Stream.

The Envirocheck Report states that there are no water abstractions recorded within 1km of the site boundary.

Tables 2 and 3 present a summary of the hydrological features and key hydrogeological nature of the site.

4.5 HYDROLOGY, HYDROGEOLOGY AND FLOOD RISK (CONTINUED)

Table 2: Summary of Site Hydrology					
Feature	Distance from site	Flow	Classification	Abstraction	Discharge
Unnamed surface and below ground features	Eastern site area	Southerly	Inland river	No	Unknown
Nant Morlais	516m southeast	Variable	Inland river	No	River Taff
Surface run-off	On site	Flows into site drainage or into site	N/A	No	Not known
Site Drainage	On site	Not known	N/A	No	Not known

Table 3: Summary of Site Hydrogeology				
Geological Unit	Aquifer Classification	Aquifer Characteristics	Source Protection Zone	Groundwater Abstractions
Made ground and/or topsoil/subsoil	Not classified	Highly variable permeability and porosity. Perched water may be present with variable flow directions.	No	None
Devensian Till	Secondary Aquifer-Undifferentiated	Variable low to moderate permeability and porosity with intergranular flow possible. High clay content likely to restrict flow.	No	None
South Wales Lower Coal Measures Formation	Secondary A Aquifer	Variable moderate permeability coal-bearing mudstones/siltstones, with seatearths and minor sandstones capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers	No	None
Bishopston Mudstone Formation		Variable moderate permeability mudstones, siltstone and beds of interbedded siltstone and mudstone. Sporadic quartzitic sandstones and rare thin coals capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers		

4.5 HYDROLOGY, HYDROGEOLOGY AND FLOOD RISK (CONTINUED)

The Groundwater Vulnerability map of the area indicates the secondary bedrock aquifer to have a medium vulnerability. The pollutant speed is low with well-connected fractures.

The Natural Resources Wales Flood Risk map as presented within the Envirocheck Report indicates that the site is not at risk of extreme flooding from rivers or sea without defences.

The Natural Resources Wales Surface Water Flood Risk map as presented within the Envirocheck Report indicates that the majority of the site is not at a high-risk of surface water flooding. However, the map indicates that the area within the southeast corner in the vicinity of the surface water feature is at a high-risk of surface water flooding (1 in 30-year flood extent).

The BGS Groundwater Flooding Susceptibility map as presented within the Envirocheck Report indicates the majority of the site to have limited potential for groundwater flooding to occur. It also indicates that the western area has potential for groundwater flooding of property situated below ground level.

4.6 LANDFILL SITES

The Envirocheck Report indicates that there are no historical, BGS recorded, or local authority recorded landfill sites or any licensed waste management facilities located within 250m of the site boundary.

There are ten areas of potentially infilled land (water) located on site and within 250m of the site boundary. The areas are located across the southern half of the site at the location of the former pond and within the northern and north-eastern area at the location of former surface water features which flowed into the pond. The off-site features were located 21m north, 107m west, 114m south, 150m north, 181m west and 246m west at the location of former surface water features.

4.7 POTENTIAL CONTAMINATION

Previous Uses

The various activities in the vicinity of the site which may have resulted in ground or water resource contamination on this site are listed below in Tables 4 and 5. A summary of the potential contaminants can be found in the tables.

4.7 POTENTIAL CONTAMINATION (CONTINUED)

Table 4: Potential Contaminants		
Land Use: Undeveloped land including Goitre Pond until the 1960's		
Material/Process	Contamination/Hazard	Evidence
Possible agricultural land across the undeveloped areas	No potential contaminants	Historical maps
Excavation of the pond including evidence of earthworks along the southern and eastern edges which may have utilised imported materials of unknown origin	Metals, semi metals, non-metals, PAH, asbestos	Historical maps
Construction and use of the tramway pre-1880 which followed the southern boundary of the site and crossed the western boundary. Construction works may have utilised imported materials of unknown origin and the use and maintenance may have caused localised spills of oil/fuel. Removed by 1900	Metals, semi metals, non-metals, PAH, asbestos	Historical maps and anecdotal
Construction of a small boathouse on the southern edge of the pond by 1900 which may have utilised imported material of unknown origin and subsequent demolition by 1919 which may have caused further ground disturbance	Metals, semi metals, non-metals, PAH, asbestos	Historical maps
Land Use: Infilling of the pond and construction of the playing fields circa 1960's		
Material/Process	Contamination/Hazard	Evidence
Infilling of the pond and other on-site surface water features with imported materials of unknown origin	Metals, semi metals, non-metals, PAH, asbestos	Historical maps
Regrading of the site to form playing fields across the former pond area and additional earthworks to create plateaux for the off-site sports pitches with potential for any imported materials to encroach across the western boundary of the site	Metals, semi metals, non-metals, PAH, asbestos	Historical maps

Existing Uses

The site is currently an area of undeveloped land. The current site uses would not add any additional contamination concerns.

4.7 POTENTIAL CONTAMINATION (CONTINUED)

Adjacent Site Uses

Table 5 : Potential Contaminants : Adjacent Site Uses		
Potential Contamination Source	Boundary	Associated Contaminants and Hazards
Pen-y-Dre High School and associated grounds	North-western	No Potential Contaminants
School playing fields and sports courts	North-eastern	No Potential Contaminants
Residential development	South-eastern	No Potential Contaminants
Goitre Lane with residential development beyond	South-western	No Potential Contaminants

4.8 OTHER ENVIRONMENTAL ISSUES

The Envirocheck Report indicates environmentally sensitive land has not been identified within 250m of the site boundary.

The Envirocheck Report indicates that there have been no pollution incidents to controlled waters recorded on site and none within 250m of the site boundary. The nearest incident was recorded 435m to the northwest and was a Category 3-Minor Incident involving an unknown pollutant. The nearest Category 2-Significant Incident was recorded 969m to the northwest involving mud/clay/soil.

There have been no substantiated pollution incidents registered on site or recorded within 250m of the site boundary. The nearest incident was recorded 474m to the northeast where commercial waste caused a significant impact on land but no impact on air or water.

There have been no prosecutions relating to controlled waters or to authorised processes recorded on site or recorded within 1km of the site boundary.

The site is vegetated with areas which are more heavily vegetated. It is uncertain if any invasive plant species are present and therefore it may be prudent to undertake a full vegetation survey prior to development.

5.0 PRELIMINARY CONCEPTUAL SITE MODEL

5.1 RISK ASSESSMENT FRAMEWORK

In order to be consistent with current UK government policies and legislation, it is necessary to identify, assess, estimate, evaluate, and take appropriate action to deal with land contamination, in accordance with the procedures specified in the Environment Agency guidance Land Contamination Risk Management (LCRM) published in October 2020. This replaces the now withdrawn 'Model Procedures for the Management of Land Contamination CLR-11' (Environment Agency 2004).

The risk assessment process is designed to provide a reasoned, structured, and pragmatic mechanism for the identification of any potential human health and controlled waters risks associated with land contamination and where necessary to develop a robust remediation strategy to ensure protection of the sensitive receptors (human health of future residents, controlled waters, etc).

In accordance with LCRM, the term 'land contamination' is defined as:

- All land affected by contamination – land that might have contamination present which may, or may or may not, meet the statutory definition of contaminated land,
- Land determined as contaminated land under Part 2A of the Environmental Protection Act 1990.

LCRM provides a tiered approach to risk assessment, comprising a preliminary risk assessment (including the development of an initial conceptual site model), a generic quantitative risk assessment and a detailed quantitative risk assessment. For each tier of risk assessment, the following steps must be followed:

1. Identify the hazard - establish contaminant sources,
2. Assess the hazard – use a source-pathway-receptor linkage approach to determine if there is potential for unacceptable risk,
3. Estimate the risk – predict what degree of harm or pollution may result and how likely it is to occur, and
4. Evaluate the risk – decide whether a risk is unacceptable.

LCRM also provides definitions of the following terms:

- Hazard – a property or situation that in particular circumstances could lead to harm or pollution,

5.1 RISK ASSESSMENT FRAMEWORK (CONTINUED)

- Risk – a combination of the probability, or frequency of occurrence of a defined hazard and the magnitude of the consequences of the occurrence,
- Risk assessment – the formal process of identifying, assessing and evaluating the health and environmental risks that may be associated with a hazard,
- Risk management – the formal process to identify, assess and determine the risks, and to select and take action to mitigate them.

The three essential elements to any risk are defined by LCRM as follows:

- A contaminant, or pollutant, that is in, on, or under the land and that has the potential to cause harm, or pollution (Source)
- A route by which a receptor is, or could be affected by a contaminant (Pathway)
- A receptor, i.e., something that could be adversely affected by a contaminant, for example a person, controlled waters, an organism, an ecosystem, or Part 2A receptors such as buildings, crops or animals (Receptor).

In order for there to be a potential risk, all three of the above elements must be present. If there is a source of contamination and a receptor (for example a resident or site user), then there is only a potential risk if there is a pathway linking the two. Such an active pathway is known as a relevant pollutant linkage. It is possible for the same contaminant to be linked to a receptor via a number of pathways, and hence it is important that all relevant pollutant linkages, to both human health and controlled waters, are separately identified on a site in order that a comprehensive conceptual model can be formed and ultimately a robust remediation strategy designed.

Current practice during Generic Quantitative Risk Assessment of land affected by contamination is to use generic soil screening values based on the appropriate proposed end use. These usually comprise risk-based Soil Guideline values (SGVs) or Generic Assessment Criteria (GACs) derived by the Environment Agency's Contaminated Land Exposure Assessment Model (CLEA). The SGVs and the supporting technical guidance were developed in order to assist in the assessment of long-term risk to human health from the exposure to contaminated soils.

Revised Statutory Guidance, published in 2012, to support Part 2A of the Environmental Protection Act 1990, introduced a new four category system for classifying land under Part 2A. Category 1 includes land where the level of risk is clearly unacceptable, and Category 4 includes land where the level of risk posed is considered to be acceptably low. Under Part 2A, land would be determined as contaminated if it falls within Categories 1 or 2.

5.1 RISK ASSESSMENT FRAMEWORK (CONTINUED)

The revised Part 2A Statutory Guidance was accompanied by an Impact Assessment that identified a role for new 'Category 4 Screening Levels' (C4SLs) that would provide a simple test for determining when land is suitable for use and definitely not contaminated land. A Policy Companion Document including the C4SLs was published in March 2014 (England) and May 2014 (Wales).

The C4SLs have been based on the CLEA methodology and derived using the CLEA model, with modified toxicological and exposure parameters. To date, C4SLs have been released for six substances (arsenic, cadmium, chromium (VI), lead, benzo(a)pyrene and benzene).

The C4SLs have been derived on the assumption that where they exist, they will be used as generic screening criteria within generic quantitative risk assessment.

Following publication of the C4SLs, Land Quality Management (LQM), in conjunction with the Chartered Institute for Environmental Health (CIEH) released Suitable 4 Use Levels (S4ULs) in January 2015.

The S4ULs have been derived in accordance with UK legislation and using a modified version of the Environment Agency's CLEA software. As such, the S4ULs are based on the concept of minimal or tolerable risk as described in Human Health Toxicological Assessment of Contaminants in Soil (Science Report SR2, Environment Agency 2009a).

S4ULs have been derived for a wider number of substances.

In addition to the existing SGVs, C4SLs and S4ULs, Atkins ATRISK^{soil} also provide a set of Soil Screening Values. These are currently intended to be used in conjunction with SGVs, although they intend to update these values in line with the C4SLs in due course.

We have reviewed all sets of values and intend to use the most appropriate assessment criteria as Tier 1 screening values in the first instance. Where a published S4UL is available, and considered appropriate, this will be used in the first instance.

5.2 CONCEPTUAL MODEL FRAMEWORK

The preliminary stage of the risk assessment process is to develop and define a conceptual site model, based on the desk study and any existing site investigation data. This is used to establish any potential contaminant sources, identify existing and future receptors and assess if there are any potentially active pathways by which a potential risk may be present.

5.2 CONCEPTUAL MODEL FRAMEWORK (CONTINUED)

The preliminary conceptual site model will be developed and refined as site specific data is gathered, such as actual ground conditions and chemical data, resulting in a more robust conceptual understanding of the site.

5.3 CRITICAL SENSITIVE RECEPTOR – HUMAN HEALTH

The proposed redevelopment of the site is for an educational end-use with the development of a new school. Since this is a non-standard land use, a residential without homegrown produce end-use has been considered in the first instance as a conservative assessment. Therefore, the critical sensitive receptor from a human health perspective is an on-site residential receptor without homegrown produce. It should also be noted that the eastern area of the site is proposed to be developed with a solar array farm and the southern area will comprise a future residential development.

In accordance with S4UL/C4SL and CLEA guidance for a standard residential without homegrown produce scenario, the critical sensitive receptor for a residential end use risk assessment is a female child, with exposure from 0 to 6 years. A less conservative commercial end use scenario would be appropriate for the solar array farm area and the critical sensitive receptor for a commercial risk assessment is a female adult, with exposure from 16 to 65 years.

The standard residential end-use conceptual model defined by S4UL/C4SL and CLEA is assumed to be suitable for the purposes of this assessment for the proposed educational facility.

5.4 CRITICAL SENSITIVE RECEPTOR – CONTROLLED WATERS

Based on the proposed redevelopment of the site for an educational end use, and the findings of the desk study, the critical sensitive receptor from a controlled water perspective is groundwater within the Secondary 'A' Aquifer of the South Wales Lower Coal Measures Formation and the Bishopston Mudstone Formation.

By considering groundwater as the critical sensitive receptor for controlled waters, the groundwater/hydrogeological risk assessment will also be protective of the surface water features which cross the site.

5.5 POTENTIAL CONTAMINANT SOURCES

As identified in the desk study, the site has remained largely undeveloped but included a large pond within the southern area. A tramway followed the southern boundary of the site and encroached across the western boundary. The tramway was dismantled and removed by 1900. The pond was infilled during the 1960's along with some of the surface water features associated with the pond. There was evidence of earthworks as part of the pond construction and subsequent infilling and also evidence of earthworks off-site to the west to construct the school sports pitches.

The potential types of contaminants of concern are listed below:

- Metals, semi-metals, and inorganics within the shallow made ground,
- Polyaromatic hydrocarbons (PAH) within the shallow made ground,
- Asbestos within the shallow made ground.

The nature of the materials utilised to infill the pond is unknown. These materials could be a source of ground gas such as methane and carbon dioxide.

5.6 POTENTIAL EXPOSURE PATHWAYS

Potential exposure pathways for the critical receptors (both human health and controlled waters) are listed below:

- Dermal contact with soil and/or soil derived dust,
- Ingestion of soil ,
- Inhalation of soil derived dust,
- Inhalation of vapours – indoor and outdoor air,
- Leaching of contaminants from made ground to groundwater,
- Transportation of contaminants within groundwater.

In addition, the following exposure pathways have also been considered:

- Ground gas generation and migration,
- Building materials durability.

5.7 SUMMARY OF CONCEPTUAL EXPOSURE MODEL

A preliminary conceptual exposure model has been developed for the site. This is based on the findings of the desk study, historical review and site walk over and includes all potential sources, pathways and receptors that may be present on site. Those that have been identified as being potentially active require further investigation in the form of sampling and testing of soils and/or groundwater, followed by appropriate risk assessment.

The preliminary conceptual exposure model will be reviewed and refined following the completion of the site works and laboratory testing.

The preliminary conceptual exposure model is presented below in Table 6.

Table 6: Preliminary Conceptual Exposure Model				
Source		Receptor	Pathway	Potentially Active Pathway?
Origin	Contaminant			
Made Ground of unknown origin and historical land uses	Metals, semi-metals, non-metals, PAH, asbestos	Resident – human health	Dermal Contact with made ground/dust	✓
			Ingestion of soil	✓
			Inhalation of dust	✓
			Inhalation of vapours – indoor/outdoor	✓
	Metals, semi-metals, inorganics, PAH	Groundwater quality	Leaching from made ground	✓
	Metals, semi-metals, inorganics, PAH	Surface water quality	Transportation within groundwater	✓
Made Ground of unknown origin and natural ground	pH and water-soluble sulphate	Building Materials Durability	Direct contact	✓
Ground Gas – organic, gas producing materials	Methane, carbon dioxide	Human health	Accumulation of gases in confined spaces, and/or migration off site, leading to asphyxiation, or risk of explosion	✓

6.0 THE SITE INVESTIGATION

6.1 FIELDWORKS

A site investigation was designed in accordance with BS 5930:2015+A1:2020, the Code of Practice for Site Investigations, BS10175:2011+A2:2017, the Code of Practice for Investigation of Potentially Contaminated Sites, and 'Development of Land Affected by Contamination: A Guide for Developers' prepared by Welsh Local Government Association (WLGA)/Natural Resources Wales (NRW) Land Contamination Working Group, 2017.

The site investigation was also designed to provide information to support and refine the preliminary conceptual site model/conceptual exposure model.

An investigation comprising fifteen machine excavated trial pits and ten windowless sample boreholes was carried out during 18th/19th and 22nd/23rd of May 2023. Soil infiltration testing was undertaken in seven of the trial pits.

Additionally, six shell and auger boreholes were drilled between the 7th and 19th of June 2023.

The approximate locations of the exploratory hole positions were provided by Cambria Consulting.

The trial pits (TP01 to TP08, and SA01 to SA07) were excavated across the site using a wheeled JCB 4CX mechanical backhoe excavator to a maximum depth of 4.1m below existing ground level.

At select trial pit locations (SA01 to SA07) soil infiltration testing was undertaken.

At each trial pit location not designated for a soil infiltration test, a Mexe Cone CBR handheld probe was utilised at 0.5m depth to order to ascertain an approximate CBR value for the shallow soils.

The windowless sample boreholes (WS01 to WS10) were located across the site and drilled to a maximum depth of 5.0m below existing ground level. In-situ strength testing (SPT/CPTs) was carried out in the boreholes.

Ground gas monitoring standpipes were installed within two of the windowless sample boreholes (WS01 and WS08).

6.1 FIELDWORKS (CONTINUED)

Six shell and auger boreholes (BH01 to BH06) were drilled on site and drilled to a maximum depth of 10.0m below existing ground level.

The purpose of the shell and auger boreholes was to prove the deeper ground conditions and allow an assessment of the most appropriate foundation type for the proposed development. In-situ strength testing (SPT/CPTs) was also carried out in the cable percussion boreholes. A chisel was also employed within the boreholes when encountering both man-made and natural obstructions and at the base of the boreholes.

Ground gas monitoring standpipes were installed within three of the shell and auger boreholes (BH02, BH05 and BH06).

A programme of gas monitoring was commenced on completion of the fieldwork.

Representative soil samples were taken from the trial pits/boreholes for laboratory chemical and geotechnical testing and placed in the appropriate sample containers deemed suitable for the analysis required. Strict protocols were adopted during this process to limit the cross contamination of samples.

The fieldworks were supervised by a qualified Geotechnical Engineer from Intégral Géotechnique (Wales) Limited who also logged the trial pits / boreholes and prepared their detailed engineering logs in accordance with the requirements of BS5930:2015+A1:2020. The engineering logs provide descriptions of the materials encountered in accordance with BSEN ISO 14688-1 (2002) and 14689-1 (2003) for soils and rocks respectively.

The approximate locations of the trial pits, windowless sample boreholes and shell and auger boreholes are shown on Figure 2, while their logs are presented in Appendices D, E and F respectively. The results of the soil infiltration testing are presented in Appendix G. The results of the handheld Mexecon CBR probe are presented on the trial pit logs in Appendix D.

6.2 FIELD OBSERVATIONS

Made ground was encountered at numerous exploratory hole locations. However, no visual or olfactory evidence of any potentially significant contamination, including fuels oils, was observed.

6.3 LABORATORY CHEMICAL TESTING

Representative soil samples were taken from the trial pits and boreholes across the site, stored at the appropriate temperature and dispatched to the UKAS and MCERT accredited laboratories of i2 analytical for laboratory chemical testing within 24 hours.

The samples were tested for a range of contaminants that reflects the historical use of the site, the findings of the desk study and the preliminary conceptual site model/conceptual exposure model. A list of the soil testing carried out is given below:

Beryllium	Cadmium
Total Chromium	Hexavalent Chromium (VI)
Copper	Lead
Mercury	Nickel
Vanadium	Zinc
Arsenic	Boron
Selenium	Elemental Sulphur
Total Cyanide	Total Sulphate
Sulphide	Water Soluble Sulphate
pH	Monohydric Phenol
Polyaromatic Hydrocarbons (PAH)	

All soil samples were also screened for the presence of asbestos.

Select soil samples were also scheduled for Waste Acceptance Criteria (WAC) testing.

The results of the chemical testing are presented in Appendix H.

6.4 LABORATORY GEOTECHNICAL TESTING

During the site investigation works representative soil samples of made ground and natural ground were also taken and dispatched to the laboratories of GSTL for laboratory geotechnical testing including pH, water soluble sulphate, optimum compaction/Dry Density relationship (OMC/DDR), particle size distribution (PSD), Atterberg limits and moisture content.

The results of the geotechnical testing are presented in Appendix I.

6.5 IN-SITU GAS MONITORING

Gas monitoring standpipes were installed in two of the windowless sample boreholes and three of the shell and auger boreholes and these have been monitored at fortnightly intervals following completion of the respective drilling operations.

The gas monitoring programme commenced on the 31st May 2023 within the windowless sample boreholes and the 18th July 2023 within the shell and auger boreholes.

The concentration levels of methane, carbon dioxide and oxygen were measured in the standpipes during each visit by using a GA5000 Landfill Gas Analyser. In addition, gas flow rate and the atmospheric pressure at the time of the field measurements were also recorded.

Gas monitoring was carried out over a range of atmospheric pressures to include at least one reading in low and/or falling pressure, in accordance with the recommendations made in CIRIA Report C665.

The results of the field gas monitoring are presented in Appendix J.

7.0 GROUND CONDITIONS

Geologically, the ground conditions generally comprise a thick mantle of made ground deposits, shallowing to the peripheries of the site. The made ground is generally underlain by soft organic soils which are in turn further underlain by natural undisturbed superficial deposits of Devensian Till. This ground profile is reflective of the historical infill of the former pond area.

A summary of the ground conditions encountered across the site is presented below in Table 7.

Table 7 : Summary of Ground Conditions		
Depth (m)		Stratum
From	To	
0.00	0.20/0.30	<u>TOPSOIL</u> Grass over soft brown and black silty slightly gravelly organic rich CLAY with frequent roots and rootlets.
0.00/0.30	0.80/4.10	<u>MADE GROUND</u> Varying densities/consistencies of very soft to stiff brown, grey and black, silty, sometimes sandy, gravelly CLAY/SILT. AND Loose to medium dense grey and black sometimes clayey, sandy GRAVEL / gravelly SAND.
1.50/4.00	1.90/4.50	Soft blackish brown spongy fibrous PEAT [suspected base of former pond].
0.30/4.10	>2.30/>10.0	<u>NATURAL SOILS</u> Typically soft to firm, locally very soft and stiff brown, grey and greyish brown silty, locally sandy gravelly CLAY/SILT. AND Medium dense sandy GRAVEL

The majority of the trial pits were recorded as generally stable with local instability associated with cobble and boulder removal.

Further instability was recorded within highly saturated made ground deposits associated with perched groundwater.

7.0 GROUND CONDITIONS (CONTINUED)

7.1 TOPSOIL

A surface covering of topsoil was recorded across the majority of the site ranging in thickness between approximately 0.20m and 0.30m. The topsoil generally comprised soft brown and black silty slightly gravelly organic rich clay with frequent roots and rootlets. Locally, a low cobble content was recorded comprising sub-angular and sub-rounded sandstone and limestone. The gravel constituents of the topsoil generally comprised fine to coarse sub-angular and sub-rounded sandstone and limestone.

7.2 MADE GROUND

Made ground was recorded within the majority of the exploratory pit/holes positioned across the site. The made ground was recorded between ground level and 0.30m depths (generally below the existing topsoil) and extended to depths of between approximately 0.80m to 4.80m below existing ground level.

The thickness of made ground was recorded to increase towards the centre of the site. Comparatively, the made ground was recorded to thin towards the northern and eastern peripheries of the site where more competent natural soils were observed within sloping areas. Within the eastern portion of the site the made ground extends to a nominal an average approximate depth of 2.70m below ground level. Within the western site area, the made ground extends to an average approximate depth of 4.00m below ground level. The made ground was recorded to thin to the north with average approximate depths of 1.50m to 2.50m. The made ground deposits are commonly recorded within the relatively flat plateau of the site, before shallowing where the site begins to slope to the north and east.

It is assumed that the made ground is the result of the infilling of the former Goitre Pond, which was infilled in the 1970's. The approximate extent of the infilled Goitre Pond is shown in Figure 3.

The made ground was variable in nature and generally comprised soft to firm, locally very soft and stiff brown, grey and black silty, sometimes sandy gravelly clay /silt. Locally a loose to medium dense grey and black sometimes clayey sandy gravel/ gravelly sand was also encountered.

The made ground also contained low to high cobble and boulder contents generally comprising sub-angular and sub-rounded sandstone, limestone, concrete, brick, and rare vesicular slag.

7.2 MADE GROUND (CONTINUED)

The gravel constituents of the made ground comprised fine to coarse angular to rounded fine charcoal, clinker, brick, concrete, bituminous material, vitreous and vesicular slag, limestone, mudstone, and sandstone.

Within the upper metre of the made ground across the site, anthropogenic inclusions were encountered comprising glass, timber, timber posts, metal bar and metal scrap, fabric, plastic, and cabling.

It should be noted that although oversized and anthropogenic material was encountered across all areas of the site. An increased count of these materials exists within the explored western site area.

It should also be noted SA04 encountered deep made ground deposits that differed in composition to the general made ground encountered across the site. The topsoil was underlain by a thin veneer of soft greyish brown clayey slightly gravelly silt. Here, the gravel comprised fine to coarse sub-angular fine ash, limestone, and sandstone. The silt layer extended to 0.4m depth before encountering a loose black clayey sandy gravel layer. The gravel within this layer comprised fine to coarse sub-angular fine ash and clinker. The depth to natural deposits was not proven in this location with the made ground extending to >3.0m depth.

Uncorrected SPT 'N' values recorded within the made ground ranged between 4 and 50, with the higher value likely reflective of the presence of cobbles and boulders within the made ground.

Laboratory plasticity testing undertaken on samples of made ground recorded a plasticity index in the range of 13% and 21%. The calculated modified plasticity indices of 6.5% and 13.3%, indicates this stratum has a low volume change potential.

7.3 NATURAL SOILS

The natural soils across the site were recorded underlying both topsoil and made ground from depths ranging between approximately 0.30m/4.10m below existing ground level.

The highly variable depths to in-situ natural strata are reflective of much of the site being occupied by the historically infilled Goitre Pond.

7.3 NATURAL SOILS (CONTINUED)

The natural soils varied in composition but generally comprised primarily cohesive deposits and more locally granular deposits were observed. Additionally, organic/peaty soil deposits were also encountered.

7.3.1 Organic Soils / Peat

A thin layer of an organic cohesive material and peat (between approximately 0.20m and 0.50m thick) was recorded below the made ground deposits within the area of the historically infilled Goitre Pond.

It is assumed that the organic soils / peat layers recorded across the site are indicative of the original ground level before the infilling of the pond. These layers will be expected to have high organic and water contents and be highly compressible in nature.

7.3.1 Glacial Till Soils

The majority of the natural soils encountered underlying the made ground or organic / peat soils, typically comprised soft to firm, locally very soft brown, grey and greyish brown silty, locally sandy, gravelly clay.

Low to high cobble and boulder contents were recorded throughout the natural soils comprising sub-angular and sub-rounded sandstone and limestone. The gravel constituents comprised fine to coarse sub-angular and sub-rounded sandstone and limestone.

Within BH01 a more granular layer of medium dense very sandy gravel with moderate cobble and boulder content was recorded between 6.5m and 8.6m depth. The gravel, cobble and boulders within this layer comprised fine to coarse sub-angular to rounded sandstone.

Uncorrected SPT 'N' values recorded within the natural soils ranged between 1 and 50.

Laboratory plasticity testing undertaken on samples of natural soils recorded a plasticity index in the range of 14% and 16%.

The calculated modified plasticity indices of 12.2% and 12.3%, indicates this stratum has a low volume change potential.

All shell and auger boreholes terminated on suspected sandstone deposits or suspected boulders within the Devensian Till deposits.

7.4 GROUNDWATER

Groundwater was recorded within the majority of exploratory hole locations.

The majority of the groundwater observed during the site investigation was representative of perched water bodies, primarily within the made ground.

Within the underlying clay soils, groundwater seepages and strikes were encountered at variable depths.

Due to the presence of cohesive soils and organic clay soils, this is likely indicative of a perched water body/pocket held within the made ground.

The depth to groundwater has been converted to an approximate groundwater level with respect to ordnance datum, and a summary provided below in Table 8.

Table 8: Summary of Groundwater Levels				
Location ID	Depth to Groundwater (m bgl)	Approximate Ground Level (mAOD)	Approximate Groundwater Level (mAOD)	Comments
TP01	0.2	290.75	290.55	Extremely Fast Inflow
TP02	3.5	291.10	287.60	Minor Seepage
TP04	1.5	290.70	289.20	Extremely Fast Inflow
TP05	2.9	290.40	287.50	Minor Seepage
TP07	2.2	290.60	288.40	Minor Seepage
TP08	2	290.00	288.00	Moderate Seepage
SA03	1.1	290.50	289.40	Moderate Seepage
SA05	3.4	290.70	287.30	Minor Seepage
SA06	3.3	290.60	287.30	Minor Seepage
SA07	0.3	290.70	290.40	Standing in Borehole
WS01	3.4	291.25	287.85	Standing in Borehole
WS02	4.7	291.30	286.60	Extremely Fast Inflow
WS04	0.6	291.20	290.60	Standing in Borehole
WS05	2.3	290.30	288.00	Standing in Borehole
WS06	0.6	290.90	290.30	Standing in Borehole
WS08	3.5	290.30	286.80	Standing in Borehole
WS09	2.2	290.70	288.50	Standing in Borehole
BH01	1.0	290.90	289.90	Standing in Borehole after 20 minutes
BH02	0.4	290.70	290.30	Standing in Borehole after 20 minutes
BH03	1.0	291.00	290.00	Standing in Borehole after 20 minutes
BH06	1.8	290.50	288.70	Standing in Borehole after 20 minutes

7.4 GROUNDWATER (CONTINUED)

The groundwater conditions are based on observations made at the time of the fieldwork. It should be noted that groundwater levels may vary due to seasonal and other effects.

Following completion of the fieldworks, return visits have been undertaken to monitor the ground gas/water levels at multiple locations across the site.

It should be noted that the windowless sample boreholes were completed before the shell and auger borehole drilling. As such, the monitoring rounds of the windowless sample boreholes were commenced first.

A summary of the groundwater levels measured within the boreholes during each monitoring visits is provided below in Table 9.

Table 9: Summary of Groundwater Monitoring						
Borehole Ref:	Depth (m bgl)					
	Round 1 31/05/23	Round 2 14/06/23	Round 3 05/07/23	Round 4 18/07/23	Round 5 11/08/23	Round 6 21/08/23
WS01	1.52	1.53	1.56	1.42	1.40	1.49
WS08	0.00	0.00	0.01	0.30AGL	0.00	0.00
Borehole Ref:	Round 1 18/07/23	Round 2 11/08/23	Round 3 21/08/23	Round 4 06/09/23	Round 5 01/10/2023	Round 6 03/11/23
BH02	0.36	0.42	0.42	0.48	0.47	0.41
BH05	1.03	1.01	1.02	1.05	1.10	0.98
BH06	1.63	1.64	1.61	1.64	1.61	1.58

It should also be noted during the fourth round of windowless sample borehole monitoring the ground local to WS08 was highly saturated and waterlogged. As a result, water level has been recorded as 0.30m above ground level.

7.5 SOIL INFILTRATION TESTING

Soil infiltration testing was carried out in seven trial pits (SA01 -SA07) at the approximate locations provided by Cambria Consulting.

The trial pits were rapidly filled with clean water from a tractor-towed agricultural bowser and the water level monitored over a period of time.

Insufficient infiltration was observed in all test locations, and it was not possible to calculate a design infiltration rate.

7.5 SOIL INFILTRATION TESTING (CONTINUED)

The soil infiltration test calculation sheets are presented in Appendix G.

The soil infiltration test results are specific to the location and depths of the tests undertaken. It should also be noted that this initial testing should only be regarded as indicative. If it should be proposed to use soakaways for this site, then more extensive follow-up tests will be required and should fully comply with BRE 365, in order to confirm the suitability of the site and to satisfy the local authority.

7.6 LABORATORY GEOTECHNICAL TESTING RESULTS

Laboratory geotechnical testing was carried out on a number of disturbed samples of made ground and superficial soils recovered from trial pits. The results of the laboratory geotechnical testing are included within Appendix H.

While a summary of the geotechnical testing results for the made ground and natural soils is presented below in Tables 10 and 11.

Table 10: Summary of Laboratory Geotechnical Parameters – Made Ground							
Summary of Atterberg Limit Testing							
Location	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Passing 425um	Modified Plasticity Index (%)	Volume Change Potential
SA03	15.7	29	16	13	50	6.5	Negligible
SA04	18.4	36	19	17	49	8.3	Negligible
TP02	17.2	39	20	18	74	13.3	Low
TP04	16.4	43	22	21	47	9.8	Negligible
Summary of Particle Distribution (Sample Portions %)							
Location	Boulders/Cobbles		Gravel	Sand	Silt	Clay	
SA03	16		27	25	32		
TP02	3		25	29	44		
TP04	1		39	29	31		
Summary of Dry Density/Optimum Moisture Content Relationship							
Location	Initial Water Content (%)		Maximum Dry Density (Mg/m³)		Optimum Moisture Content (%)		
SA03	15.7		1.91		10		
TP02	17.2		1.89		12		
TP04	16.4		1.83		14		

7.6 LABORATORY GEOTECHNICAL TESTING RESULTS (CONTINUED)

Table 11: Summary of Laboratory Geotechnical Parameters – Natural Soils							
Summary of Atterberg Limit Testing							
Location	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Passing 425um	Modified Plasticity Index (%)	Volume Change Potential
SA01	14.4	37	19	16	76	12.2	Low
SA05	18.9	33	19	14	88	12.3	Low
Summary of Particle Distribution (Sample Portions %)							
Location	Boulders/Cobbles		Gravel	Sand		Silt	Clay
SA05	0		8	30		62	
Summary of Dry Density/Optimum Moisture Content Relationship							
Location	Initial Water Content (%)		Maximum Dry Density (Mg/m³)		Optimum Moisture Content (%)		
SA05	1.84		13.8		18.9		

7.7 IN-SITU MEXE CONE CBR TESTING RESULTS

In situ Mexe Cone CBR testing was carried out at 0.5m depth at the eight trial pit locations across the site (TP01 – TP08)

Excavation of the trial pits was halted at 0.5m depth to allow three CBR values to be obtained. The results of the Mexe Cone CBR testing are reflective of the made ground materials recorded at the respective locations.

It should be noted that due to the extremely fast ground water inflows encountered at TP01, no CBR value was recorded at this location.

The results of the CBR testing are shown in the trial pits logs, presented in Appendix D.

The results indicate average CBR values across the site at approximately 0.5m depth within the made ground range between 0.98% and 3.15%.

8.0 CONTAMINATION

8.1 AVERAGING AREAS

To assess the laboratory test results reliably and in context, the data have been grouped into an averaging area. An averaging area (or area of interest) is that area of soil to which a receptor is exposed, or which otherwise contributes to the creation of hazardous conditions. This may be an area of historical industrial usage, a soil type, or a specific proposed end use.

In the case of this analysis, the averaging area has been determined according to the proposed school end use.

8.2 SOIL CONTAMINATION

The Suitable 4 Use Levels (S4ULs) published by LQM have been adopted as critical concentrations against which soil contaminant concentrations can be compared. In the absence of additional published S4ULs, the Category 4 Screening Levels (C4SLs) derived by DEFRA and Soil Screening Values (SSVs) derived by Atkins ATRISK^{soil} for a residential without home grown produce end use have been adopted, where considered appropriate.

It should be noted that published thresholds for a school end use are unavailable, and it has been considered that a residential without the consumption of home grown produce end use has been deemed appropriate for the site, as a conservative assessment in the first instance.

Since the results of the testing indicate total organic carbon content (TOC) in the range of 0.3% to 5.1%, the results have been compared to the respective guidelines, where applicable, for 1% soil organic matter content.

The results of the soil chemical testing have been summarised and are shown in Appendices K.

8.2.1 *Made Ground*

A total of eleven samples of the made ground were tested for contamination, including asbestos in accordance with the findings of the desk study.

The results of the laboratory testing indicate that the majority of the analysed chemical elements or compounds are present at concentrations below the appropriate thresholds. However, the initial screening indicates exceedances of beryllium and several PAH compounds.

8.2 SOIL CONTAMINATION (CONTINUED)

Beryllium was detected at elevated concentrations in two out of the eleven made ground samples and detected at concentrations between 2.3mg/kg and 5.4mg/kg, elevated above the adopted threshold of 1.7mg/kg (S4UL 1%SOM).

Benzo(a)pyrene was detected at an elevated concentration in one made ground sample (SA03 at 0.40m). The concentration of 5.0mg/kg exceeds the adopted screening value of 3.2mg/kg (S4UL 1% SOM).

Benzo(b)fluoranthene was detected at an elevated concentration in one made ground sample (SA03 at 0.40m). The concentration of 8.7mg/kg exceeds the adopted screening value of 3.9mg/kg (S4UL 1% SOM).

Dibenzo(ah)anthracene was detected at an elevated concentration in one made ground sample (SA03 at 0.40m). The concentration of 0.75mg/kg exceeds the adopted screening value of 0.31mg/kg (S4UL 1% SOM).

Asbestos was detected within one sample of made ground from WS05 at 0.4m depth. Asbestos quantification testing revealed that chrysotile and amosite fibres were present at a concentration of <0.001% by weight.

No further exceedances were detected within the tested samples of made ground.

8.2.2 Topsoil and Natural Soils

A total of two topsoil samples and one natural soil sample were tested for contamination.

The results of the laboratory testing indicate that all of the analysed chemical elements or compounds are present at concentrations below the appropriate thresholds.

With regards to the natural soils, no visual or olfactory evidence of contamination of the in-situ natural ground was identified during the excavation of the trial pits or drilling of the boreholes. It is considered likely that any concentrations of determinants within the natural ground are likely to be naturally occurring and as such, the natural ground poses no significant threat to human health or the environment.

8.3 GROUND GASES

Ground gas was monitored on a fortnightly basis using a GA5000 Gas Analyser. The results of the gas monitoring programme are included in Appendix J. A summary of the results is given in the following Table 12.

8.3 GROUND GASES (CONTINUED)

Table 12: Summary of Ground Gas Results				
Borehole	Maximum Methane Concentration (%)	Maximum Carbon Dioxide Concentration (%)	Minimum Oxygen Concentration (%)	Gas Flow Rate (l/hr)
WS01	0.2	3.6	18.7	<0.3
WS08	2.2	0.4	18.2	<0.3
BH02	0.3	0.7	17.8	<0.3
BH05	0.1	0.3	19.1	<0.3
BH06	0.4	0.8	17.2	<0.3

The results show a maximum methane concentration of 2.2% and a maximum carbon dioxide concentration of 3.6%. A maximum gas flow rate of <0.3/hr was measured during the gas monitoring programme.

In addition to the above, carbon monoxide and hydrogen sulphide concentrations are also measured. Results indicate the general absence of hydrogen sulphide, with concentrations below the limit of detection. During all monitoring rounds a maximum carbon monoxide concentration of 6ppm was recorded.

9.0 REVISED CONCEPTUAL EXPOSURE MODEL

The preliminary conceptual exposure model has been reviewed and revised to reflect the findings of the site investigation and the results of the laboratory testing of soils and gas monitoring. Pathways identified as a relevant pollutant linkage require appropriate risk assessment or mitigation measures (see Section 10).

Table 13: Revised Conceptual Exposure Model						
Source		Receptor	Pathway	Preliminary Active Pathway? (see Sect. 5.7)	Relevant Pollutant Linkage	Justification/ Mitigation
Origin	Contaminant					
Made Ground of unknown origin and historical land uses	Metals, semi-metals, non-metals, PAH and asbestos	Resident – human health	Dermal Contact with made ground/dust	✓	✓	Elevated concentrations of beryllium and PAH compounds and asbestos fibres identified within the made ground – Risk assess.
			Ingestion of soil and/	✓	✓	
			Inhalation of dust	✓	✓	
			Inhalation of vapours – indoor/outdoor	✓	X	No sufficiently volatile contaminants identified.
	Metals, semi-metals, inorganics, PAH	Groundwater quality	Leaching from made ground	✓	X	Slight, localised elevations of total concentrations of beryllium and speciated PAHs. All PAHs elevations are local to SA04. Given the slight exceedances and localised nature of contamination, risk of leachate generation and risk to groundwater is considered low.
		Surface water quality	Transportation within groundwater	✓	X	

9.0 REVISED CONCEPTUAL EXPOSURE MODEL (CONTINUED)

Table 13: Revised Conceptual Exposure Model (Continued)						
Source		Receptor	Pathway	Preliminary Active Pathway?	Relevant Pollutant Linkage	Justification/ Mitigation
Origin	Contaminant					
Made Ground of unknown origin and natural ground	pH and Water-Soluble Sulphate	Building Materials Durability	Direct contact	✓	✓	Building materials will be in contact with made ground and natural soils– Risk assess
Ground Gas – organic, gas producing materials	Methane, carbon dioxide	Human health	Accumulation of gases in confined spaces, and/or migration off site, leading to asphyxiation, or risk of explosion	✓	✓	Potential gas producing materials present in the form of made ground and organic natural peaty soils. – Risk assess

10.0 RISK ASSESSMENT

10.1 METHODOLOGY

The risk of pollution, health effects or environmental harm occurring as a result of ground contamination is dependent upon three principal factors:

- The scale of the contamination sources;
- The presence of sensitive “receptors”, e.g., Humans: health of the general public, site occupiers, redevelopment workers. Environment: flora, fauna, etc;
- The existence of migration pathways by which contaminants can reach the sensitive receptors.

This section assesses each of these factors in order to evaluate the overall level of risk and potential harm to receptors. The receptor may be human, a water resource, an eco-system or construction materials. Pathways connecting a perceived hazard to a receptor are referred to as exposure pathways.

The sources of contamination and the links connecting the hazards to the sensitive receptors will represent the basis for the risk assessment.

10.2 SOURCE-PATHWAY-RECEPTOR MODEL

The preliminary conceptual site model was based on the findings of the desk study. This was later reviewed and refined according to the findings of the site investigation, allowing for the ground conditions encountered and the results of laboratory testing of soil and groundwater. Any pathways considered to be inactive were removed from the model and all remaining potentially active pathways require risk assessment.

The pathways shown as potentially active in the Revised Conceptual Site Model in Section 9.0 above have been assessed below.

10.3 HUMAN HEALTH RISK ASSESSMENT

10.3.1 *Site in its Present Condition*

It is considered that the site does not pose any risks to casual visitors or trespassers.

10.3 HUMAN HEALTH RISK ASSESSMENT (CONTINUED)

10.3.2 Future Site Users

The contamination test results, and investigation observations show locally elevated concentration levels in the made ground of beryllium and three PAH compounds (benzo(a)pyrene, benzo(b)fluoranthene and dibenzo(ah)anthracene).

Chrysotile and amosite fibres were detected in one screened sample of made ground at a concentration of <0.001% by weight.

Given the elevated beryllium and PAH concentrations and the presence of asbestos fibres within the general made ground encountered across the site, it is considered that a potential risk to human health may exist via the following relevant pollutant linkages:

- Dermal contact,
- Ingestion of soil or soil derived dust,
- Inhalation of soil bourn dust.
- Inhalation of fibres.

It is therefore considered necessary to protect end users from the elevated concentrations of beryllium, PAH, and asbestos fibres in the made ground. It is considered necessary to break the above listed relevant pollutant linkages in order to remove the potential risk.

It is recommended that a capping layer, of a minimum thickness of 600mm, of clean imported subsoil and topsoil is placed in all areas of soft landscaping and any sport pitches underlain by made ground. This should be placed above a robust high visibility anti-mixing membrane/geofabric. This would break all the above listed relevant pollutant linkages.

10.3.2 Construction Operatives

With future site development works involving the excavation and removal of the made ground, there would be a risk to workers from contaminants in the soils and also the groundwater if it is encountered. Appropriate measures are therefore recommended for works involving the made ground materials which are known to be present beneath the site.

All excavations should be regularly checked for safe atmospheres.

Normal good hygiene practices should be adequate to protect the health and safety of redevelopment workers, and should include:

10.3 HUMAN HEALTH RISK ASSESSMENT (CONTINUED)

- Minimum handling of materials,
- Washing of hands prior to all meal breaks, which should be taken in a designated clean area,
- The use of standard protective clothing such as boots and overalls and gloves, where considered relevant.

As a minimum, all groundworkers should be asbestos awareness trained.

In dry weather, inhalation of dust and gases should be avoided preferably by the use of dust suppression techniques to minimise fugitive emissions and minimisation of exposed materials at any particular time.

Additionally, a system should be established by which any 'unusual' materials that may be encountered are reported rapidly to the site management, so that the appropriate action may be taken, following specialist advice if necessary. An unusual material may be identified on site by colour, odour, or physical nature.

Reference should be made to the Health and Safety Executive document "Protection of Workers and the General Public during the development of contaminated land" for detailed guidance on these matters.

10.4 RISKS TO VEGETATION

As outlined above, it is recommended that a capping layer, of a minimum thickness of 600mm, of clean imported subsoil and topsoil is placed in all areas of soft landscaping and any sport pitches underlain by made ground. This should be placed above a robust high visibility anti-mixing membrane/geofabric.

10.5 CONTROLLED WATERS RISK ASSESSMENT

Localised elevated concentrations of beryllium and three PAH compounds (benzo(a)pyrene, benzo(b)fluoranthene and dibenzo(ah)anthracene) were encountered within the made ground located beneath the site.

The underlying natural ground comprised of generally cohesive glacial deposits, although perched ground incidences were recorded in the made ground and natural soils.

10.5 CONTROLLED WATERS RISK ASSESSMENT (CONTINUED)

In the developed state, the site will be covered by either the building footprint or areas of hardstanding and the areas of soft landscaping and any sport pitches underlain by made ground will be covered by a minimum 600mm thick capping layer of clean inert imported soils, placed above a high visibility anti-mixing membrane/geofabric.

It is therefore considered that the potential for rainfall infiltration into the made ground, subsequent leachate generation from the made ground and the potential for vertical migration of unacceptable leachate concentrations to impact the underlying perched groundwater bodies is considered to be low.

Consultation should be undertaken with regulators prior to development. Regulators may require additional leachate and groundwater sampling and analysis on site to confirm the above.

10.6 GROUND AND MINE GAS RISK ASSESSMENT

The results show a maximum methane concentration of 2.2% and a maximum carbon dioxide concentration of 3.6%. A maximum gas flow rate of <0.3l/hr was measured during the gas monitoring programme.

In accordance with CIRIA Report C665 a Gas Screening Value (GSV) of 0.0108/hour has been calculated. This GSV corresponds to gas Characteristic Situation 1 (CS1), which does not require any special gas protective measures.

However, due to the significant thickness of made ground, methane concentrations above 1% and the presence of significantly thick organic cohesive soils underlying the site, it would be prudent to increase the gas Characteristic Situation to Situation 2 (CS2).

Reference should also be made to BS8485+A1:2019.

In accordance with BS8485+A1:2019 and based on the results of the ground gas monitoring programme with the site being classified as CS2, for Development Type B and C (commercial/public), the minimum gas protection score is 3.5.

As stated in Section 8.3, maximum carbon monoxide concentrations of 6ppm were detected during the gas monitoring programme.

10.6 GROUND AND MINE GAS RISK ASSESSMENT (CONTINUED)

The HSE Workplace Exposure Limit for carbon monoxide is 20ppm for long term exposure (8-hour time weighted average period), which is not exceeded by the maximum recorded concentration. It is therefore considered that the potential risk from carbon monoxide within the proposed school buildings is considered to be low.

No radon protective measures are required.

Gas evolution from coal seams and accumulated sources such as abandoned tunnels and workings cannot be discounted and will require further assessment conducted in accordance with CL:AIRE document Good Practice for Risk Assessment for Coal Mine Gas Emissions, dated October 2021.

The site is not located within a high-risk development area but based on the above guidelines a mine gas risk assessment should still be undertaken. The initial desk-based assessment of the site will be utilised in order to develop the level of mine gas risk within the site.

There are many sources of gas in mine workings including desorption of gas from coal and rocks, oxidation of coal, decomposition of old wood (such as pit props) and acidic mine drainage reacting with carbonate in the rocks around the seam or shaft.

These gases, if produced within the old workings, would need a viable pathway to the surface such as a shaft or fractured rock above the workings.

The desk study shows that the site is not located within a high-risk development area. Shallow coal workings are not recorded and there are no potential shallow unrecorded workings beneath the site.

There are no mine entries located within 100m of the site boundary. It is therefore concluded that there are no viable pathways, via old shafts or adits, for any mine gas beneath, or within an influencing distance, of the site.

No faults, fissures or breaklines are known to affect the development site according to the Coal Authority. The site is also overlain by a thickness of cohesive superficial deposits. Although lines of fault are indicated on the geology map, one of which crosses the site, it is considered that no workings where gas could generate are present beneath the site. It is therefore concluded that the faults would not provide a risk.

10.6 GROUND AND MINE GAS RISK ASSESSMENT (CONTINUED)

Based on the desk-based research, the potential risk from coal mine gas emissions at the development site is considered below:

Figure 13.1 Decision Support Tool for Mine Gas Risk Assessment, included within CL:AIRE document Good Practice for Risk Assessment for Coal Mine Gas Emissions, dated October 2021 includes a flow chart to aid the risk assessment process and decision making.

Stage 1 of the flow chart asks if the site is within a Coal Authority defined Coal Mining Reporting Area. Since the site is located within a Coal Authority defined Coal Mining Reporting Area the flow chart then asks if all of the following statements are true:

- Mine entries >50m from site boundary,
- Workings >150m depth,
- No faults or other potential pathways connecting surface to deeper unflooded workings,
- Outside area of past or probable shallow workings on Coal Authority viewer.

Based on the information gained from the desk-based research, it is considered that the Stage 1 statements are true. The CL:AIRE document 'Good Practice for Risk Assessment for Coal Mine Gas Emissions dated October 2021' therefore classifies the site as being within a "Negligible Risk Zone" and states that mitigation is not required based on the proposed development of the site.

10.7 RISKS TO BUILDINGS AND MATERIALS DURABILITY

10.7.1 Concrete Classification

A summary of the laboratory chemical test results for the chemicals monohydric phenol, sulphur, total sulphate, water soluble sulphate, sulphide, and pH, which may adversely affect the durability of building materials is presented in Appendix G.

Evidence to date does not indicate any specifically aggressive conditions, but it would be reasonable to expect a degree of sulphate and acidic aggressiveness from the made ground.

10.7 RISKS TO BUILDINGS AND MATERIALS DURABILITY (CONTINUED)

Made Ground

In accordance with BRE Digest SD1:2005 and adopting the assessment procedure specified therein for brownfield sites, the laboratory chemical test results indicate a characteristic value (taking the highest test result) for water soluble sulphate within the made ground of 410mg/l.

Using Table C2 of BRE Digest SD1:2005, this characteristic value corresponds to Design Sulphate Class DS-1.

The groundwater regime of the site has been assessed as 'mobile' and a characteristic pH value within the made ground of 7.0 has been determined (adopting the lowest test result). The Design Sulphate Class has been modified to give a site ACEC class of AC-1 for concrete structures constructed within the made ground.

Natural Soils

In accordance with BRE Digest SD1:2005 and adopting the assessment procedure specified therein for brownfield sites, the laboratory chemical test result (based on one sample of natural soil) indicate a characteristic value for water soluble sulphate within the natural soil of 17mg/l.

Using Table C2 of BRE Digest SD1:2005, this characteristic value corresponds to Design Sulphate Class DS-1.

The groundwater regime of the site has been assessed as 'mobile' and a characteristic pH value within the made ground of 5.8 has been determined (adopting the mean of the lowest 20% of the test results). The Design Sulphate Class has been modified to give a site ACEC class of AC-2z for concrete structures constructed within the natural soils.

10.7.2 Water Services

Water supply pipes will need to be protected from any contamination present within the ground. In particular, the presence of organic contaminants (such as PAH) should be addressed when selecting pipe materials. Measures to protect the pipes will include clean backfill to trenches and possibly alternative material selection.

Reference should be made to UKWIR Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, document No. 10/WM/03/21. The final design and selection of the pipe and associated backfill should be agreed with the appropriate Regulator prior to installation.

10.7 RISKS TO BUILDINGS AND MATERIALS DURABILITY (CONTINUED)

In order to comply with the UKWIR guidance, specific sampling and testing along the actual line of the proposed water supply route may need to be carried out once this has been established.

10.8 WASTE DISPOSAL

Excavated materials generated by the development may be considered as waste and subject to waste controls. Any re-use of excavated materials on-site should be undertaken in accordance with current waste and environmental legislation, and which may require the production of an approved Materials Management Plan (MMP) prepared in accordance with the CL:AIRE Code of Practice.

It is recommended that a sustainable development strategy is adopted which reduces to a practicable minimum the generation of waste materials and the need for disposal to a licensed tip. Emphasis should be on recovery and re-use rather than disposal.

However, any waste or surplus materials that are generated will need to be classified in accordance with current EC regulations and Environment Agency guidance prior to disposal. It is the responsibility of the waste producer to classify the waste.

Based on the data obtained from the site investigation works, any waste materials comprising the existing made ground are likely to be classified as a combination of non-hazardous and hazardous waste (a preliminary HazWasteOnline Waste Classification Report is presented in Appendix L).

The existing natural ground are likely to be classified as non-hazardous waste.

Any asbestos containing materials (ACMs) will be classified as hazardous waste.

This classification is provisional, and indicative of the likely waste classification based on the data obtained to date (including chemical composition, moisture content, etc.). It also assumes that the materials tested will be representative of future generated waste.

In order to minimise disposal, the materials generated should be segregated and examined, with appropriate testing as necessary, to enable the materials to be sorted or treated into lower classifications, with the resultant benefit of potentially generating re-use rather than disposal.

10.8 WASTE DISPOSAL (CONTINUED)

Once final waste sources and volumes are known, the waste stockpile to be disposed off-site will need to be classified in accordance with Environment Agency/Natural Resources Wales Waste Classification – Guidance on the Classification and Assessment of Waste Technical Guidance WM3 (2015). This is likely to require additional sampling and testing of the generated waste materials to provide an up-to-date current basis for classification.

Waste Acceptance Criteria testing was taken on one sample of topsoil (TP02 at 0.1m depth) and one sample of made ground (SA04 at 00.45m depth).

Copies of the results from the WAC testing are presented in Appendix G.

It is recommended that the results of any waste classification and any WAC testing are sent to the intended licensed waste operator prior to disposal in order to confirm their classification and acceptance.

10.9 UNCERTAINTIES

It is important to recognise that there may be areas of contamination within the site that have not been found or that contaminants may be present at concentrations above those that have been found. It is also important to recognise that contamination may be localised and that no investigation, however comprehensive, is capable of finding such occurrences, other than by chance.

11.0 ENGINEERING CONSIDERATIONS AND RECOMMENDATIONS

11.1 DETAILS OF PROPOSED DEVELOPMENT

The development proposals include the construction of a new school building with associated external play areas, access roads, and areas of car parking. At the time of writing the final proposed development layout and engineering levels had not been confirmed.

Additionally, it is understood that a solar array farm has been proposed to the east of the school site, and a future LDP housing zone has been allocated to the south of the school site.

It should be noted that the recommendations outlined in this report relate to the proposed school development area only.

The following recommendations should be reviewed and revised accordingly once the final proposed layout and engineering levels have been confirmed.

11.2 GEOTECHNICAL CONSTRAINTS AND CONSIDERATIONS

A number of geotechnical constraints have been identified that require careful consideration prior to development.

A summary of the main geotechnical constraints on development are outlined below.

- A significant portion of the site is underlain by the footprint of an historically infilled pond (the former Goitre Pond). The historical infill materials generally comprise soft cohesive made ground (up to approximately 4.00m thick) and are underlain by a layer of organic-rich / peaty soils (up to approximately 0.50m thick) considered to represent the historical pond base.
- Due to the presence of thick made ground deposits and the underlying peat layer, the use of conventional shallow foundations and a ground bearing floor slab for the proposed building is not advisable due to the potential for unacceptable levels of total and differential settlements.
- It is recommended that a piled foundation solution is utilised for the proposed building.

11.2 GEOTECHNICAL CONSTRAINTS AND CONSIDERATIONS (CONTINUED)

- If adopting a piled foundation solution, then the effects of settlement outside the footprint of the building, between the thresholds of the piled structure and external areas / infrastructure / service entry points needs to be carefully considered. In order to create a suitable plateau and to minimise potential associated differential settlements, it is recommended that the site is reclaimed in accordance with an agreed Earthworks Specification.
- When setting levels for the proposed development allowances should be made for the inclusion of a minimum 600mm clean capping layer (placed over a hi-visibility geotextile separation membrane) in all proposed soft landscaped areas that are underlain by made ground.
- In the event that ground levels are to be raised greater than 600mm above existing, then detailed settlement assessments will be required in order to assess potential differential settlement risks (particularly at the interface between external areas and piled structures).

11.3 SITE PREPARATION

11.3.1 Services

Prior to any works commencing on site, any existing buried services, including any culverts, within the site area should be identified and either diverted or protected. It is possible that a significant stream is culverted beneath the site. Further investigations to confirm the presence or absence of any culverts should be undertaken prior to detailed design. Any diversion works should be carried out under the supervision of, and to the specification of, the appropriate statutory authorities. The resulting excavations should be backfilled with suitable granular material.

11.3.2 Vegetation Clearance and Site Strip

It has previously been noted that invasive plants, specifically Japanese Knotweed are present in localised parts of the site, specifically the northern site area. It is recommended that a full pest plant survey is undertaken and should the existence of Invasive Plants be identified, a licenced and competent contractor is engaged to undertake an eradication programme.

11.3 SITE PREPARATION (CONTINUED)

There are mature trees/vegetation along the edges of the site. Allowances should therefore be made for the protection of any trees or vegetation which are to be retained. Where trees are to be removed this should include the removal of any associated roots that may become exposed in any nearby earthworks and foundation excavations.

All existing topsoil should be stripped from development areas and stockpiled on site for potential re-use or removal off-site. Given the nature of the near surface soils, the exposed surface of the site will deteriorate in poor weather and due to trafficking of plant. We therefore recommend that to minimise surface water management risks and minimise the generation of silt, softened materials and unsuitable arising materials strategic earthworks materials management is required.

The exposed areas should be minimised at all times. All exposed areas should be protected from damage in wet weather. Designated access routes should be maintained and suitably designed and maintained working platforms for construction plant provided.

11.3.3 Unexpected Occurrences

A system should be established by which any 'unusual' materials that may be encountered are reported rapidly to the site management, so that the appropriate action may be taken, following specialist advice if necessary. An unusual material may be identified on site by colour, odour, or physical nature.

Allowances should be made for potentially encountering and dealing with possible springs, land drains and uncharted buried services.

11.3.4 Site Reclamation Earthworks

The site is underlain by variable thicknesses of made ground / historical pond infill materials.

It is recommended that the proposed building utilises piled foundations (as outlined below in Section 11.4). However, in order to provide a suitable plateau for the proposed development and to minimise settlements beneath access roads, car parking areas, drainage, and services (particularly at the interface with the piled structure), it is recommended that site reclamation earthworks are undertaken prior to development, to ensure adequate compaction of the existing made ground / pond infill deposits.

The compaction of the made ground / pond infill could be achieved through an 'excavation-and-recompaction' earthworks exercise, or by utilising a ground improvement technique such as High Energy Impact Compaction (HEIC).

11.3 SITE PREPARATION (CONTINUED)

Alternatively, ground improvement utilising vibro-stone column could also be considered.

Excavation and Recompaction

If it is proposed to undertake an excavate-and-recompact earthworks exercise, then the made ground beneath the footprints of all proposed development areas should be excavated to a depth of 2.0m below proposed development levels, or undisturbed virgin natural ground (whichever is shallowest).

Any excavated materials should be inspected, processed, and sorted in accordance with an agreed Earthworks Strategy and Materials Management Plan. The Materials Management Plan should be produced in accordance with the CL:AIRE Code of Practice and approved by a Qualified Person. Any unacceptable materials (such as wood, metal, etc) should be removed and disposed off-site. The acceptable materials should then be stockpiled on site for compliance testing and subsequent re-use as fill material.

The exposed sub-formations should be proof rolled. Any soft spots, soft cohesive or organic materials at sub-formation level will require excavation and replacement with granular fill materials.

The reduced levels should be brought up to the required levels with the processed made ground in controlled and compacted layers in accordance with Department of Transport (DTp) Specification for Highway Works. Any shortfall in quantities shall be made up with clean, inert, granular imported materials in accordance with an agreed specification. These materials will need to be placed and compacted to achieve structural performance standards suitable for the development.

The results of some initial Dry Density/Moisture Content Relationship testing (presented in Appendix I) indicate that the tested samples of the made ground and natural soils are currently beyond optimum moisture content for optimum compaction.

During the reclamation earthworks it will be necessary to implement suitable land drainage and surface water management control measures.

Any soft spots within prepared formations should be excavated and replaced with inert structural fill. Engineered fill should be of granular nature, rolled and compacted over benched formations, and placed in accordance with Department of Transport Specification for Highways Works. Detailed material re-use strategies should be produced prior to the commencement of works to maximise the re-use of materials.

11.3 SITE PREPARATION (CONTINUED)

The required site preparatory earthworks should be properly designed, specified, and monitored by a suitably qualified Geotechnical Engineer.

The recommended site reclamation earthworks should be undertaken in accordance with a separately prepared and agreed Earthworks Specification document.

It should be noted that earthworks will be seasonally dependant and will rely on control of water content in the structural soils.

It is recommended that earthworks are carried out as enabling works during the summer months.

Allowances should also be made for conditioning/drying out the structural soils prior to placement/compaction.

With regard to the re-workability of as dug materials, recent experience of sites of a similar nature in this vicinity has demonstrated that as dug materials are likely to be extremely susceptible to weather softening. Great care will need to be taken by the groundworks contractor to preserve as dug usable materials excavated to an acceptable standard.

Significant areas of the site are notably waterlogged/boggy.

Land drainage will be required to control seepage horizons and surface water migration.

Validation testing, chemical and physical (typically plate load tests and dynamic probing) should be carried out across the completed prepared plateau in order to ensure its performance.

High Energy Impact Compaction (HEIC)

Subject to advice from a specialist ground improvement contractor, an alternative to the 'excavation and recompaction' earthworks, would be to treat the made ground material utilising high energy impact compaction (HEIC) ground improvement.

Treatment is achieved by applying and self-monitoring, using real time deflectometer data, repeated HEIC until no further induced settlements are achievable. The use of systems such as this avoid the requirement to carry out bulk earthworks to densify made ground materials.

11.3 SITE PREPARATION (CONTINUED)

A HEIC system should incorporate real time deflectometer data or similar for the impacts which provides the accurate data supporting the successful treatment of the ground to an agreed compaction specification.

The utilisation of HEIC would also have the added benefit of further compaction of soils to a depth of approximately 3m below existing ground level, thereby providing further betterment.

The HEIC treatment area should cover the full extents of proposed development footprints.

It is recommended that any HEIC ground improvement works are carried out as enabling works during the summer months.

Ground Improvement utilising Vibro-stone Columns

Ground improvement using vibro-stone columns would involve the construction of closely spaced stone columns beneath the proposed development areas. The aim is to ensure 'stiffening' of the ground, thereby spreading and dissipating the new development loads in order to minimise total and differential settlements within the underlying soils.

The advice of a specialist vibro-compaction contractor should be sought in order to fully explore the suitability of this ground improvement technique. It should be noted that vibro contractors generally won't treat areas of recently placed cohesive fill material, so an idea of cut and fill levels is advised prior to seeking the advice of a specialist.

Allowances should be made by the vibro contractor for carrying out suitable in-situ strength testing of the prepared formations.

11.3.5 Certification

The required site preparatory earthworks should be properly designed, specified, and supervised by a suitably qualified Geotechnical Engineer. Validation testing, chemical and physical (typically plate load tests and dynamic probing), level station monitoring (as appropriate) should be carried out across the completed prepared plateau in order to ensure its performance.

A verification report will be required upon completion of the site works in order to satisfy the requirements of the local planning authority, Natural Resources Wales, and the Premier Guarantee, as appropriate.

11.3 SITE PREPARATION (CONTINUED)

11.3.6 Pollution Protection and Management

During the site clearance and subsequent operations airborne nuisance caused by dust from the site must be controlled on account of the health and safety of site operatives and the general public who are occupying nearby properties.

Temporary drainage grips and silt pumps will be required during earthworks in order to control near surface formations and protect the adjacent water courses to the north and east of the site from uncontrolled run-off.

11.3 FOUNDATIONS AND FLOOR SLABS

The ground conditions below the site are characterised by a variable thickness of made ground overlying a thin layer of clayey peat (former pond basin) overlying variable till deposits and solid strata. The use of conventional shallow foundations is not considered feasible due to the potential for unacceptable total and differential settlements.

It is recommended that piled foundations are used for the proposed school buildings.

Subject to vibration and noise, driven pre-cast concrete piles, driven to an appropriate set within the natural stiff/dense superficial deposits or natural solid strata.

Based on the results of the intrusive site investigation, pile lengths are anticipated at approximately around 6-12m, although variations should be expected dependent on localised ground conditions, pile diameters and choice of pile. Pile capacity would be generated from both skin friction and end bearing resistance, subject to the advice of a specialist piling contractor.

It is recommended that follow on rotary cored boreholes are progressed 5m below base of the proposed pile toe levels to establish the bedrock strength / degree of weathering. Point load and UCS testing should be undertaken on core samples gained.

Variations in pile lengths should be limited to avoid over-stressing adjacent piles of different lengths. Allowances should be made for moving piles affected by shallow obstructions, or alternatively any shallow obstructions removed with excavation plant.

Piles will need to be designed to ignore load contribution from the made ground and soft and very soft underlying clay strata.

11.3 FOUNDATIONS AND FLOOR SLABS (CONTINUED)

In the event that ground levels are to be raised greater than 600mm above existing, then a detailed settlement assessments will be required in order to assess potential differential settlement risks at the interface between external areas and piled structures.

Any piles that are driven to a premature set should be investigated and allowances made for re-driving, digging out any encountered shallow obstructions, or pile replacement. Steel driven piles would be a viable alternative and a contingency should be allowed for a certain number of steel piles, especially on the peripheral areas of the site removed from the historic pond feature.

Subject to the advice of a specialist piling contractor, the use of alternative piling techniques may be required.

Note that the adopted piling system will need to consider any potential vibration and noise issues in relation to the adjacent buildings/structures. If noise and/or vibration issues preclude the use of driven pre-cast concrete piles, then steel driven piles or a bored or drilled piling system deriving load capacity in the form of a suitably designed and constructed socket within superficial deposits and bedrock could be considered.

If an augured piling system is adopted, it will be necessary to segregate the made ground arisings from the natural soil arisings for appropriate off-site disposal.

It is recommended that the advice of a specialist piling contractor is sought in order to confirm the most appropriate piling technique and for the detailed pile design.

Floor slabs should be designed and constructed as suspended.

Based on the results of the gas monitoring programme, gas protective measures are required, as detailed in Section 10.6. No radon protective measures are required.

11.4 EXCAVATIONS AND FORMATIONS

Most of the excavations should be possible with normal soil excavating machinery. However, it should be noted that occasional obstructions and difficult dig conditions were observed throughout the site investigation. Allowances should be made for the use of larger excavators and/or hydraulic breaking equipment to deal with any unforeseen obstructions.

Inflows of perched groundwater were encountered at depths ranging from 0.2m to 4.7m below existing ground level within the exploratory holes positioned across the site.

11.4 EXCAVATIONS AND FORMATIONS (CONTINUED)

Consideration will need to be given to the control of the groundwater incidences into excavations.

Instability of trial pit sides was frequently associated with cobble and boulder removal, Locally, made ground deposits were recorded as unstable due to the higher granular content or the influence of perched water.

Instability of the excavation sides, including overbreak should be allowed for.

Excavations should not be entered and the sides of excavations deeper than 1.0m should be fully supported by trench boxes.

11.5 ACCESS ROADS AND CAR PARKING AREAS

For access roads and car parking formations within existing made ground and/or in situ natural soils, California Bearing Ratio (CBR) values of 1% to 3% should be used for design purposes.

In areas of re-engineered made ground or engineered fill, for access roads and car parking formations California Bearing Ratio (CBR) values of 4% or greater should be achievable.

After proof rolling the formations, any 'soft spots/areas' should be removed and replaced with well-compacted imported granular materials. Department of Transport (DTp) Type 1

Sub-Base, or similar approved, could be used and should be compacted in layers in accordance with the current DTp Specification for Highway Works.

Formations should be regarded as frost susceptible.

It should be noted that field CBR tests should be carried out in order to confirm the above assumptions. Depending on the outcome of such field tests, the above recommendations may need to be revised.

Special care in detailing of hard finished surfaces should also be taken where hard finished and tarmac surfaces approach piled structures. A considerable degree of flexibility should also be allowed in the details to deal with potential differential movements.

11.6 DRAINAGE

Soil Infiltration testing was carried out in seven trial pits (SA01 to SA07).

Insufficient infiltration was observed in all test locations, and it was not possible to calculate a design infiltration rate/soil permeability. The soil infiltration test calculation sheets are presented in Appendix G.

The soil infiltration test results are specific to the location and depths of the tests undertaken.

It should also be noted that this initial testing should only be regarded as indicative. If it should be proposed to use soakaways for this site, then more extensive follow-up tests will be required and should fully comply with BRE 365, in order to confirm the suitability of the site and to satisfy the local authority.

It is recommended that a drainage engineer is consulted for the detailed design with regard to falls adopted and provision of adequate rocker details to drainage runs and at the junction with piled structures, in order to accommodate differential settlements.

11.7 RECOMMENDED FURTHER WORKS

In the event that ground levels are to be raised greater than 600mm above existing, then detailed settlement assessments will be required in order to assess potential differential settlement risks (particularly at the interface between external areas and piled structures).

It is recommended that follow on rotary cored boreholes are progressed 5m below base of the proposed pile toe levels to establish the bedrock strength / degree of weathering. Point load and UCS testing should be undertaken on core samples gained.

APPENDIX A

ENVIROCHECK REPORT

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

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

Ordnance Survey Plan 1:10,000

	Chalk Pit, Clay Pit or Quarry		Gravel Pit
	Sand Pit		Disused Pit or Quarry
	Refuse or Slag Heap		Lake, Loch or Pond
	Dunes		Boulders
	Coniferous Trees		Non-Coniferous Trees
	Orchard		Scrub
	Bracken		Heath
	Marsh		Reeds
	Building		Glasshouse
	Sloping Masonry		Pylon
	Cutting		Embankment
	Road Under		Road Over
	Level Crossing		Foot Bridge
	Standard Gauge Multiple Track		Standard Gauge Single Track
	Siding, Tramway or Mineral Line		Narrow Gauge
	Geographical County		Administrative County, County Borough or County of City
	Municipal Borough, Urban or Rural District, Burgh or District Council		Borough, Burgh or County Constituency
	Civil Parish		
	Boundary Post or Stone		Police Station
	Church		Post Office
	Club House		Public Convenience
	Fire Engine Station		Public House
	Foot Bridge		Signal Box
	Fountain		Spring
	Guide Post		Telephone Call Box
	Mile Post		Telephone Call Post
	Mile Stone		Well

1:10,000 Raster Mapping

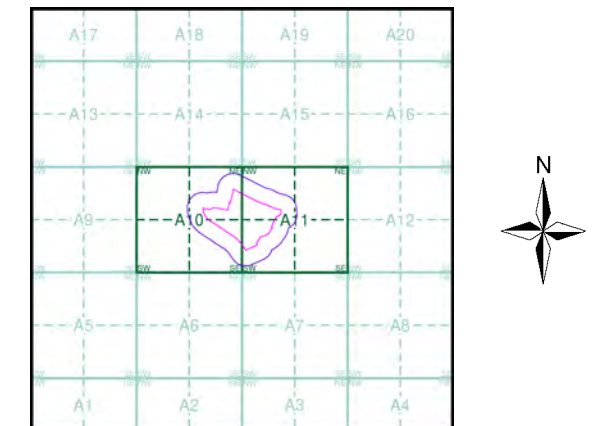
	Gravel Pit		Refuse tip or slag heap
	Rock		Rock (scattered)
	Boulders		Boulders (scattered)
	Shingle		Mud
	Sand		Sand Pit
	Slopes		Top of cliff
	General detail		Underground detail
	Overhead detail		Narrow gauge railway
	Multi-track railway		Single track railway
	County boundary (England only)		Civil,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

Intégral Géotechnique

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Brecknockshire	1:10,560	1884 - 1885	2
Monmouthshire	1:10,560	1884	3
Glamorganshire	1:10,560	1885	4
Glamorganshire	1:10,560	1901	5
Brecknockshire	1:10,560	1905	6
Brecknockshire	1:10,560	1922	7
Brecknockshire	1:10,560	1938 - 1951	8
Historical Aerial Photography	1:10,560	1945	9
Brecknockshire	1:10,560	1951	10
Ordnance Survey Plan	1:10,000	1965	11
Ordnance Survey Plan	1:10,000	1977 - 1979	12
Ordnance Survey Plan	1:10,000	1983	13
Ordnance Survey Plan	1:10,000	1992	14
10K Raster Mapping	1:10,000	1999	15
10K Raster Mapping	1:10,000	2006	16
VectorMap Local	1:10,000	2022	17

Historical Map - Slice A



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 1000

Site Details

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Landmark
INFORMATION GROUP

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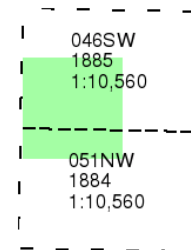
Brecknockshire

Published 1884 - 1885

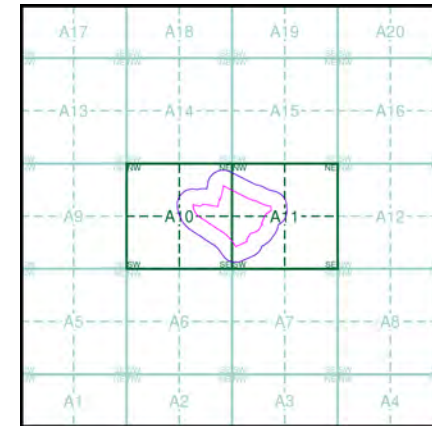
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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps.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

Map Name(s) and Date(s)



Historical Map - Slice A



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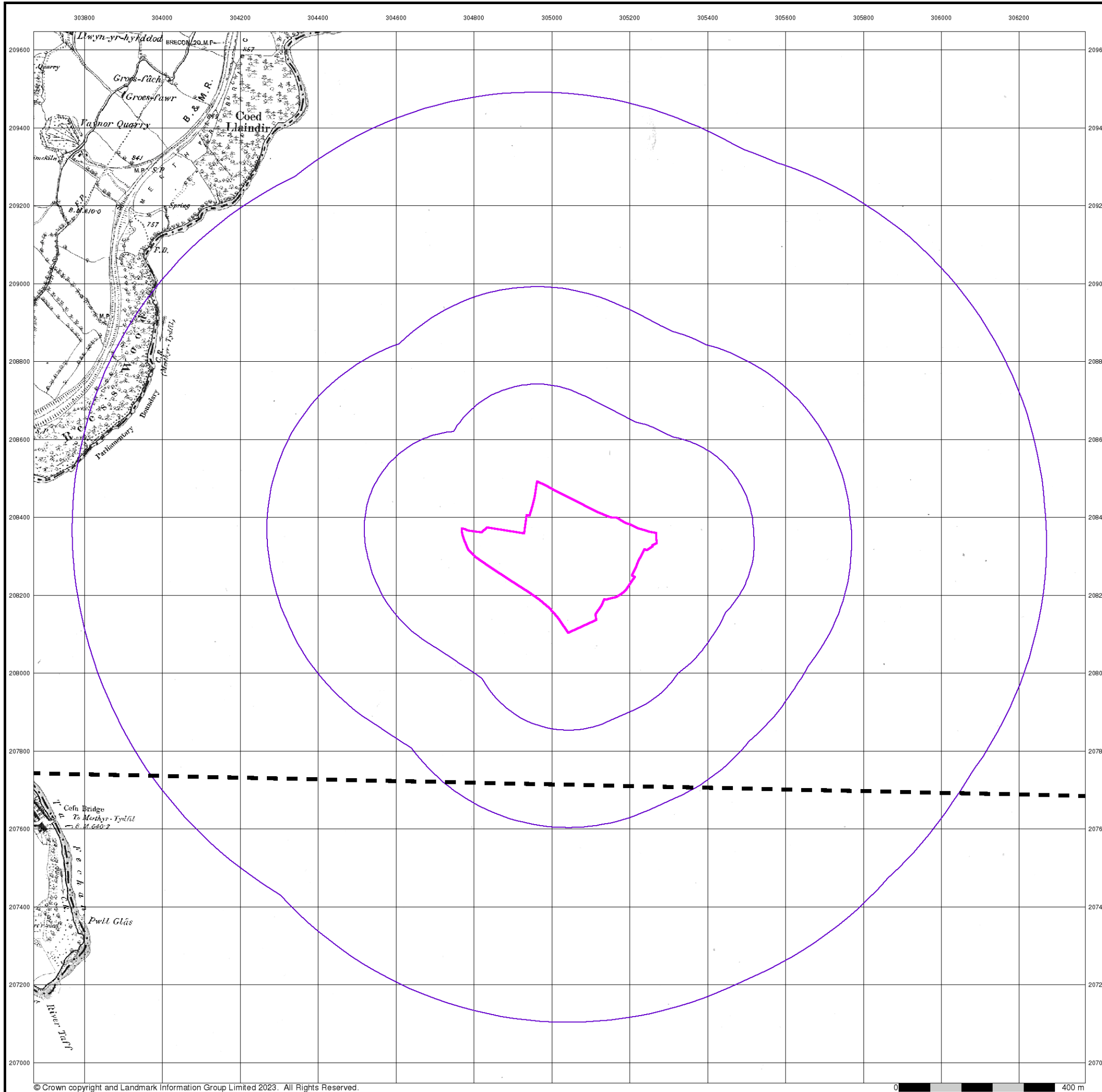
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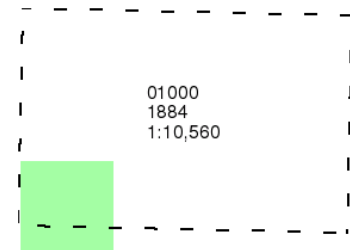
Monmouthshire

Published 1884

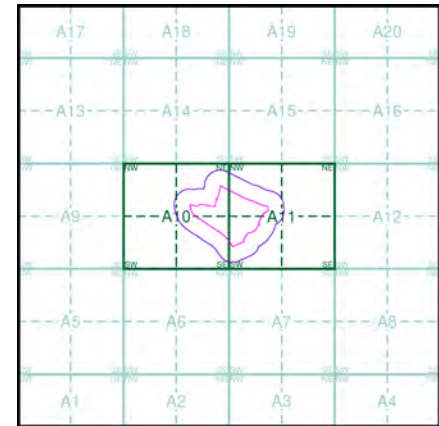
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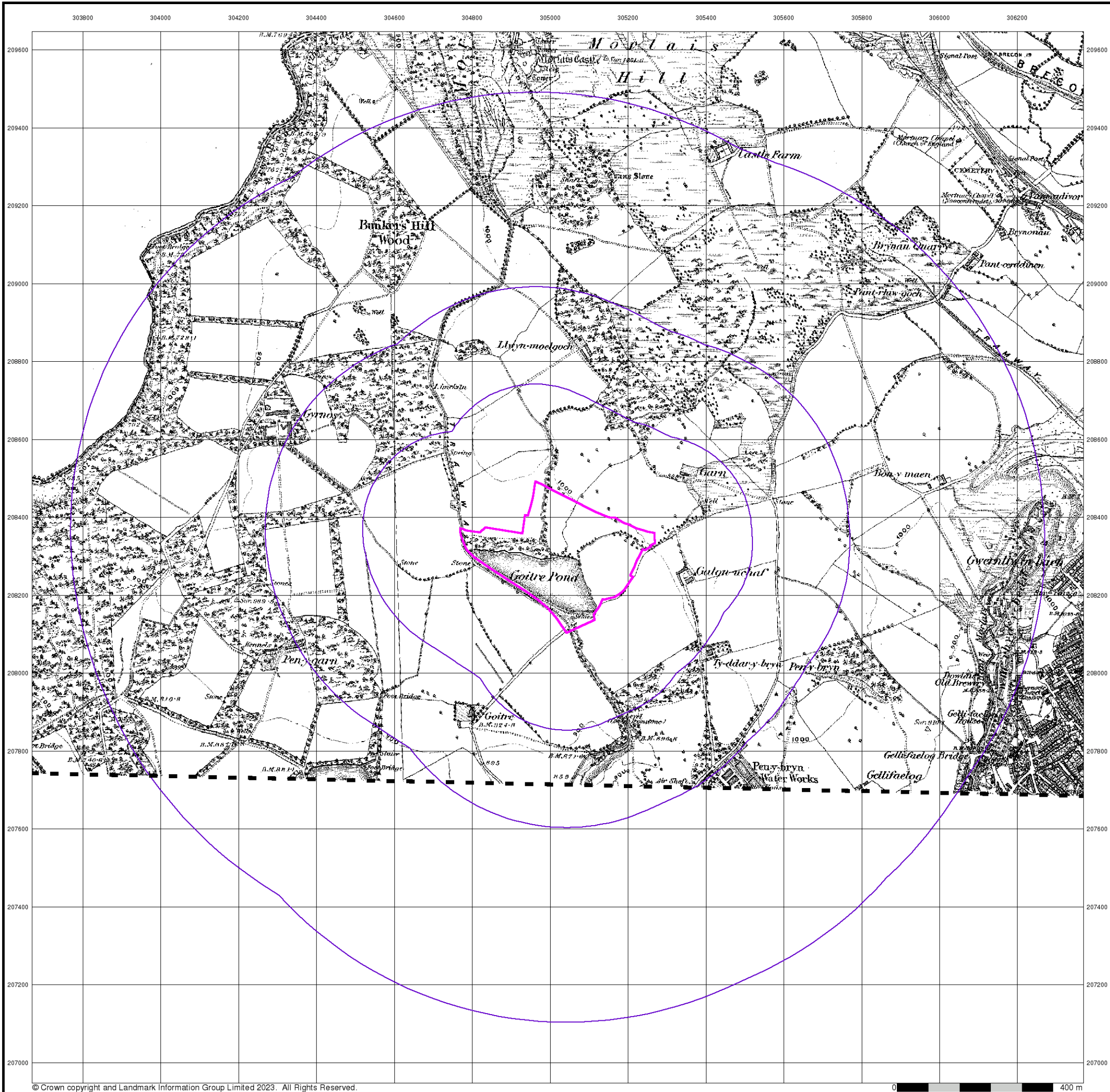
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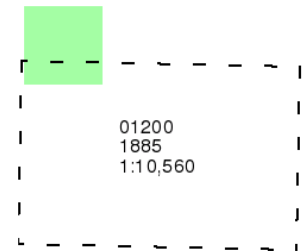
Glamorganshire

Published 1885

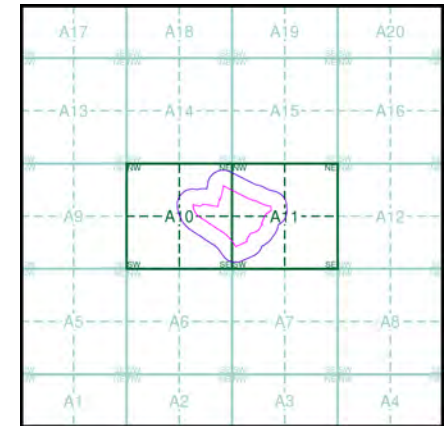
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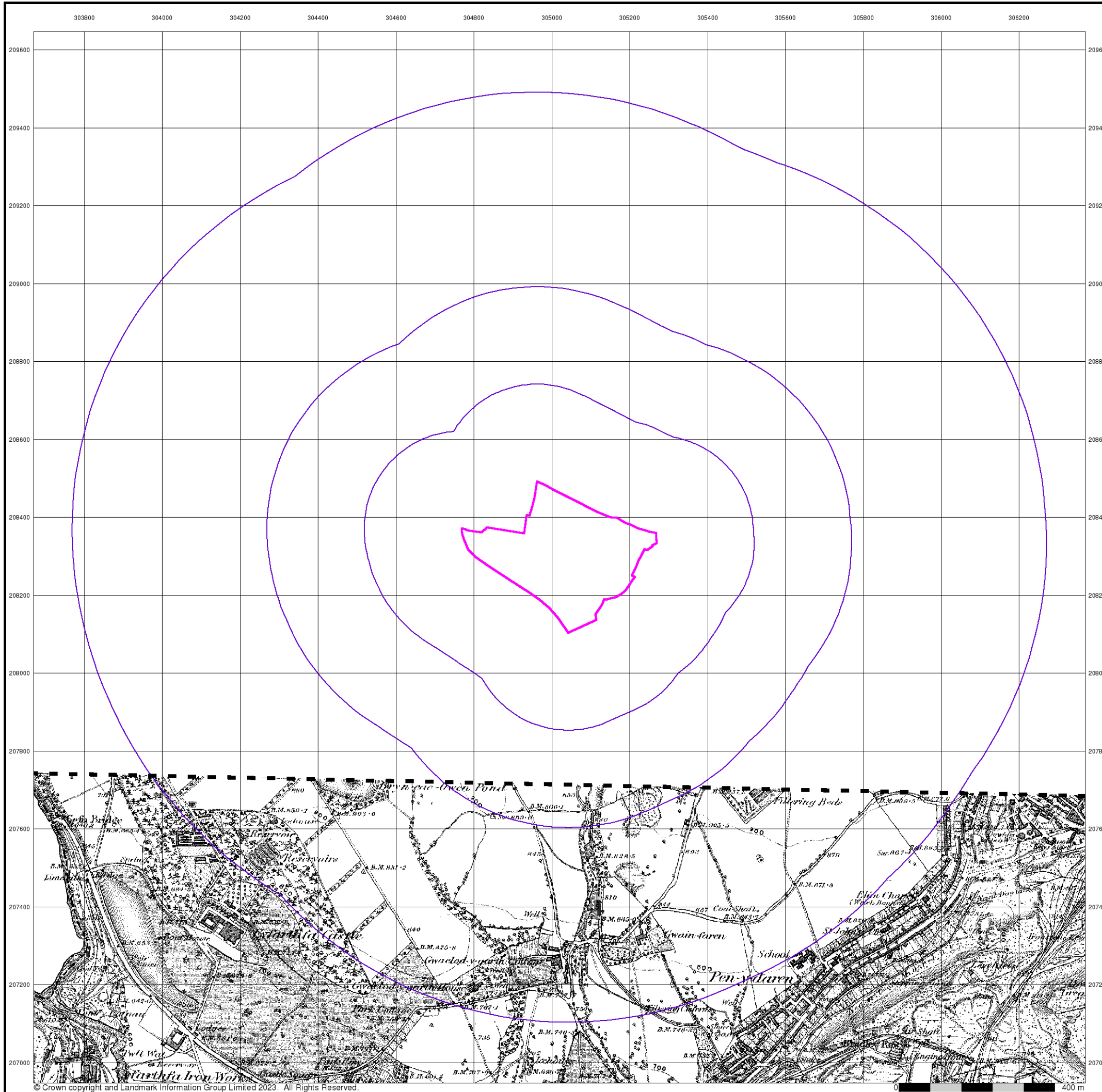
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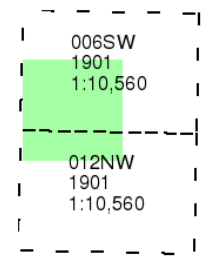
Glamorganshire

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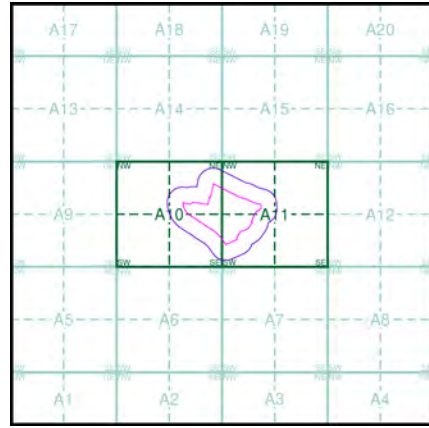
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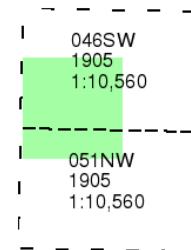
Brecknockshire

Published 1905

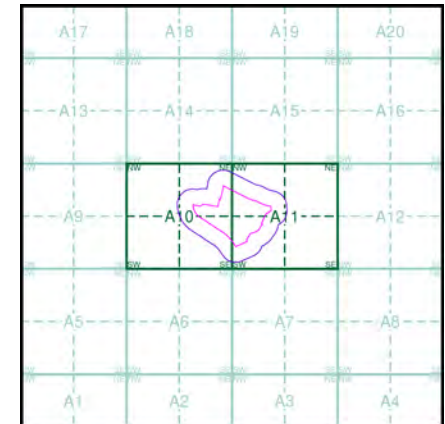
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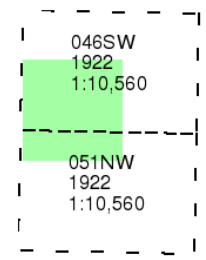
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Published 1922

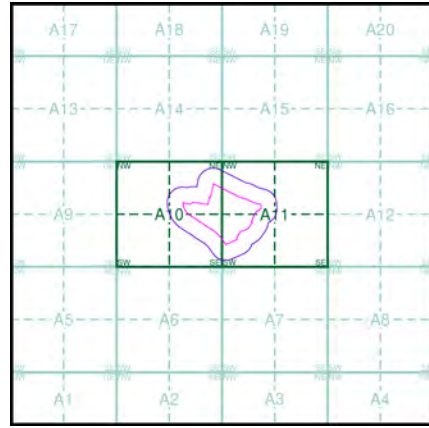
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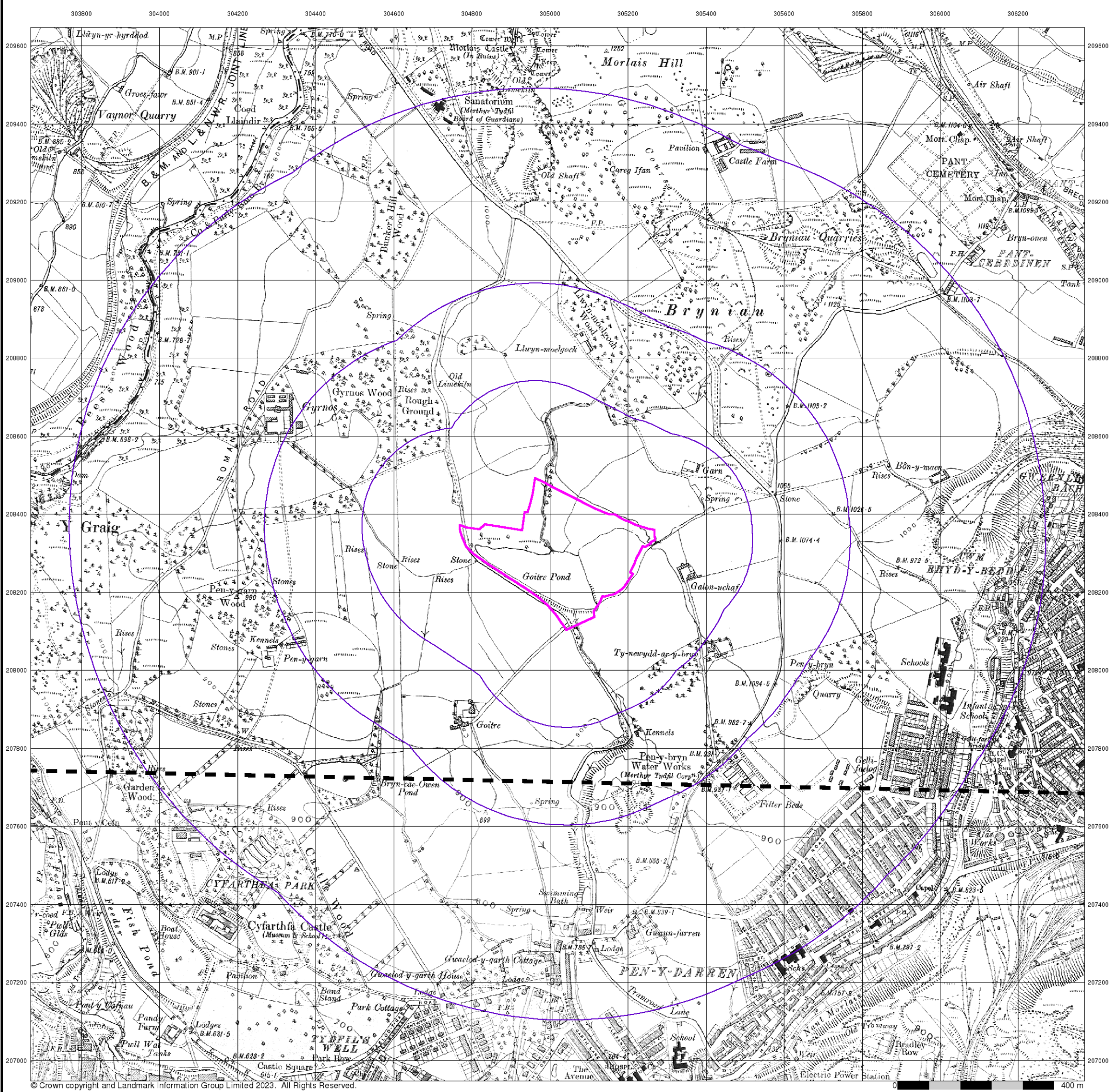
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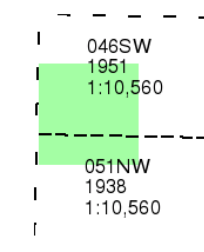
Brecknockshire

Published 1938 - 1951

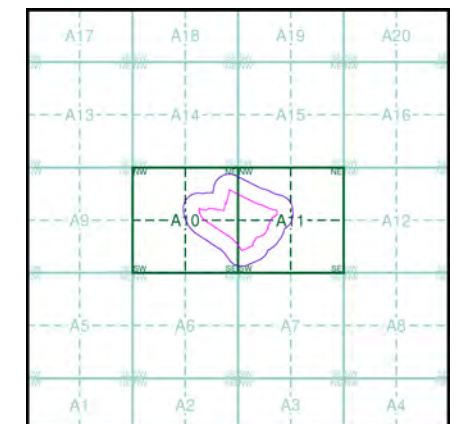
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Historical Aerial Photography

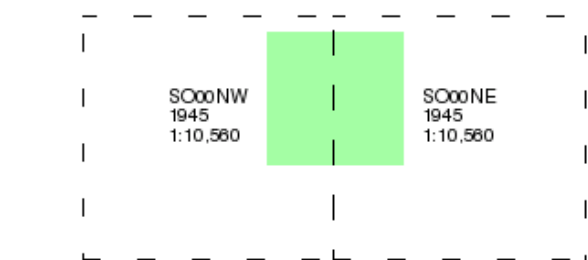
Published 1945

Source map scale - 1:10,560

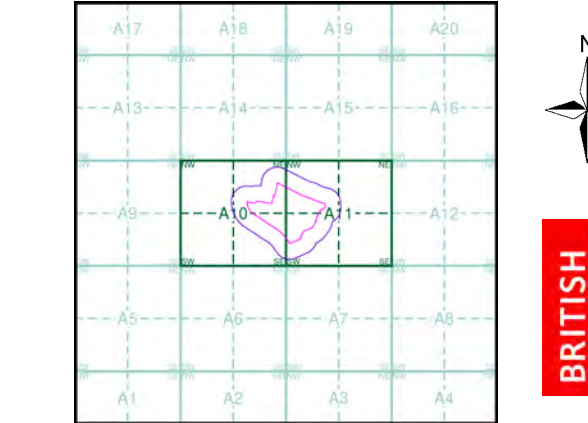
The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

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Map Name(s) and Date(s)



Historical Aerial Photography - Slice A



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
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Slice: A
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Site Details

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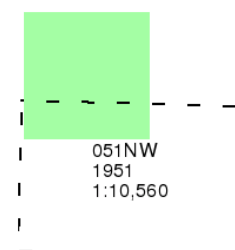


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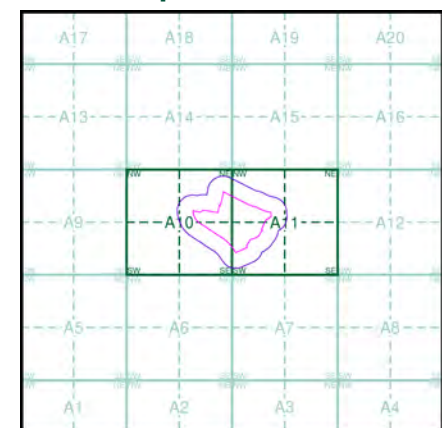


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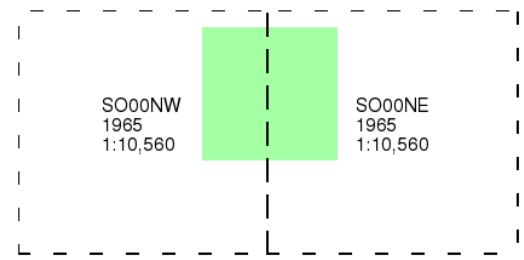
Ordnance Survey Plan

Published 1965

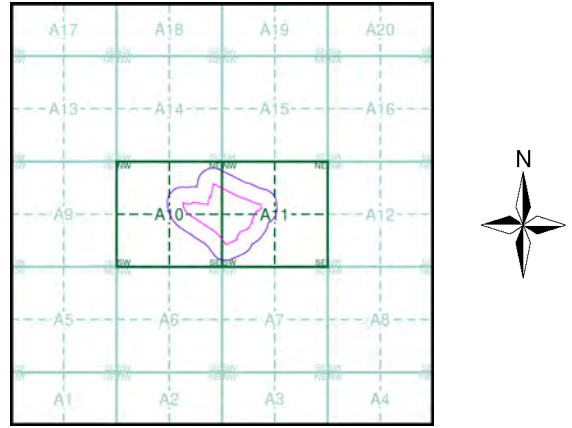
Source map scale - 1:10,000

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

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

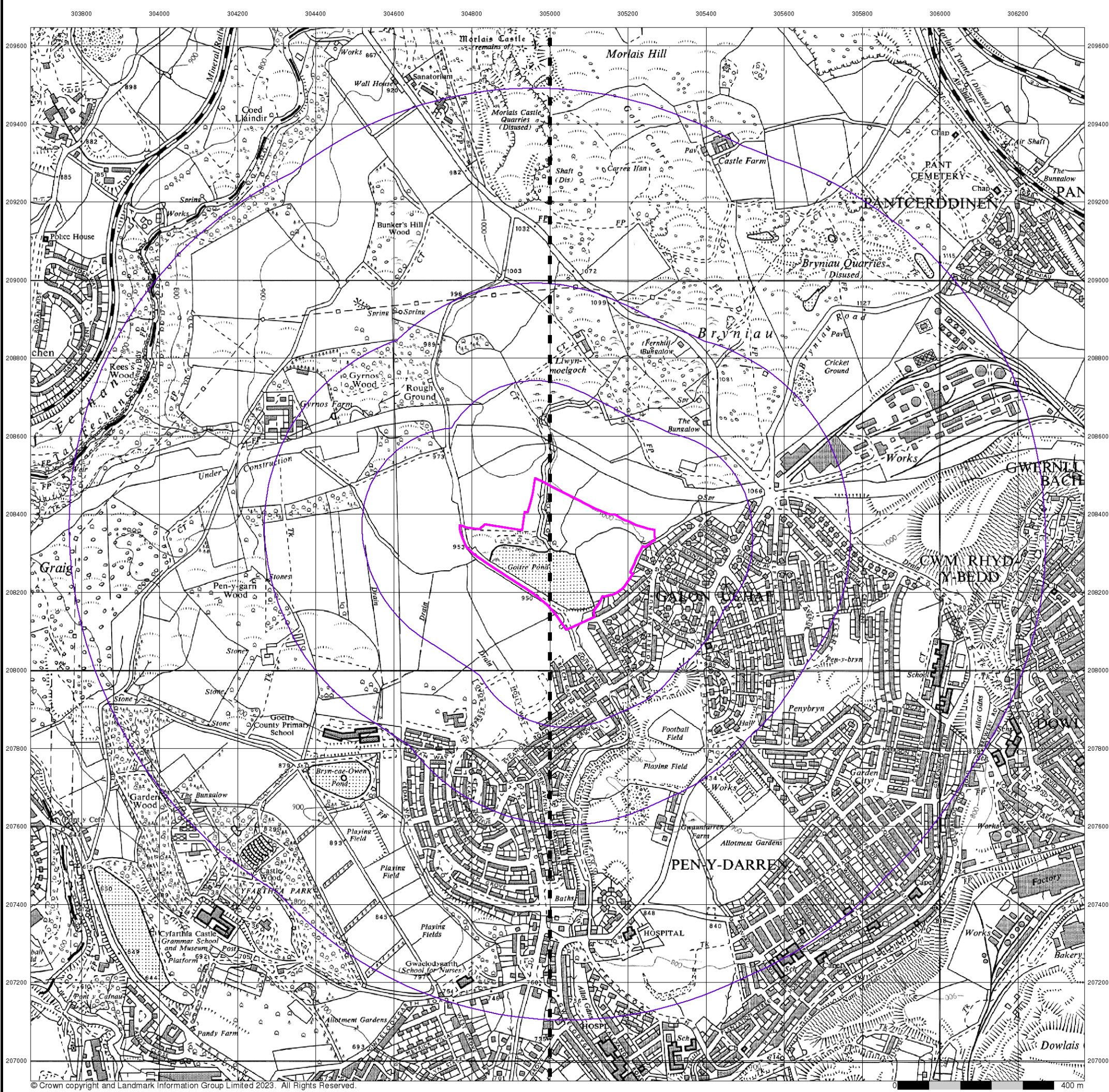
Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 1000

Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR TYDFIL, CF47 9BY



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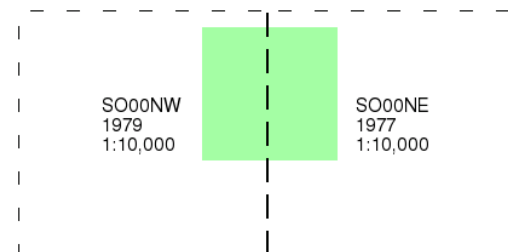
Ordnance Survey Plan

Published 1977 - 1979

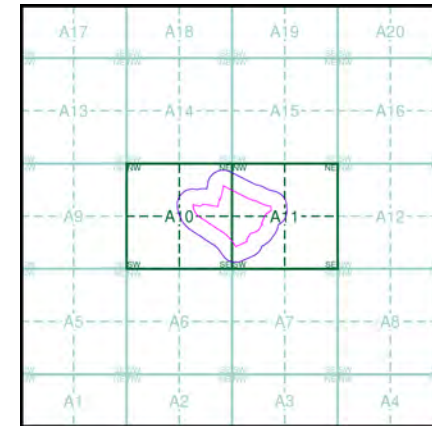
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Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 310553660_1_1
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National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 1000

Site Details

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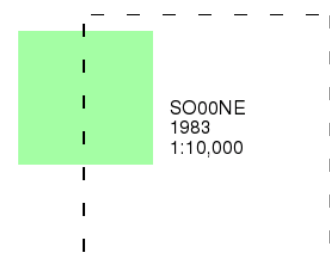


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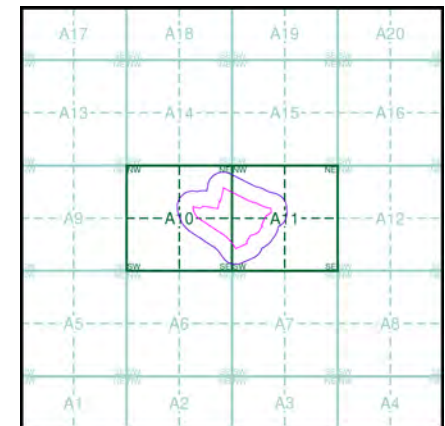


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Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 1000

Site Details

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INFORMATION GROUP

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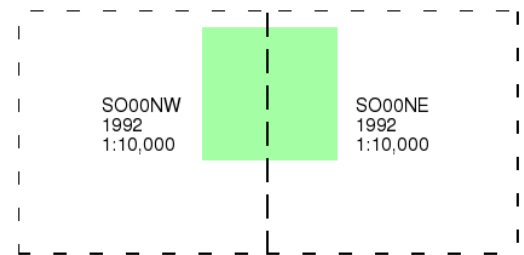
Ordnance Survey Plan

Published 1992

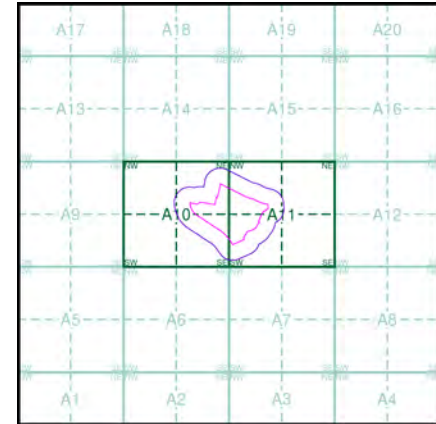
Source map scale - 1:10,000

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

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

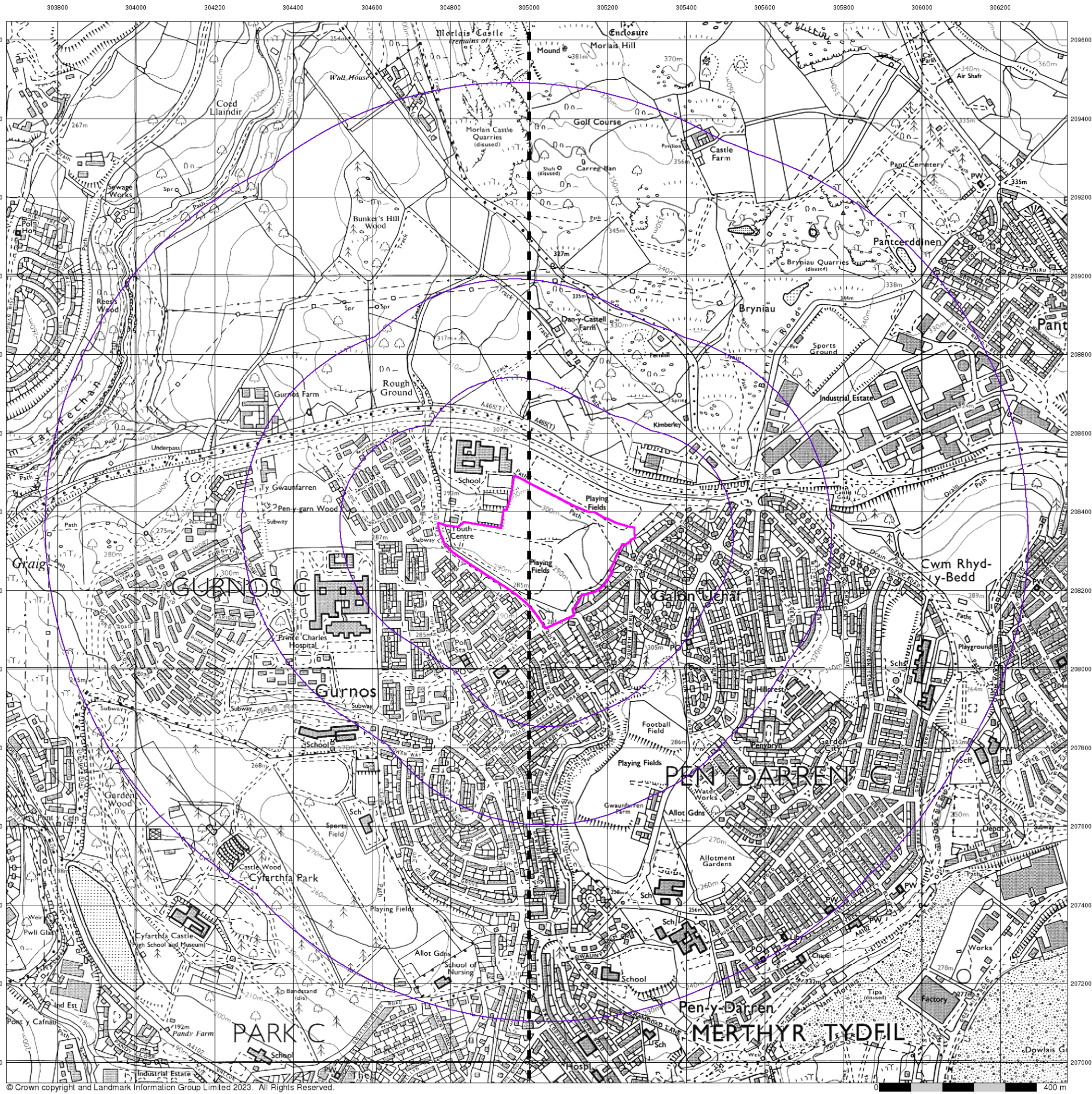
Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 1000

Site Details

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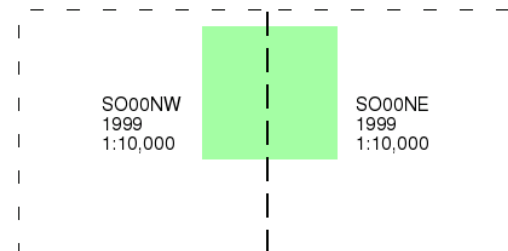
10k Raster Mapping

Published 1999

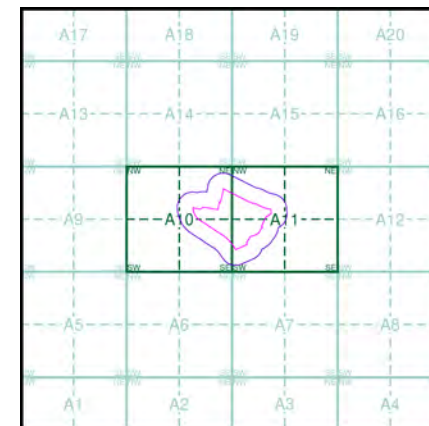
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey's 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 1000

Site Details

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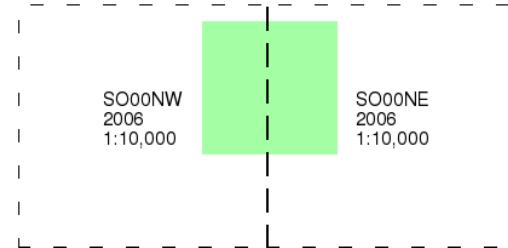
10k Raster Mapping

Published 2006

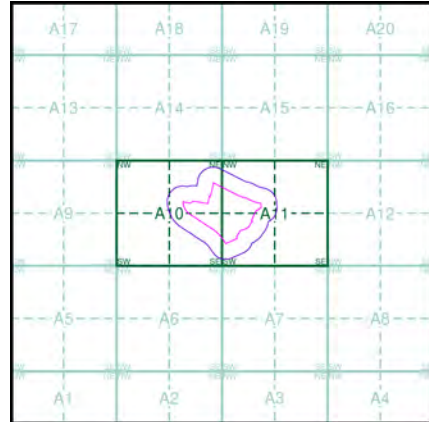
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey's 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

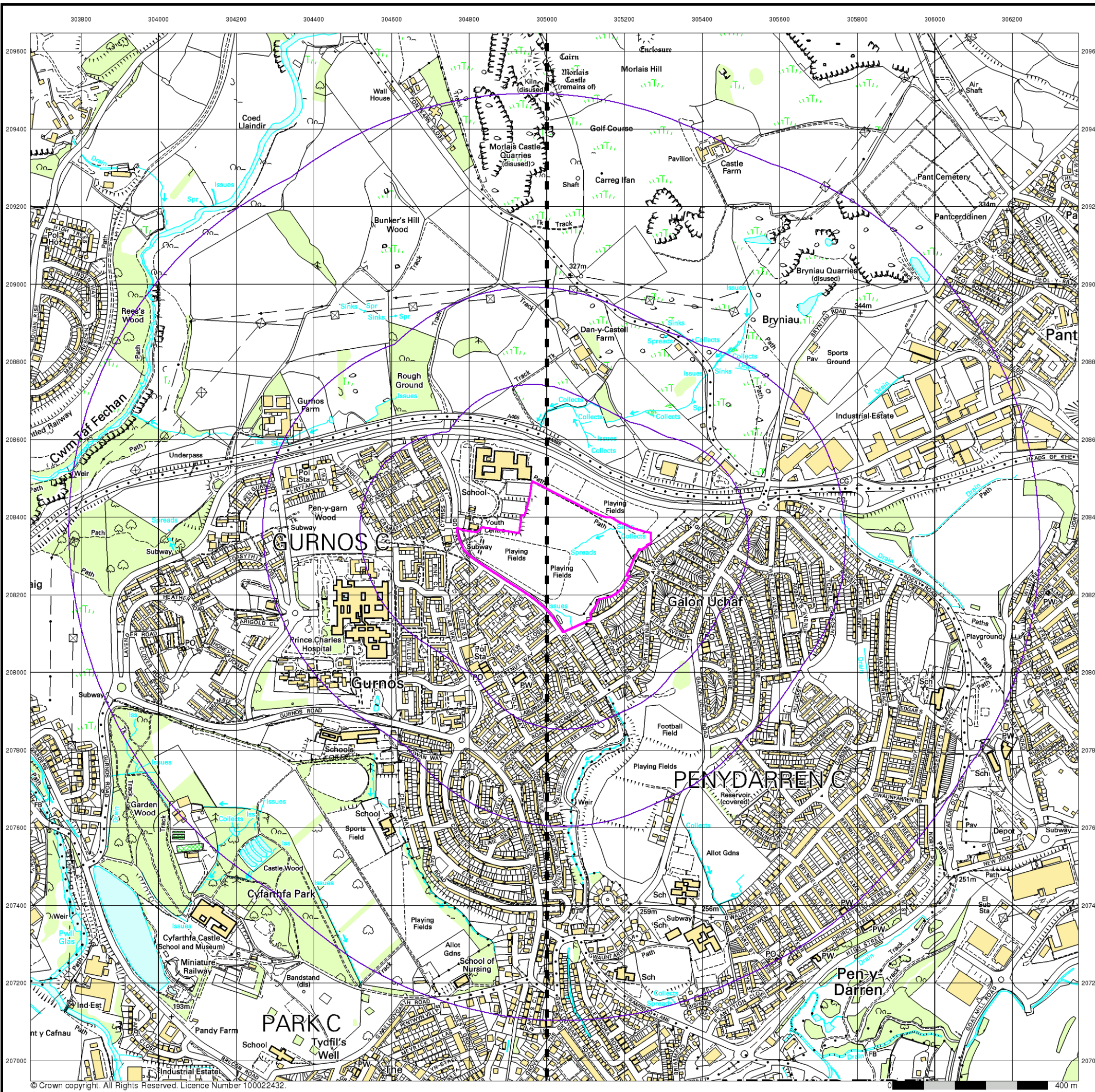
Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 1000

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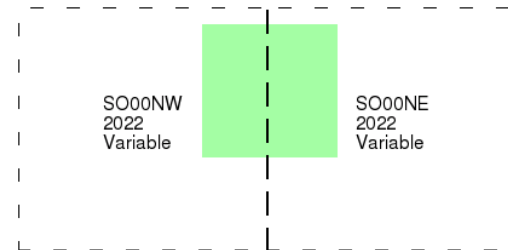
VectorMap Local

Published 2022

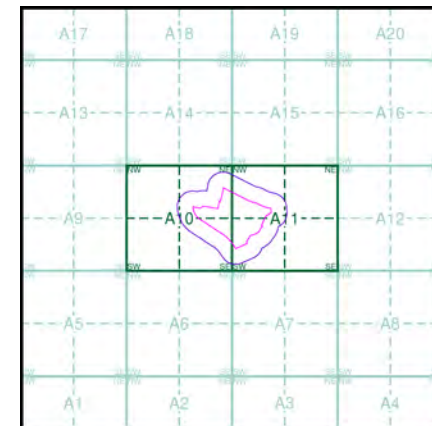
Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities), 1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

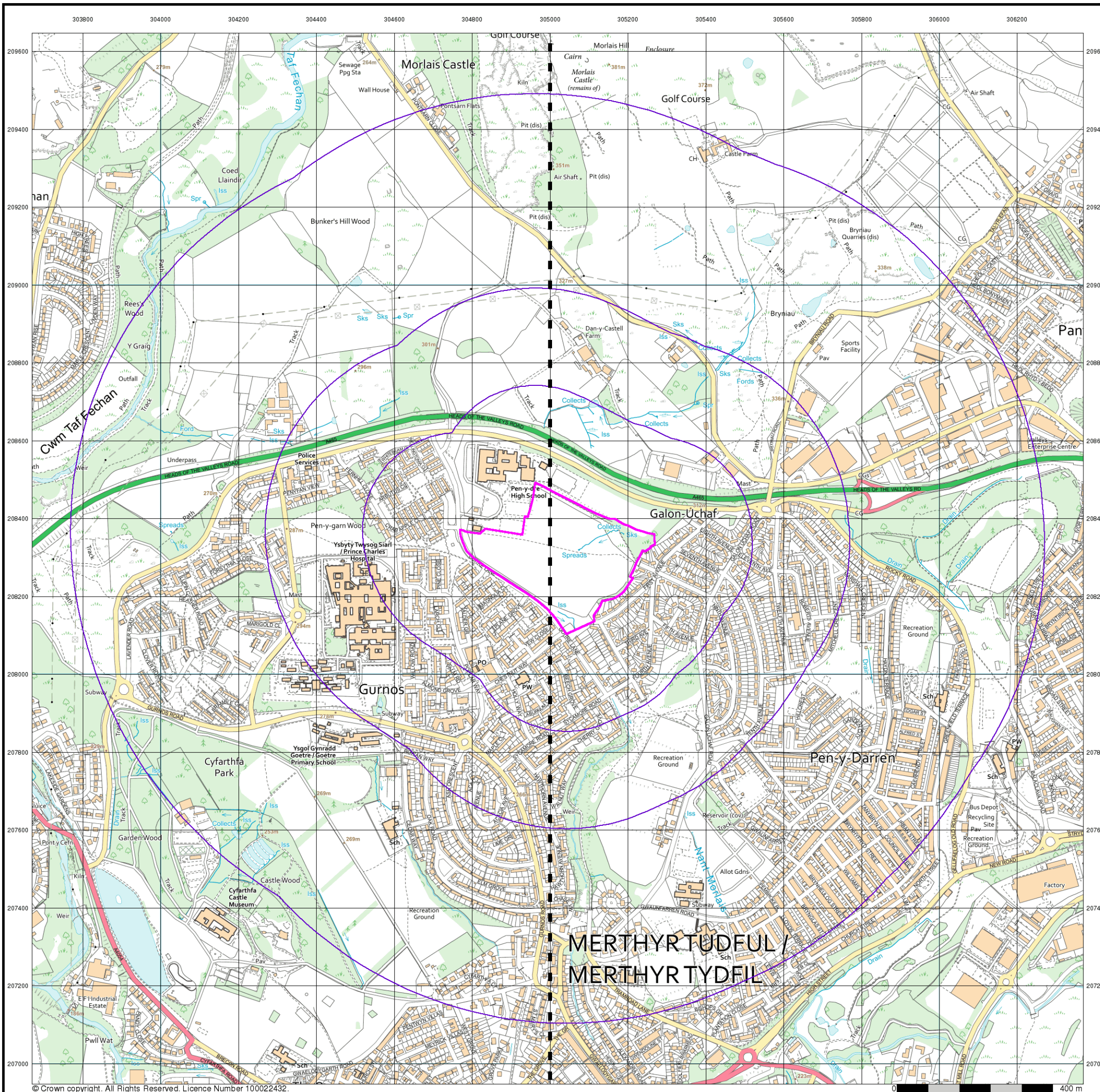
Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 1000

Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR TYDFIL, CF47 9BY

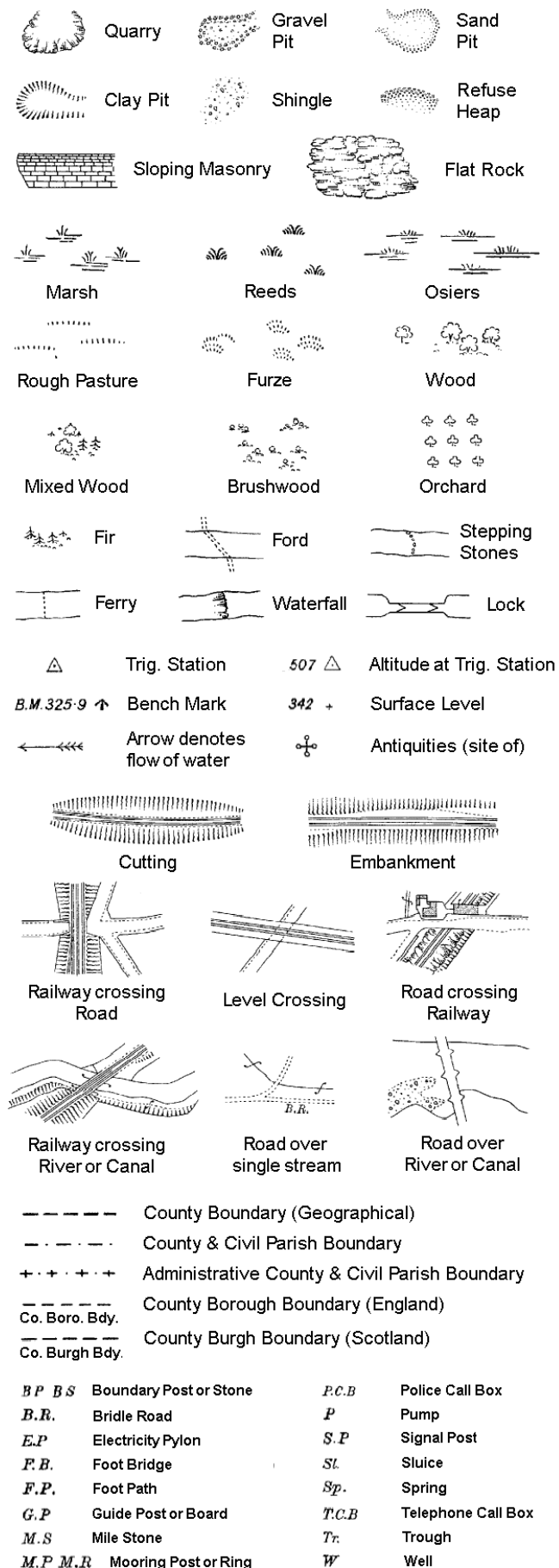


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Historical Mapping Legends

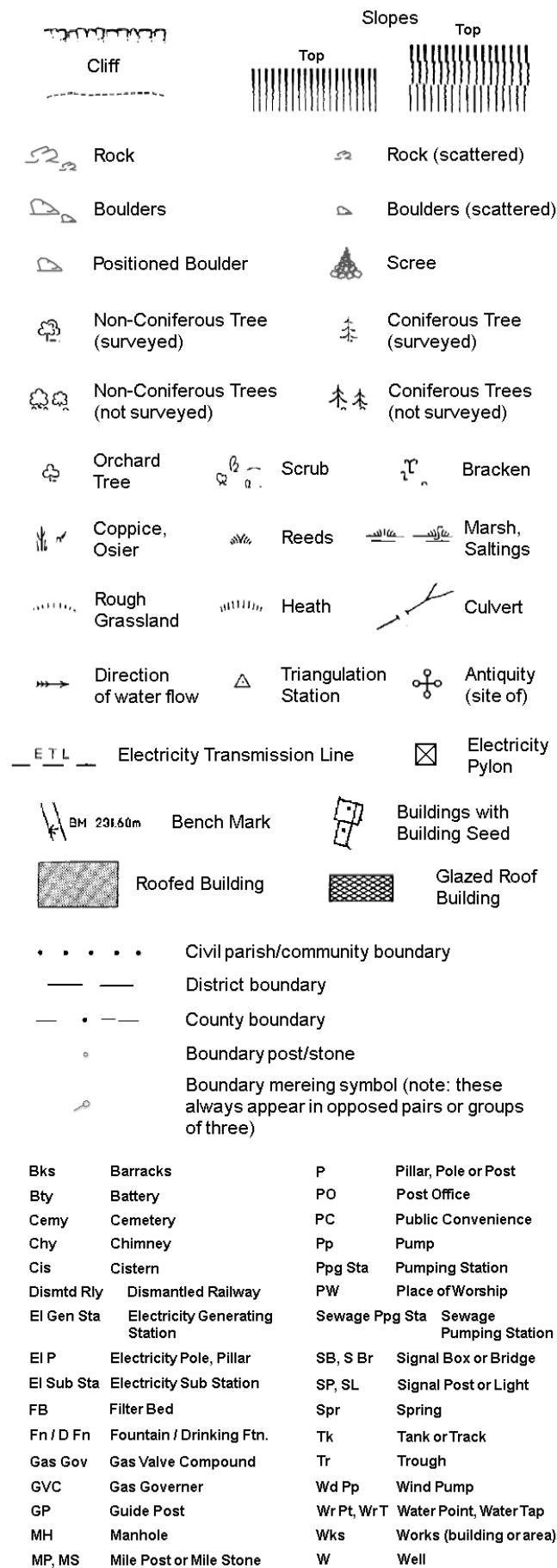
Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



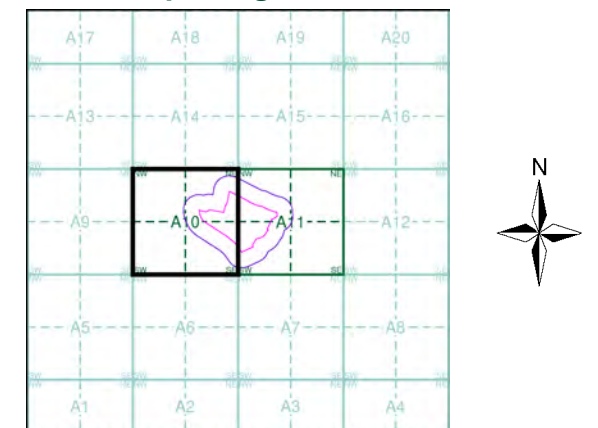
Large-Scale National Grid Data 1:2,500 and 1:1,250



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Glamorganshire	1:2,500	1875	2
Brecknockshire	1:2,500	1887	3
Glamorganshire	1:2,500	1900	4
Brecknockshire	1:2,500	1904	5
Brecknockshire	1:2,500	1919	6
Ordnance Survey Plan	1:1,250	1956 - 1974	7
Ordnance Survey Plan	1:2,500	1963 - 1964	8
Ordnance Survey Plan	1:1,250	1963 - 1989	9
Additional SIMs	1:1,250	1963 - 1988	10
Additional SIMs	1:2,500	1964	11
Supply of Unpublished Survey Information	1:1,250	1975	12
Additional SIMs	1:1,250	1981 - 1990	13
Ordnance Survey Plan	1:2,500	1986	14
Additional SIMs	1:1,250	1990	15
Large-Scale National Grid Data	1:1,250	1993	16
Large-Scale National Grid Data	1:1,250	1994 - 1995	17
Historical Aerial Photography	1:2,500	2001	18

Historical Map - Segment A10



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

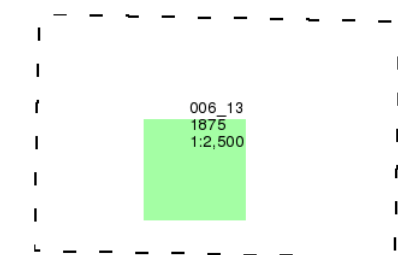
Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR
TYDFIL, CF47 9BY



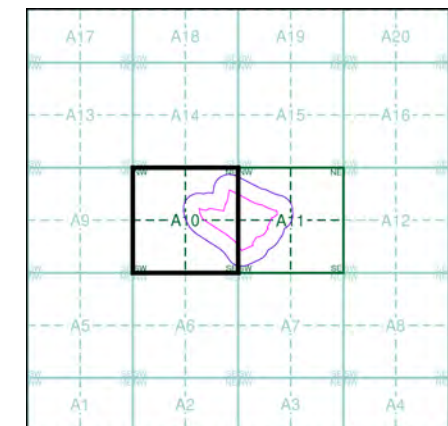
Tel: 0844 844 9952
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Web: www.envirocheck.co.uk

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Map Name(s) and Date(s)



Historical Map - Segment A10

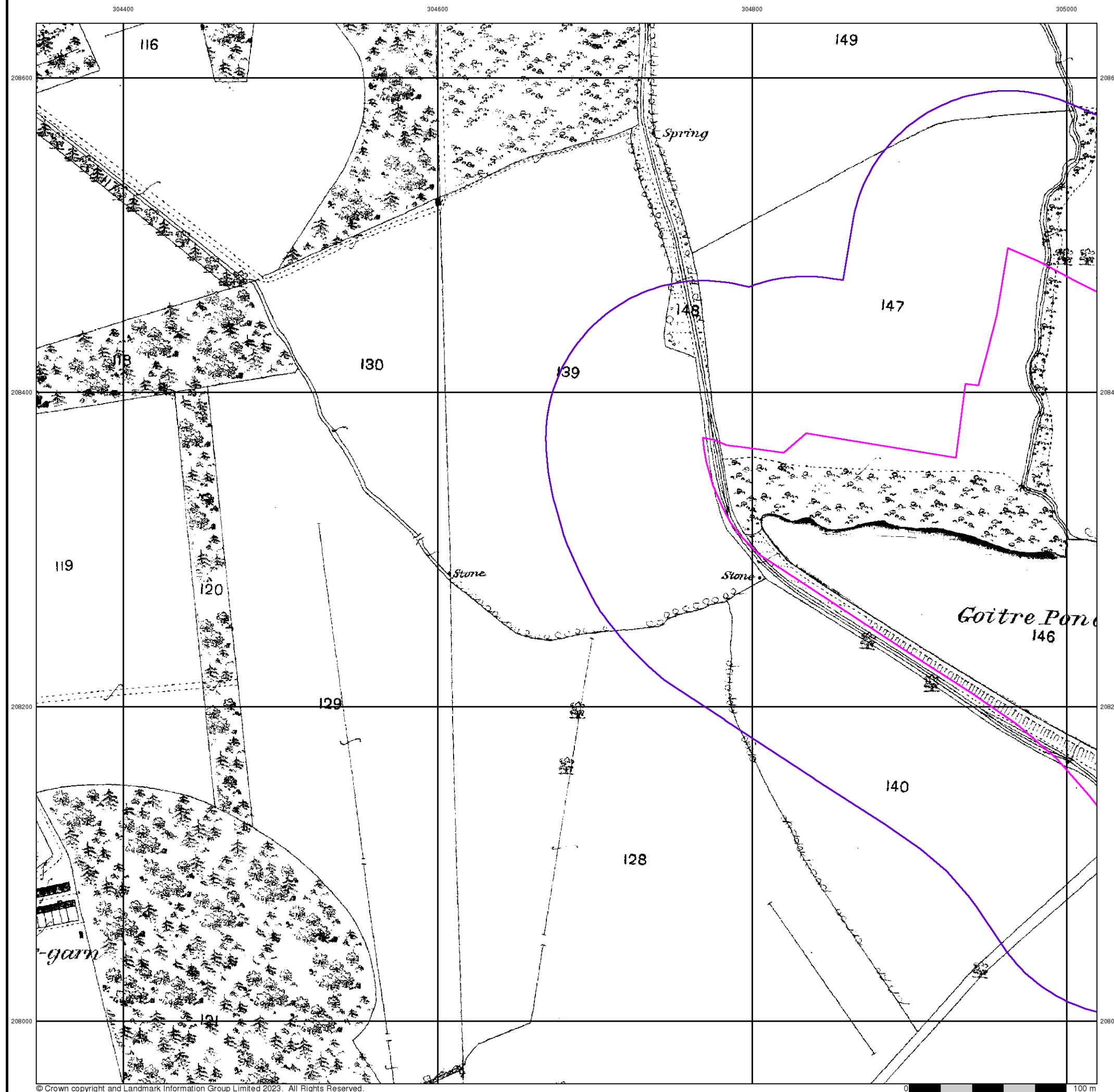


Order Details

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Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

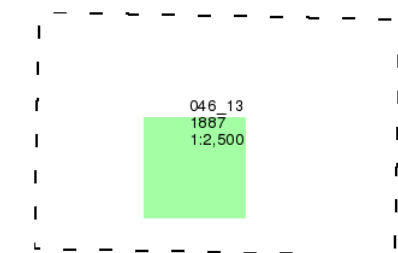
Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR TYDFIL, CF47 9BY

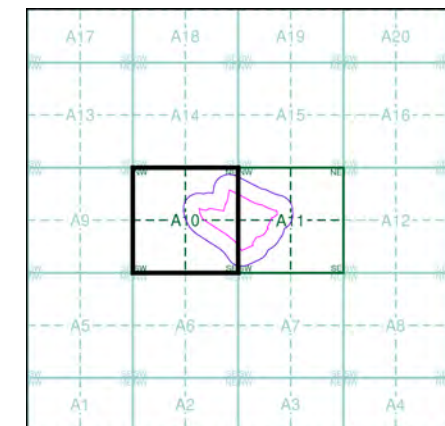


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Map Name(s) and Date(s)



Historical Map - Segment A10

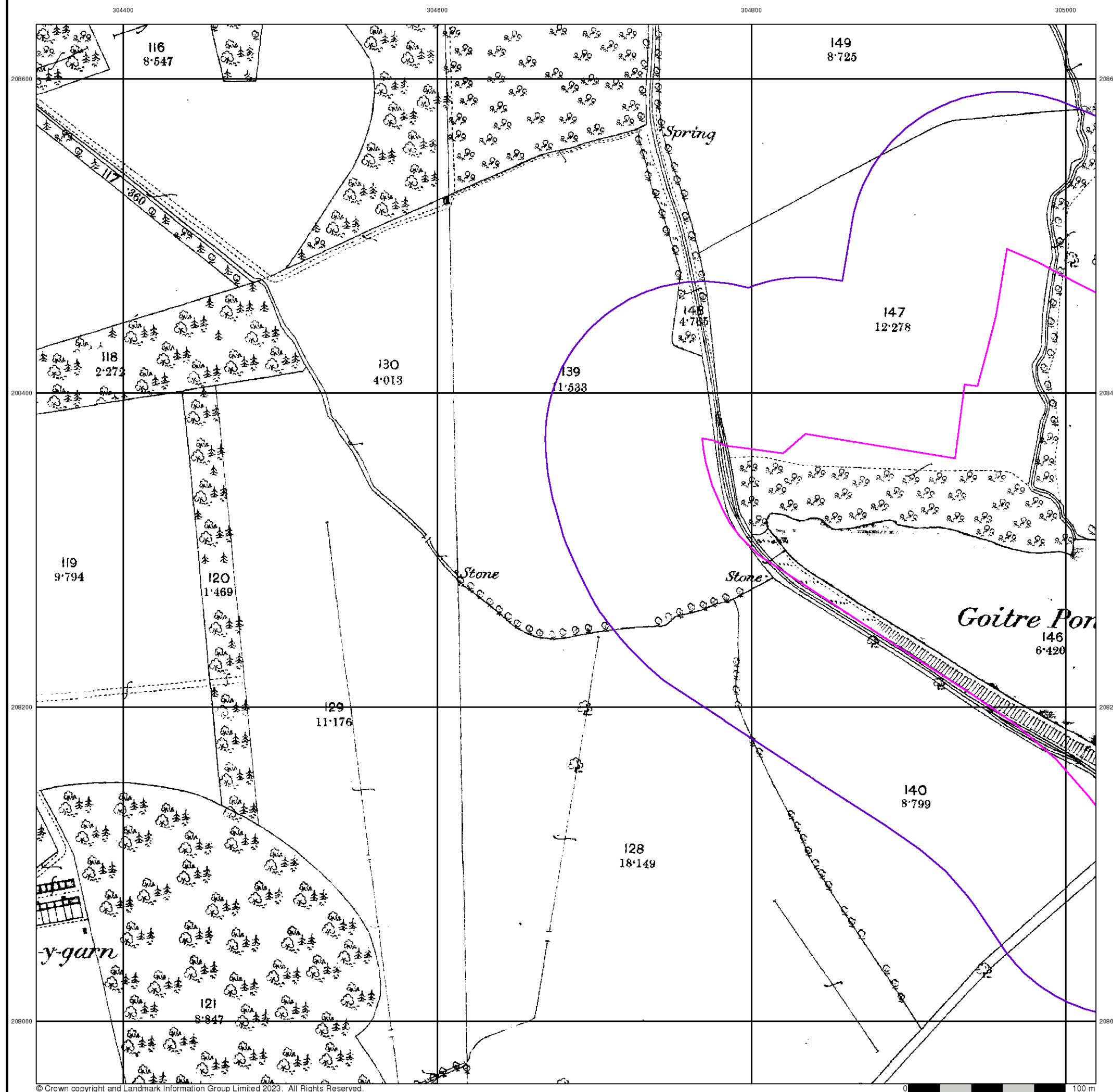


Order Details

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Customer Ref: 14209/LP
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Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

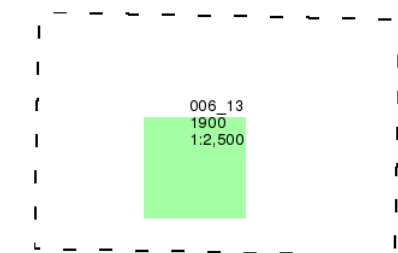
Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR TYDFIL, CF47 9BY

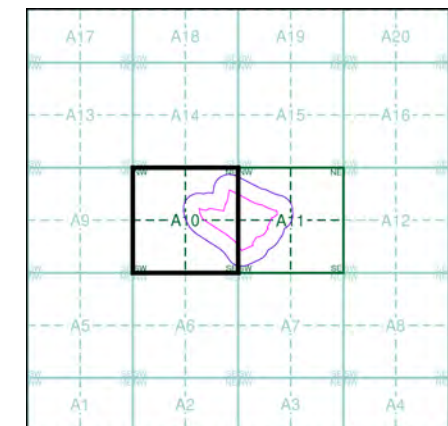


The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A10

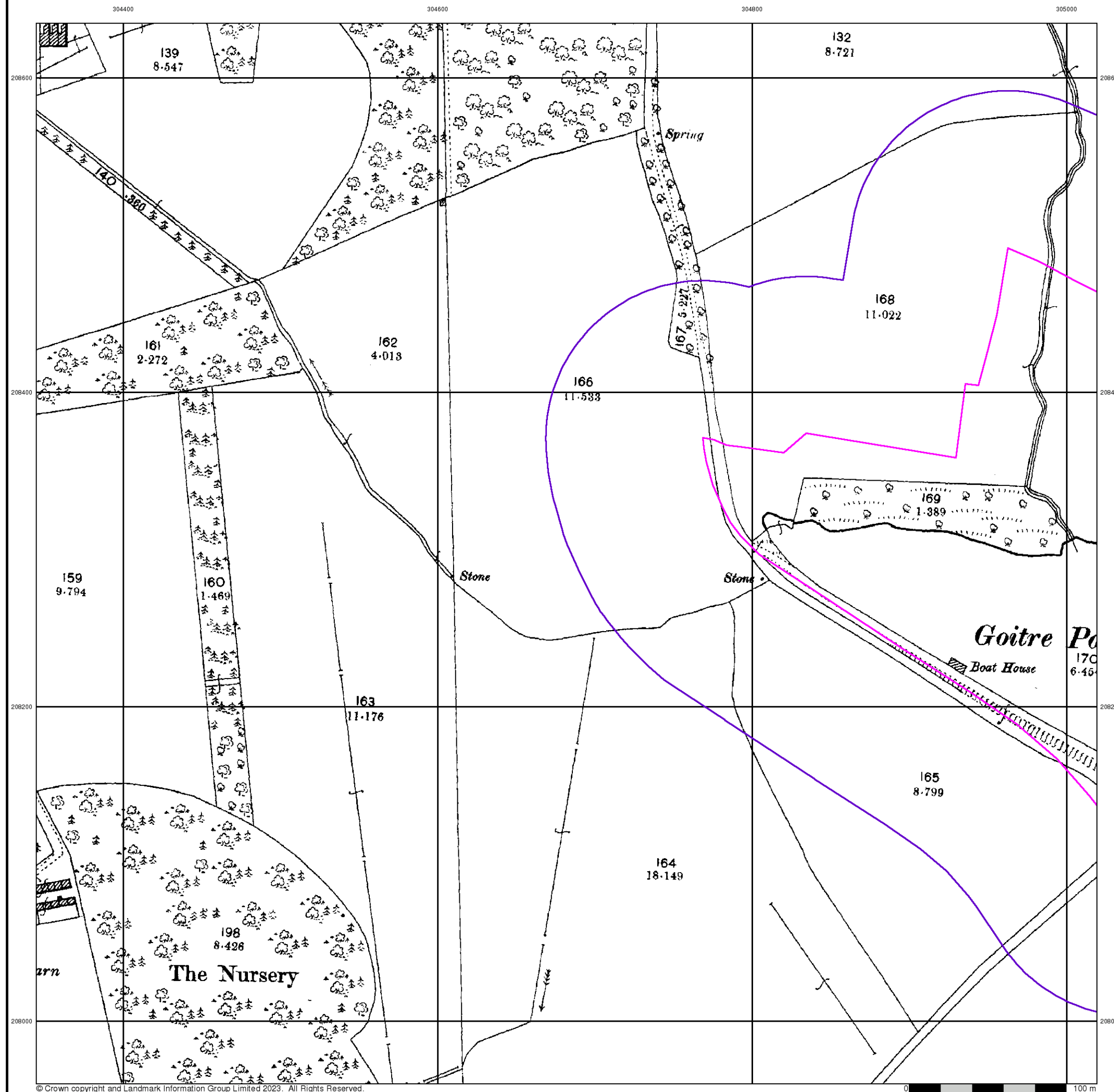


Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR TYDFIL, CF47 9BY





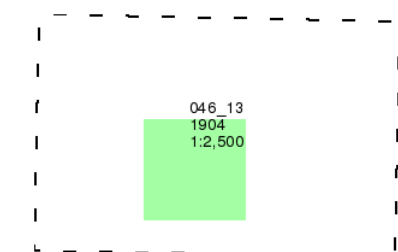
Brecknockshire

Published 1904

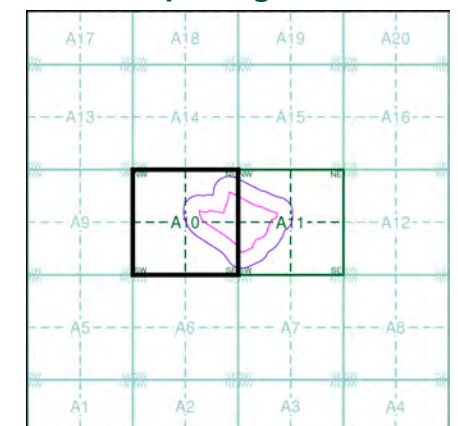
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A10



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

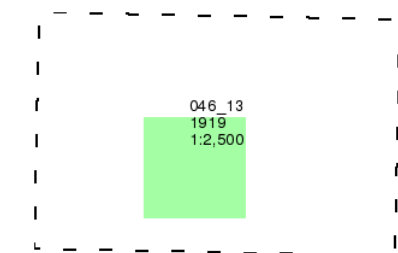
Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR
TYDFIL, CF47 9BY

Landmark
INFORMATION GROUP

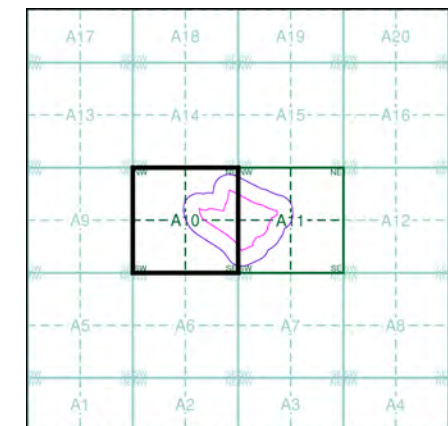
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Web: www.envirocheck.co.uk

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Map Name(s) and Date(s)



Historical Map - Segment A10

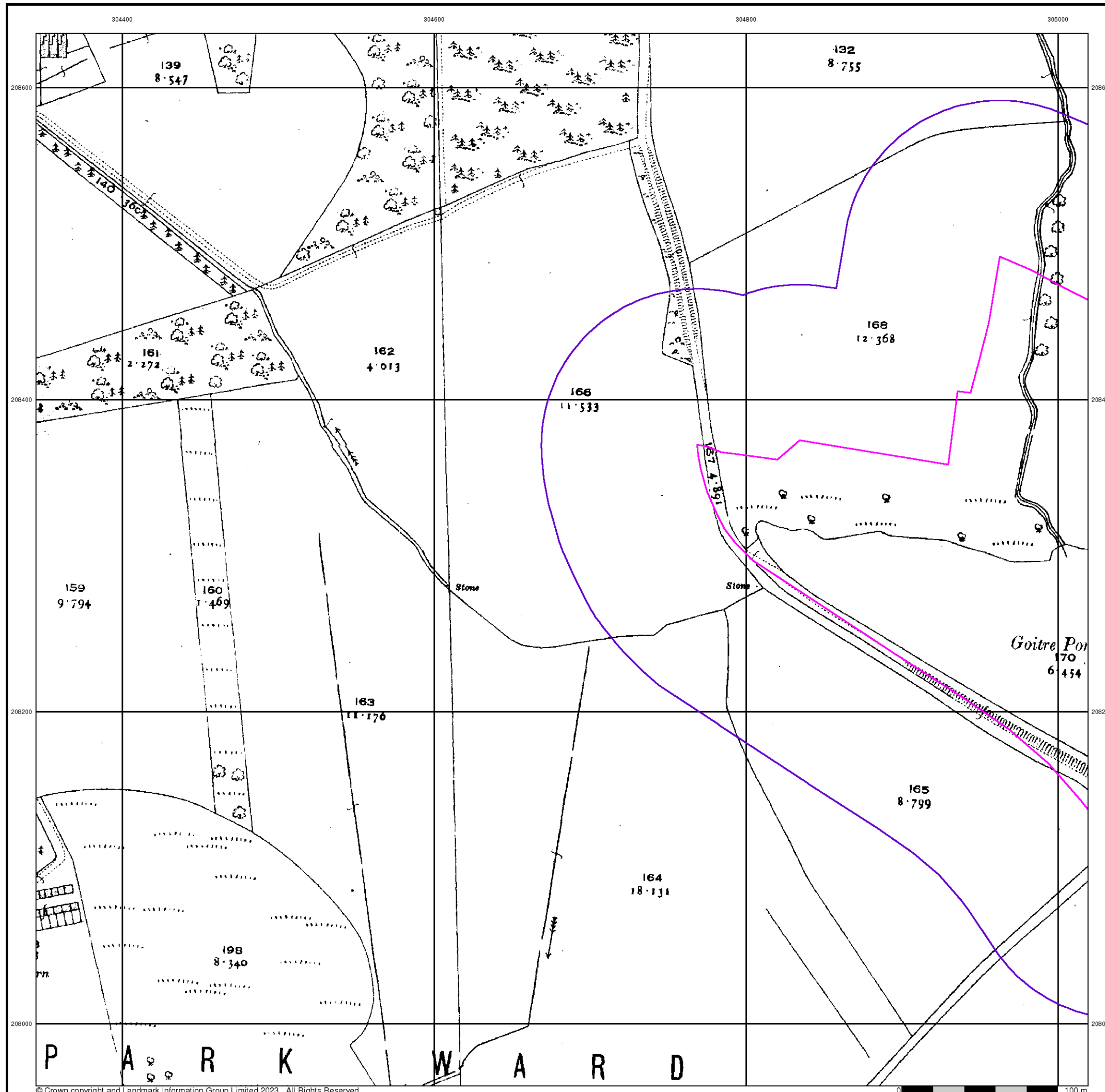


Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

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Ordnance Survey Plan

Published 1956 - 1974

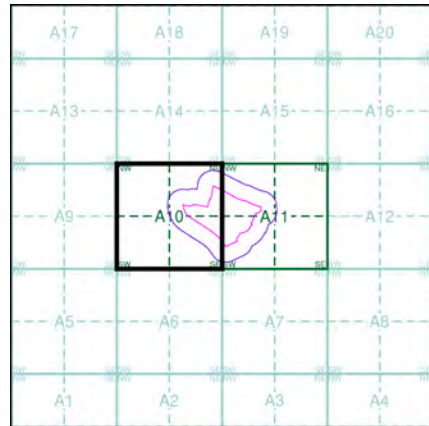
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SO0408SW 1974 1:1,250	SO0408SE 1970 1:1,250	SO0508SW 1956 1:1,250
SO0407NW 1963 1:1,250	SO0407NE 1963 1:1,250	SO0507NW 1957 1:1,250

Historical Map - Segment A10



Order Details

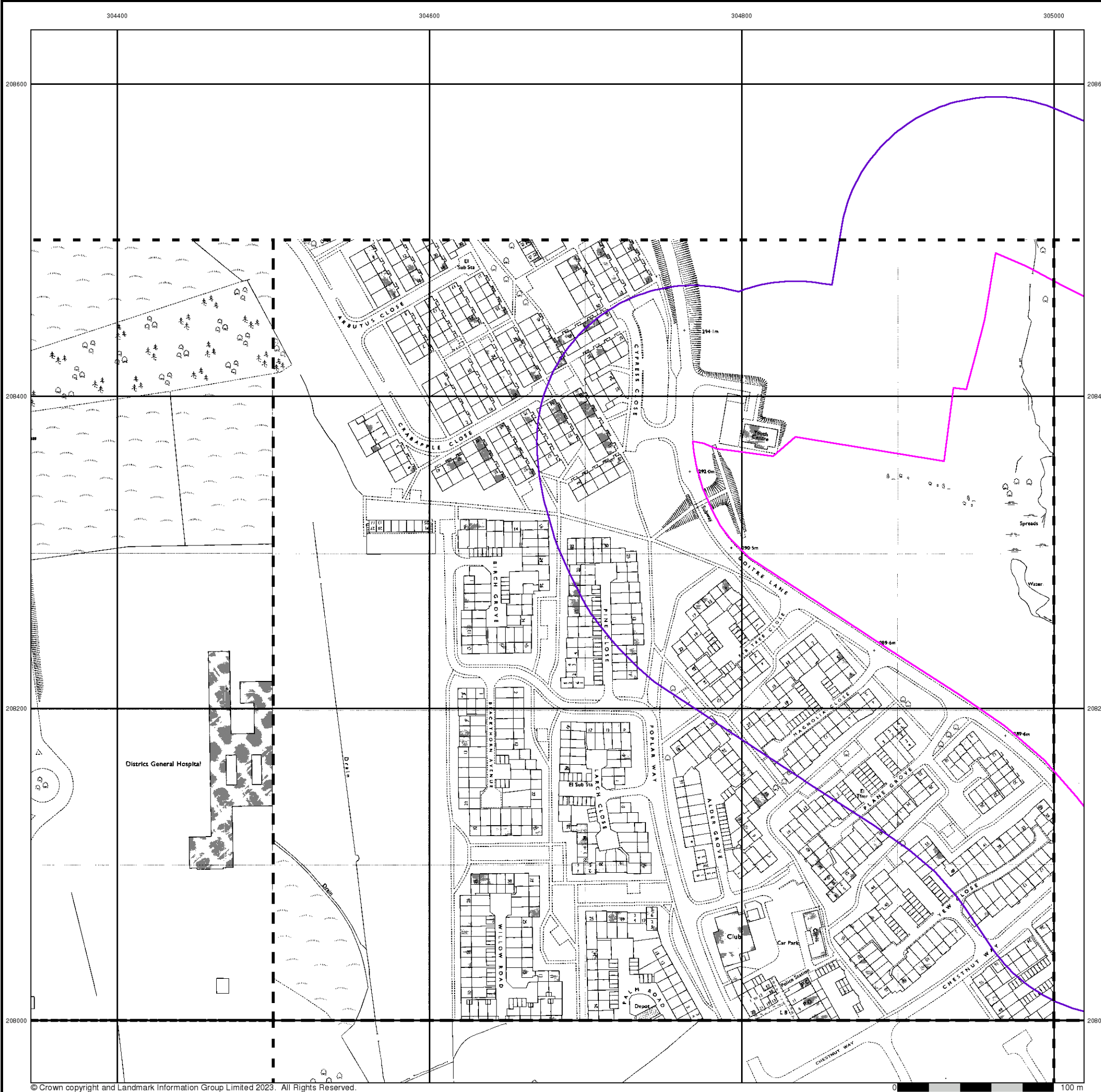
Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

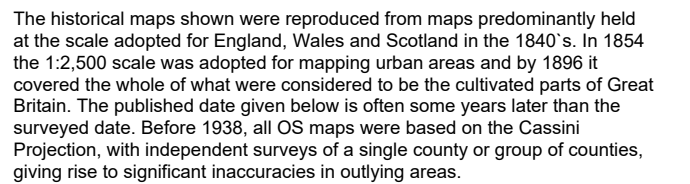
Site Details

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SO0408 1964 12,500	SO0508 1964 12,500
SO0407 1963 12,500	SO0507 1963 12,500



Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
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Ordnance Survey Plan

Published 1963 - 1989

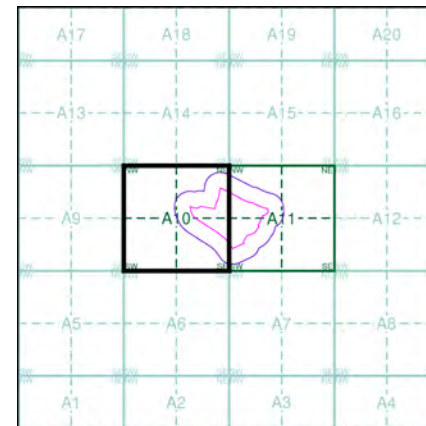
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SO0408SW 1989 1:1,250		SO0508SW 1970 1:1,250
SO0407NW 1973 1:1,250	SO0407NE 1970 1:1,250	SO0507NW 1963 1:1,250

Historical Map - Segment A10



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

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Additional SIMs

Published 1963 - 1988

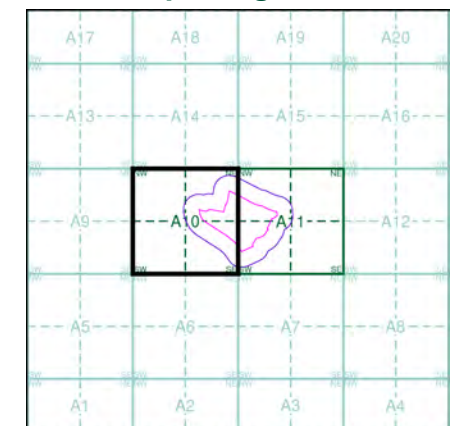
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SO0408SW 1977 1:1,250	SO0408SE 1977 1:1,250	SO0508SW 1988 1:1,250
SO0407NW 1984 1:1,250	SO0407NE 1986 1:1,250	SO0507NW 1983 1:1,250

Historical Map - Segment A10



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR
TYDFIL, CF47 9BY

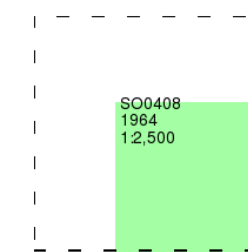
Additional SIMs

Published 1964

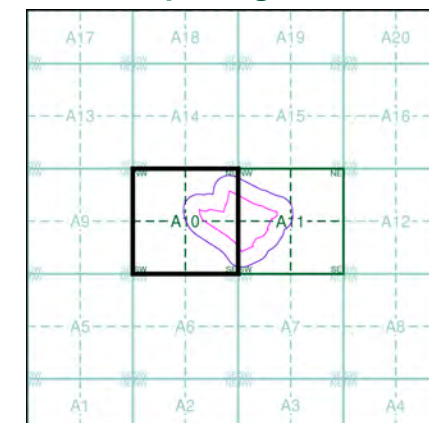
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A10

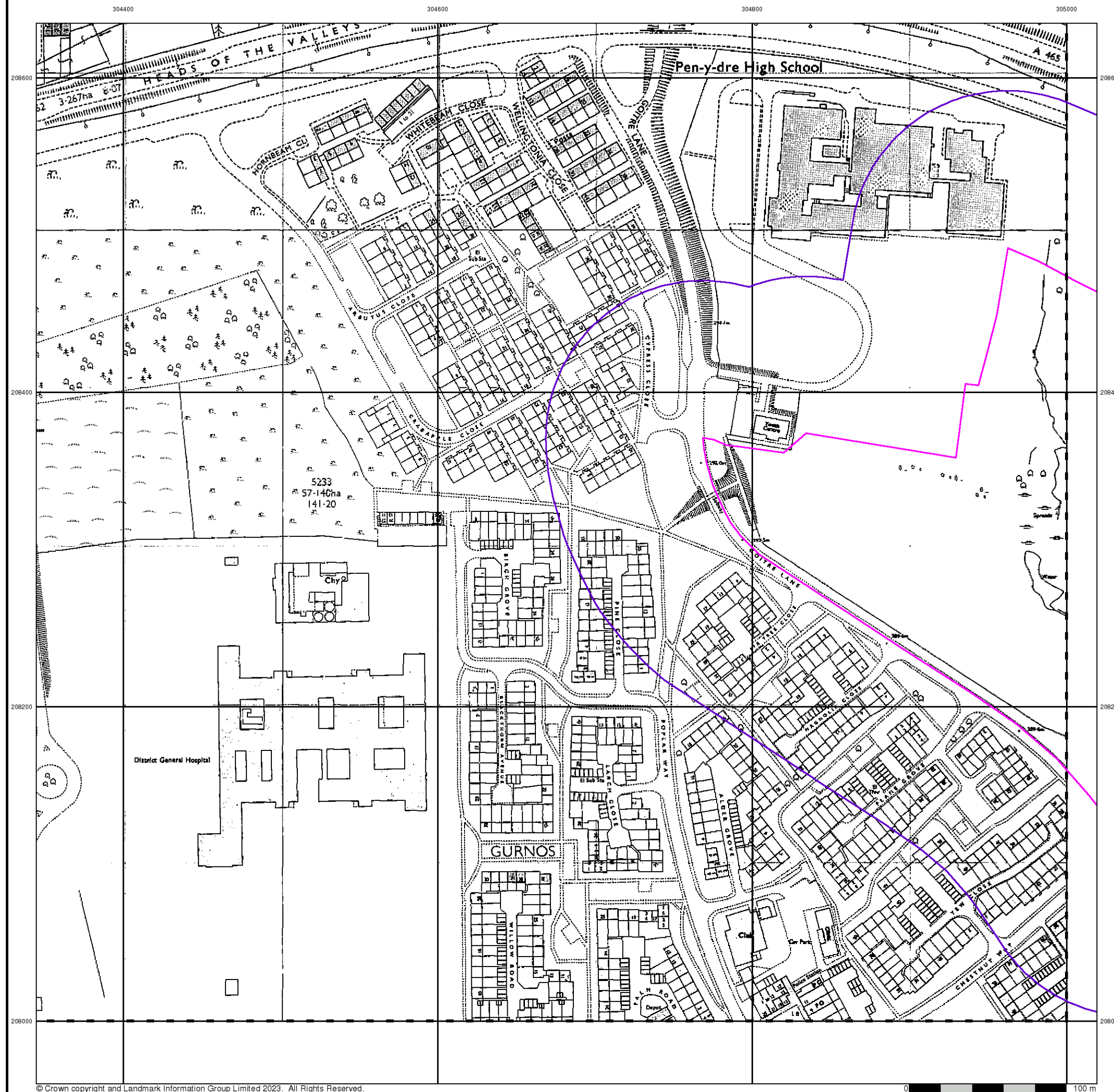


Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR
TYDFIL, CF47 9BY





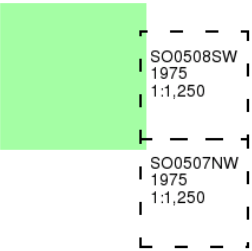
Supply of Unpublished Survey Information

Published 1975

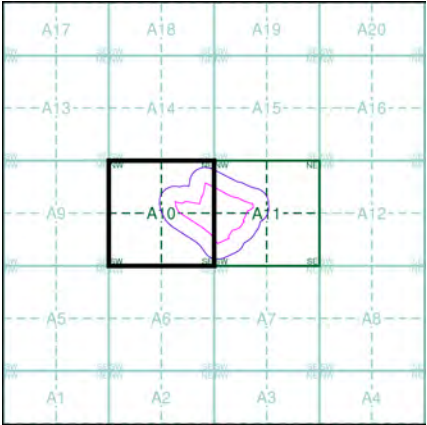
Source map scale - 1:1,250

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A10



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

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Web: www.envirocheck.co.uk

Additional SIMs

Published 1981 - 1990

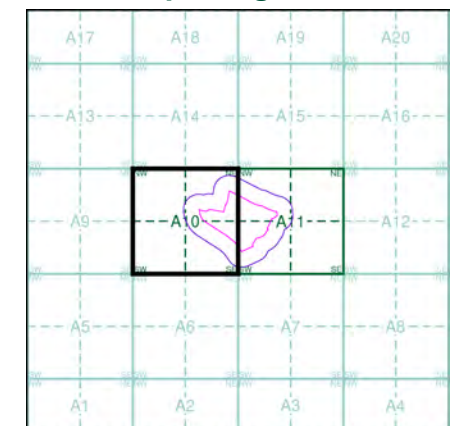
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SO0408SW 1981 1:1,250	SO0408SE 1984 1:1,250	SO0508SW 1988 1:1,250
SO0407NW 1990 1:1,250	SO0407NE 1990 1:1,250	

Historical Map - Segment A10



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR
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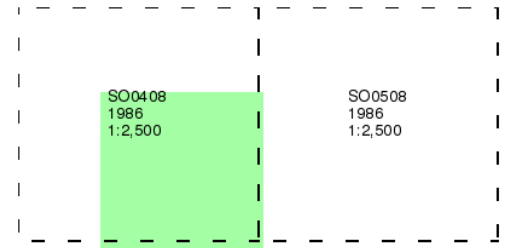
Ordnance Survey Plan

Published 1986

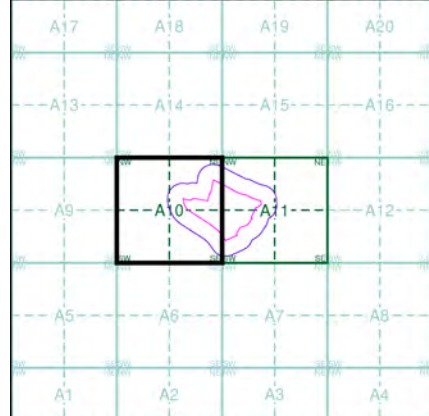
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A10



Order Details

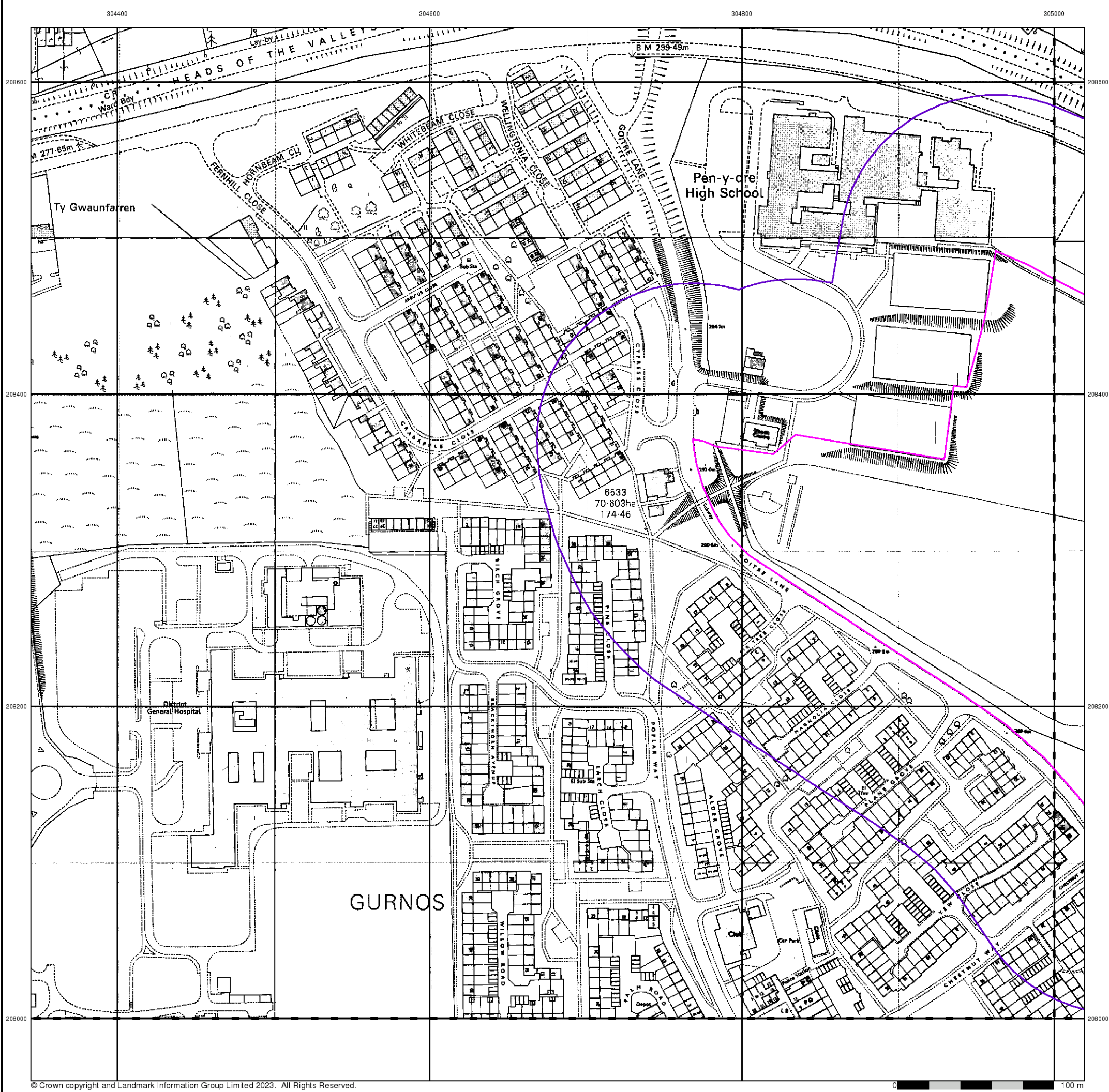
Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

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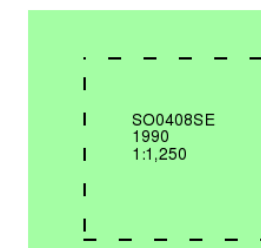
Additional SIMs

Published 1990

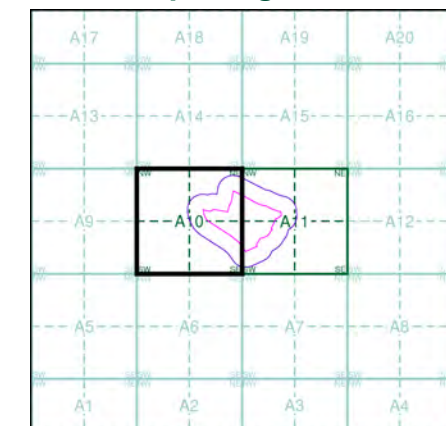
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)
1. <i>Map of the Eastern United States, showing the distribution of the Eastern Bluebird in the early 1900s.</i> 2. <i>Map of the Western United States, showing the distribution of the Western Bluebird in the early 1900s.</i>



Historical Map - Segment A10



Order Details

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Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

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Landmark
INFORMATION GROUP

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Large-Scale National Grid Data

Published 1993

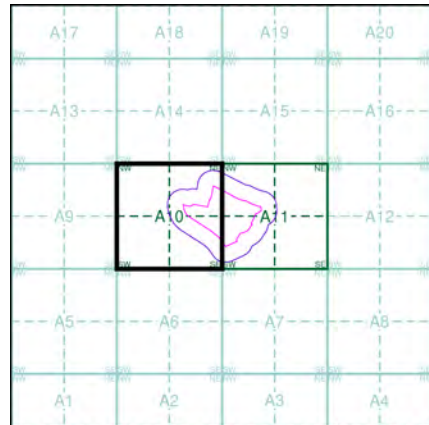
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

500408NW	500408NE	500508NW
1993	1993	1993
1:1,250	1:1,250	1:1,250
500408SW	500408SE	500508SW
1993	1993	1993
1:1,250	1:1,250	1:1,250
500407NW	500407NE	500507NW
1993	1993	1993
1:1,250	1:1,250	1:1,250

Historical Map - Segment A10



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

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Large-Scale National Grid Data

Published 1994 - 1995

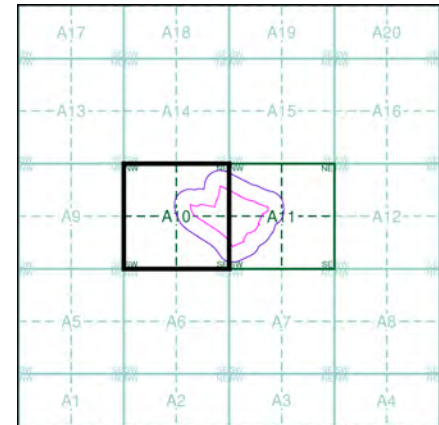
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SO0408NW 1995 1:1,250	SO0508NW 1994 1:1,250
SO0408SW 1995 1:1,250	

Historical Map - Segment A10



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

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Web: www.envirocheck.co.uk

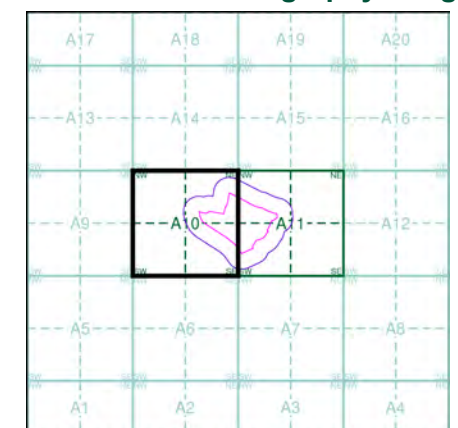


Historical Aerial Photography

Published 2001

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

Historical Aerial Photography - Segment A10



Order Details

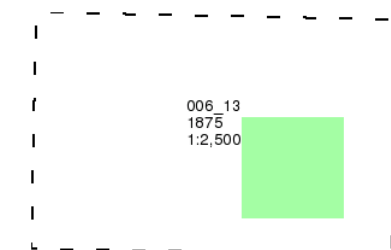
Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

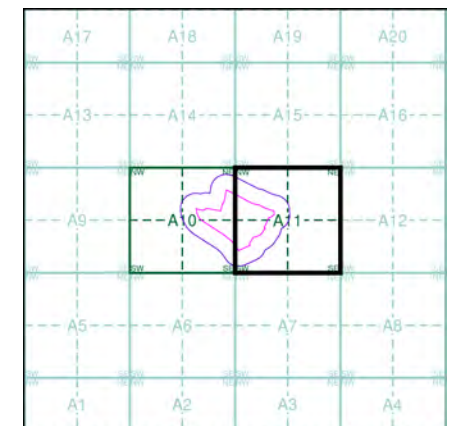
Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR
TYDFIL, CF47 9BY

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A11

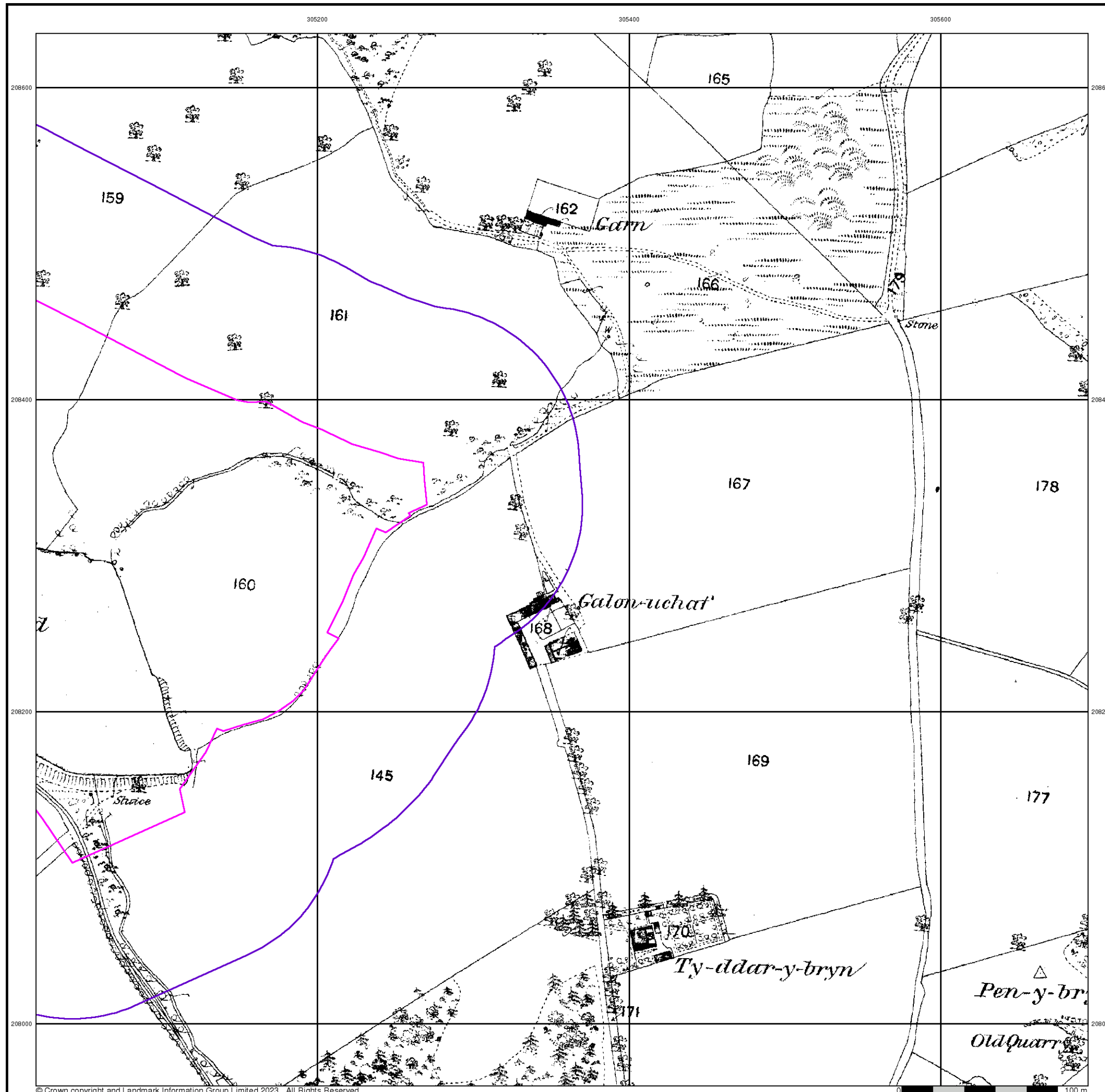


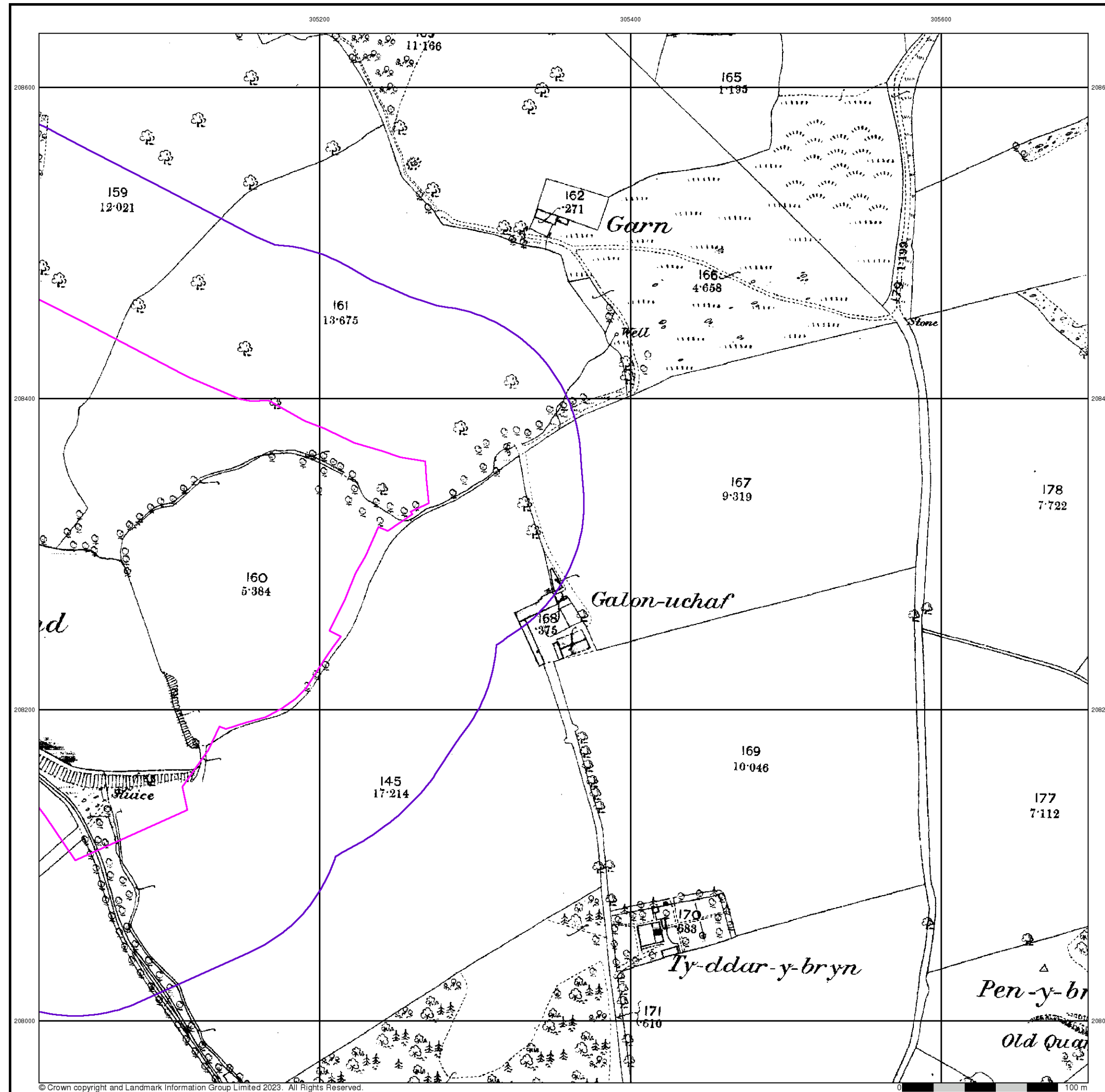
Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR TYDFIL, CF47 9BY





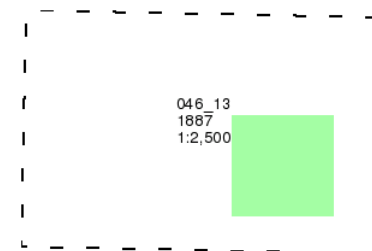
Brecknockshire

Published 1887

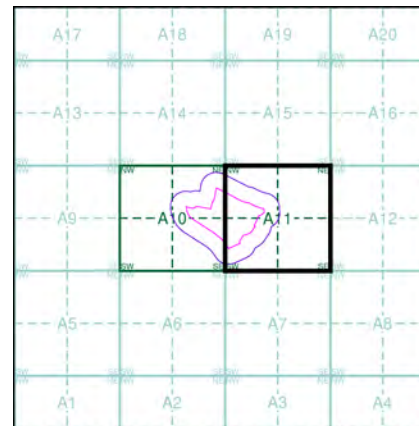
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A11



Order Details

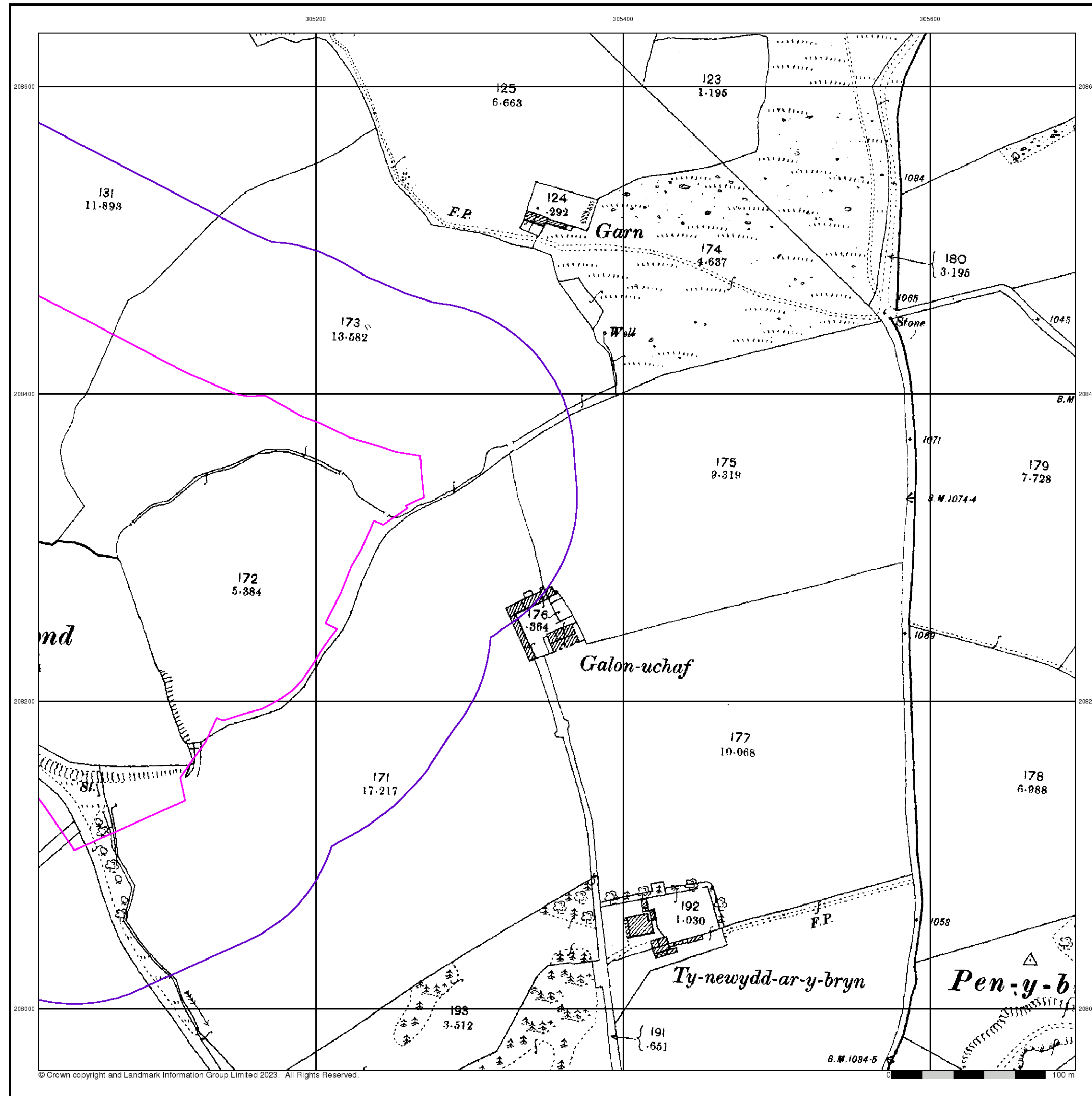
Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

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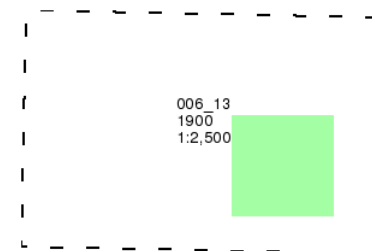
Glamorganshire

Published 1900

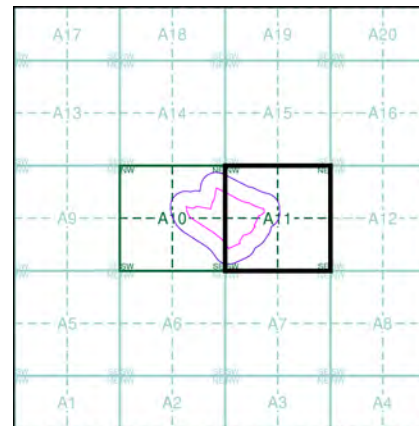
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A11



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

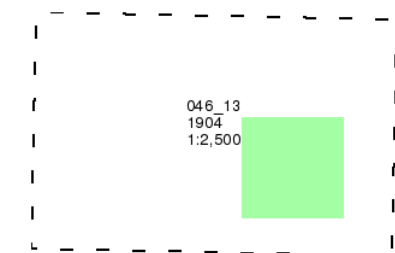
Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR TYDFIL, CF47 9BY



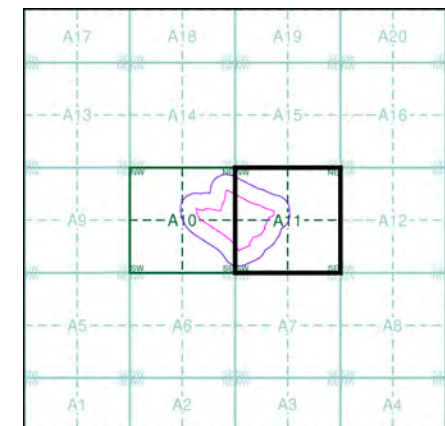
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Web: www.envirocheck.co.uk

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A11

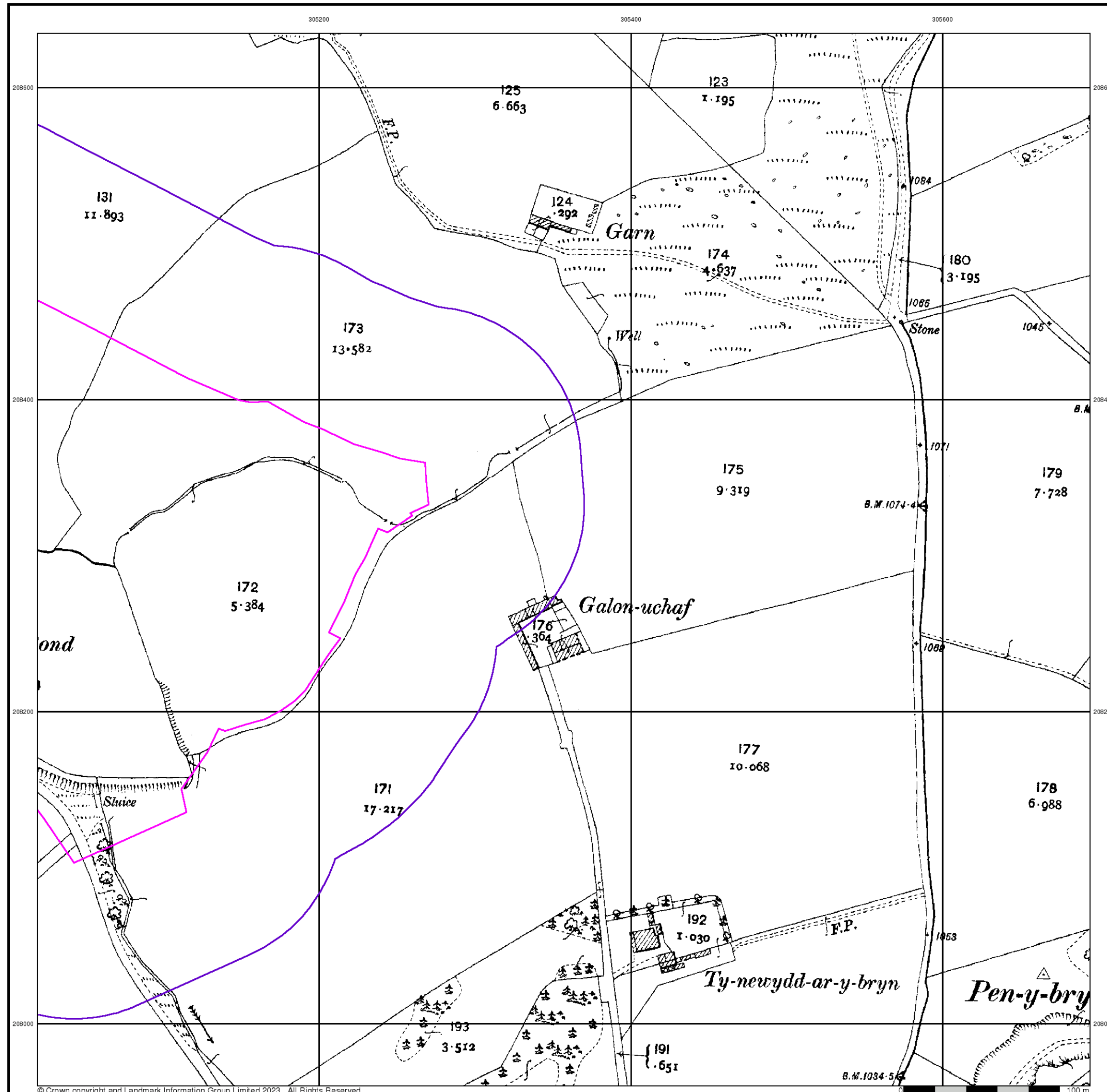


Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

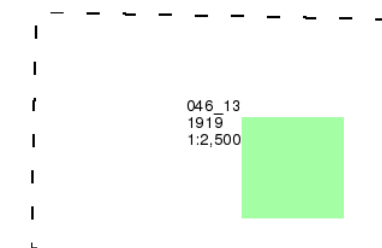
Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR TYDFIL, CF47 9BY

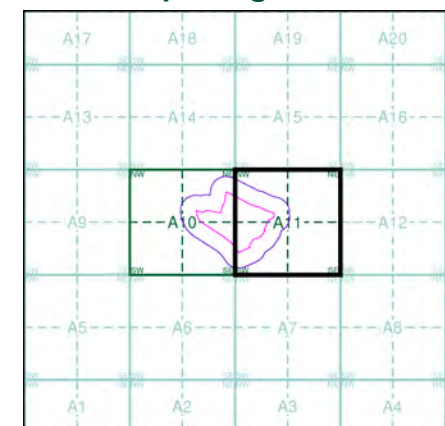


The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A11

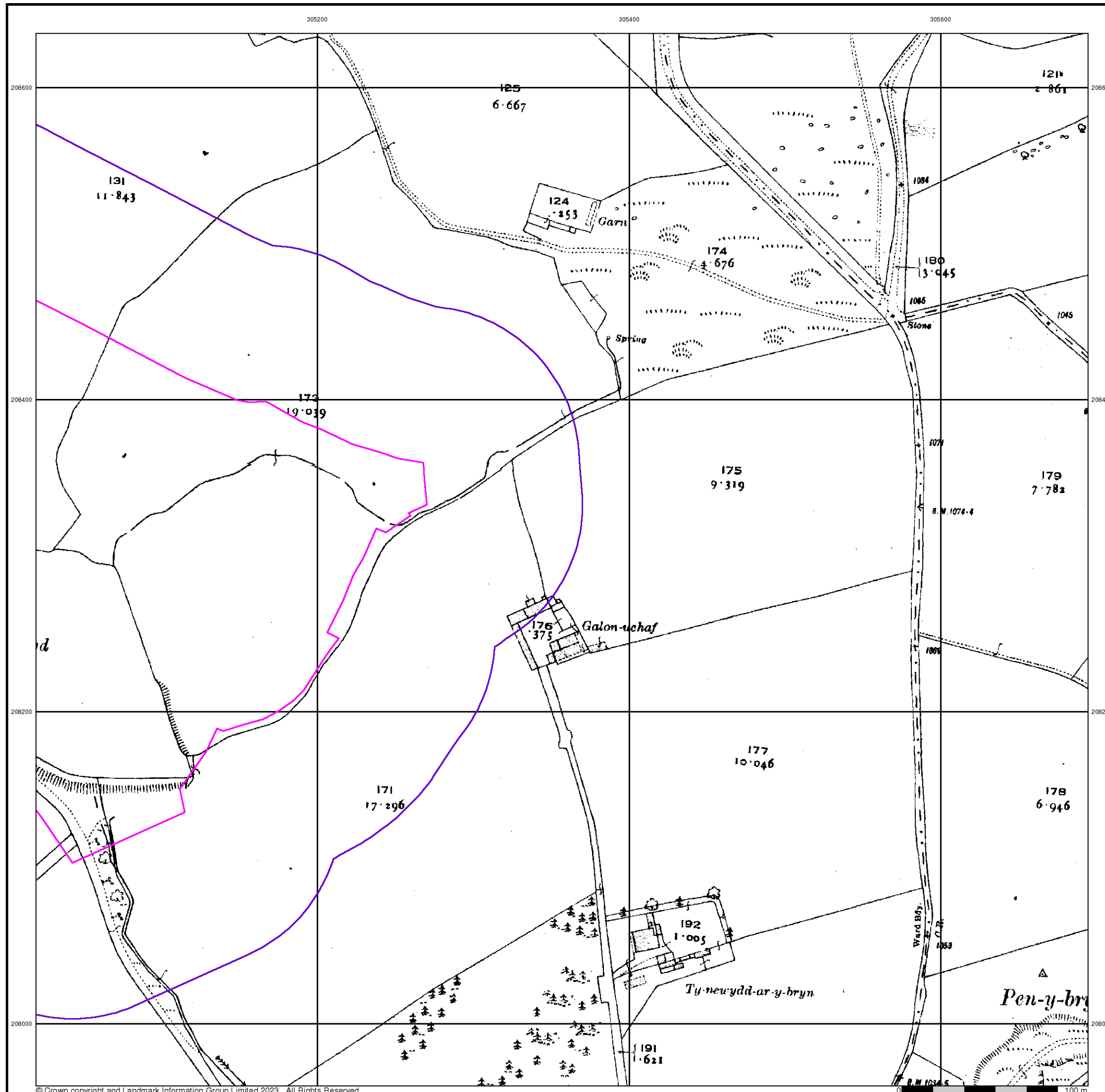


Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR TYDFIL, CF47 9BY





Ordnance Survey Plan

Published 1956 - 1957

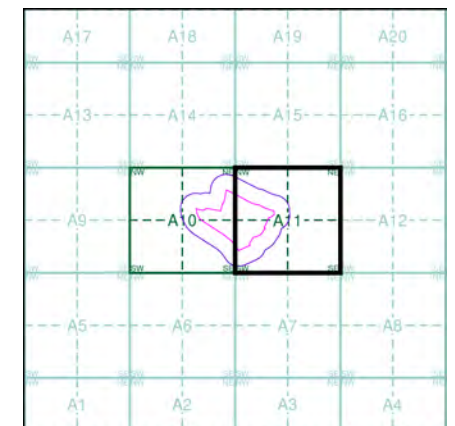
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SO0508NE	1956	1:1,250
SO0508SV	1956	1:1,250
SO0508SE	1956	1:1,250
SO0507NW	1957	1:1,250
SO0507NE	1957	1:1,250

Historical Map - Segment A11



Order Details

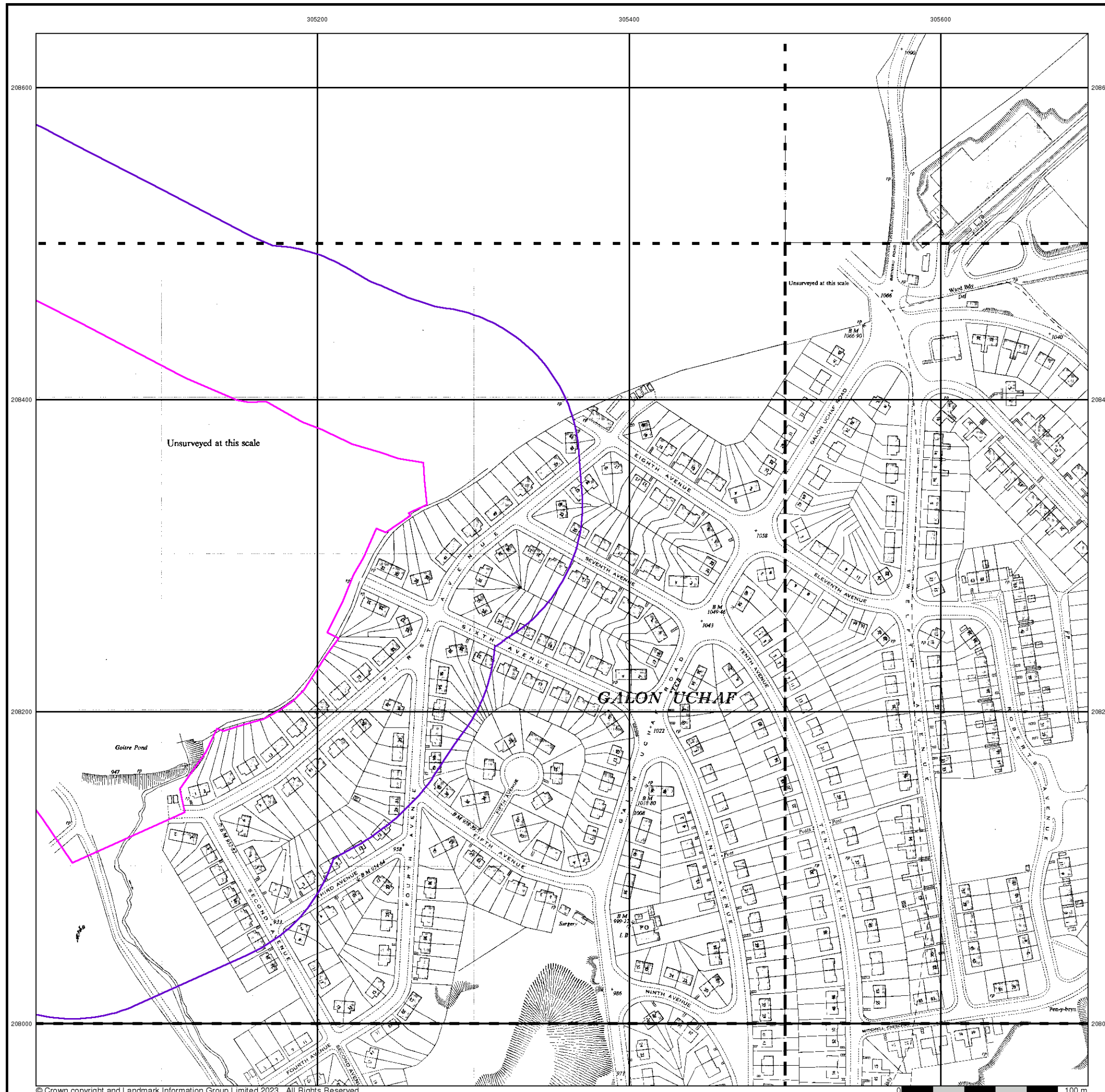
Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

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Ordnance Survey Plan

Published 1963 - 1964

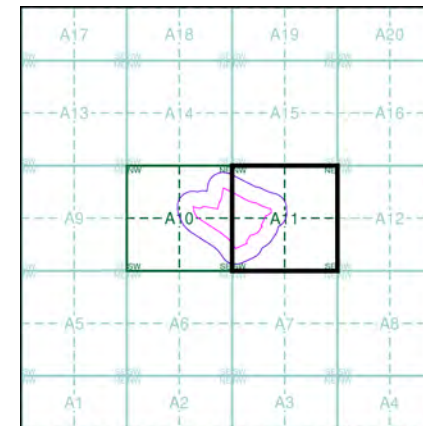
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SO0508
1964
1:2,500
SO0507
1963
1:2,500

Historical Map - Segment A11



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

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Ordnance Survey Plan

Published 1963 - 1972

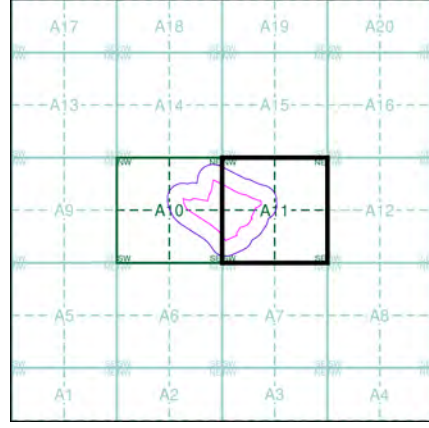
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SO0508NE	1972	1:1,250
SO0508SV	1970	1:1,250
SO0508SE	1969	1:1,250
SO0507NW	1963	1:1,250
SO0507NE	1971	1:1,250

Historical Map - Segment A11



Order Details

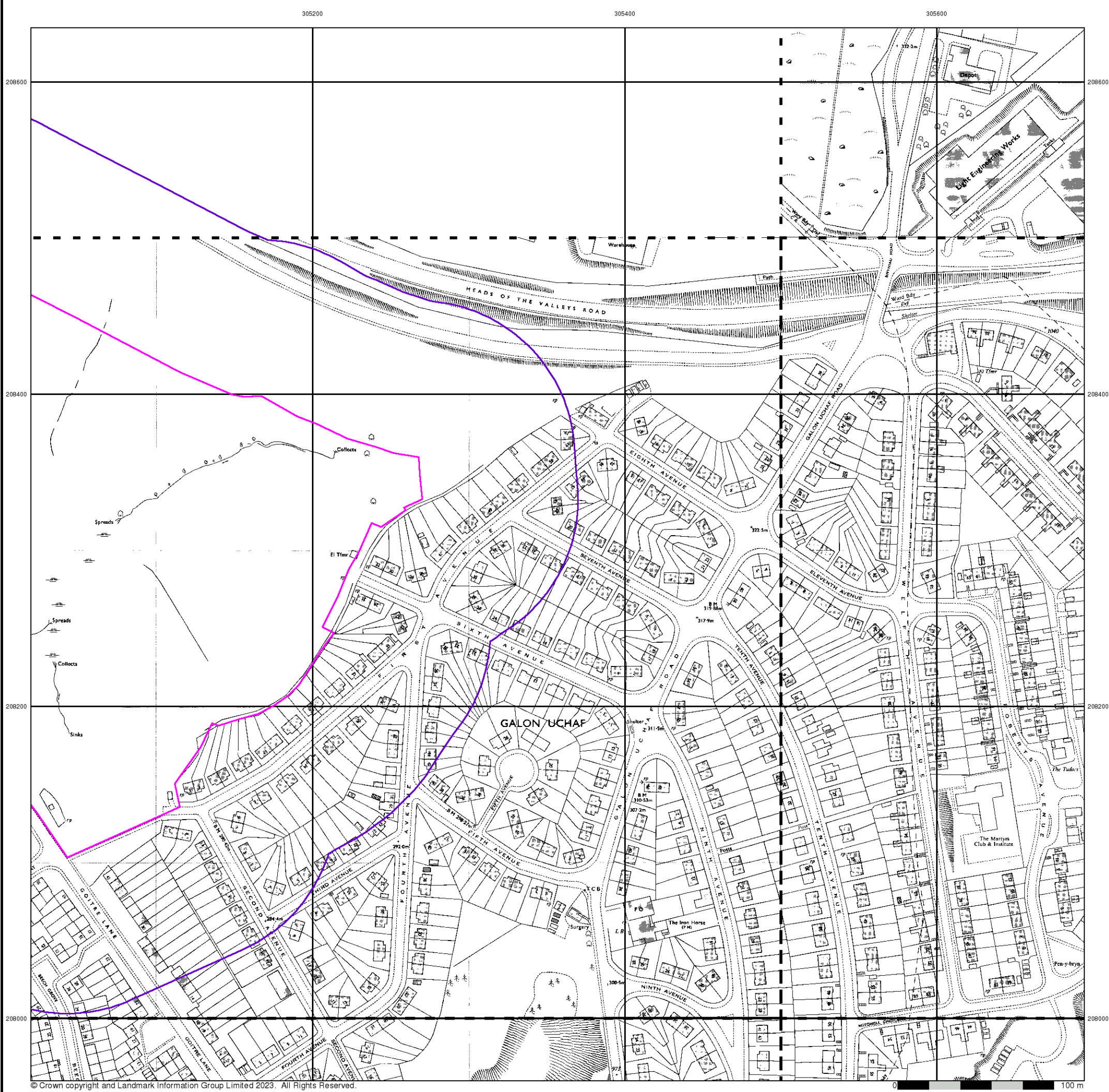
Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

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Additional SIMs

Published 1963 - 1988

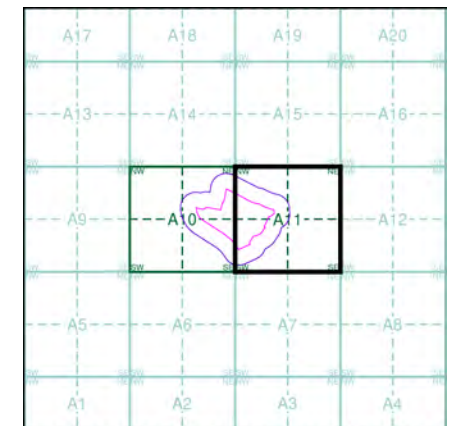
Source map scale - 1:1,250

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Map Name(s) and Date(s)

SO0508NE	1984	1:1,250
SO0508SV	1988	1:1,250
SO0508SE	1988	1:1,250
SO0507NW	1963	1:1,250
SO0507NE	1984	1:1,250

Historical Map - Segment A11



Order Details

Order Number: 310553660_1_1
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Slice: A
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Supply of Unpublished Survey Information

Published 1975

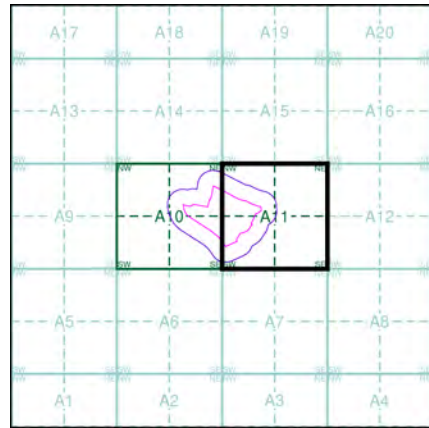
Source map scale - 1:1,250

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SO0508NE	1975	1:1,250
SO0508SV	1975	1:1,250
SO0508SE	1975	1:1,250
SO0507NW	1975	1:1,250
SO0507NE	1975	1:1,250

Historical Map - Segment A11



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR TYDFIL, CF47 9BY



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



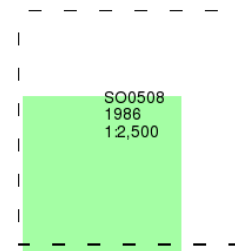
Ordnance Survey Plan

Published 1986

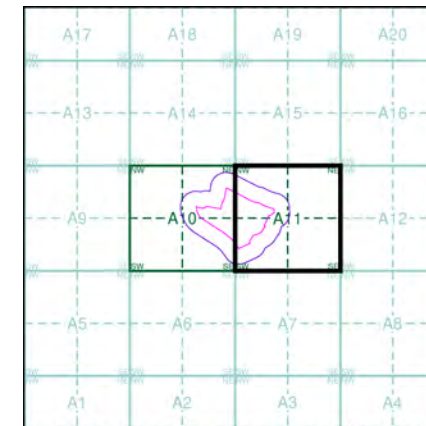
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A11



Order Details

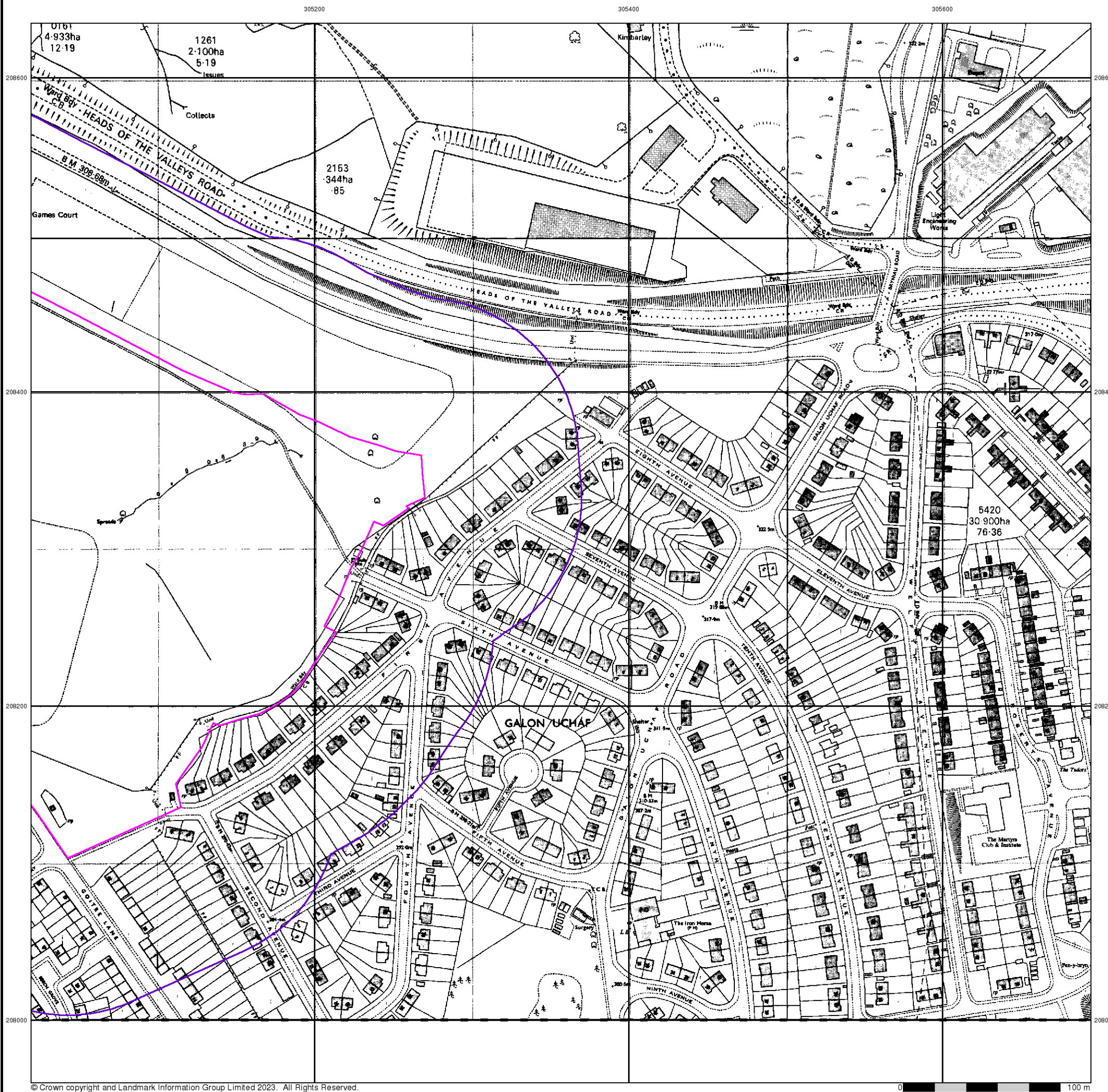
Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
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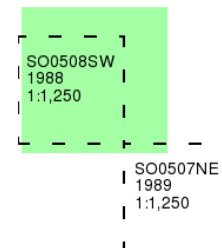
Additional SIMs

Published 1988 - 1989

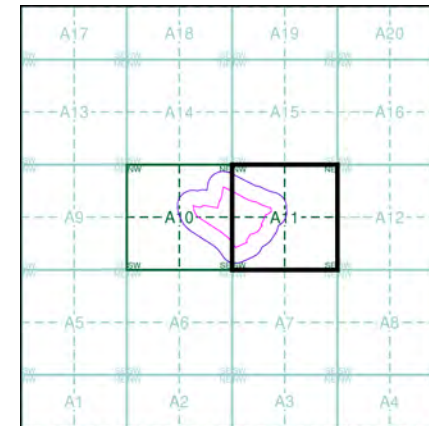
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A11



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
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Large-Scale National Grid Data

Published 1993

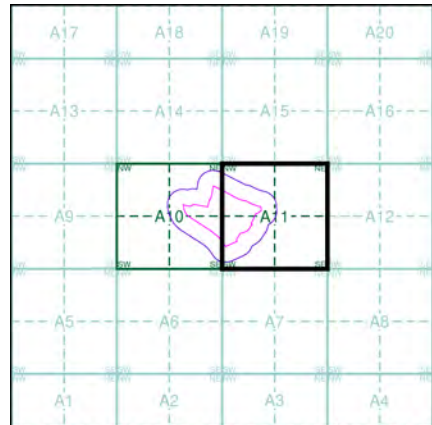
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

IO0508NW	IO0508NE
993	1993
1:1,250	1:1,250
IO0508SW	IO0508SE
993	1993
1:1,250	1:1,250
IO0507NW	IO0507NE
993	1993
1:1,250	1:1,250

Historical Map - Segment A11



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR TYDFIL, CF47 9BY



Tel: 0844 844 9952
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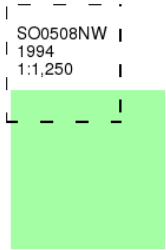
Large-Scale National Grid Data

Published 1994

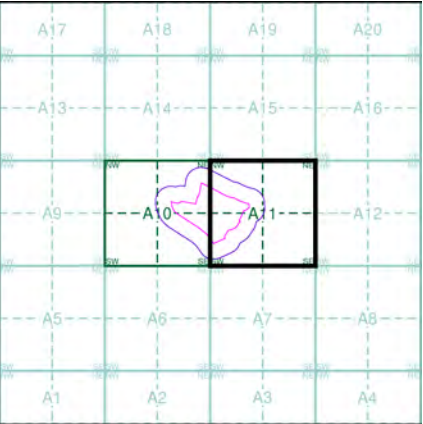
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A11



Order Details

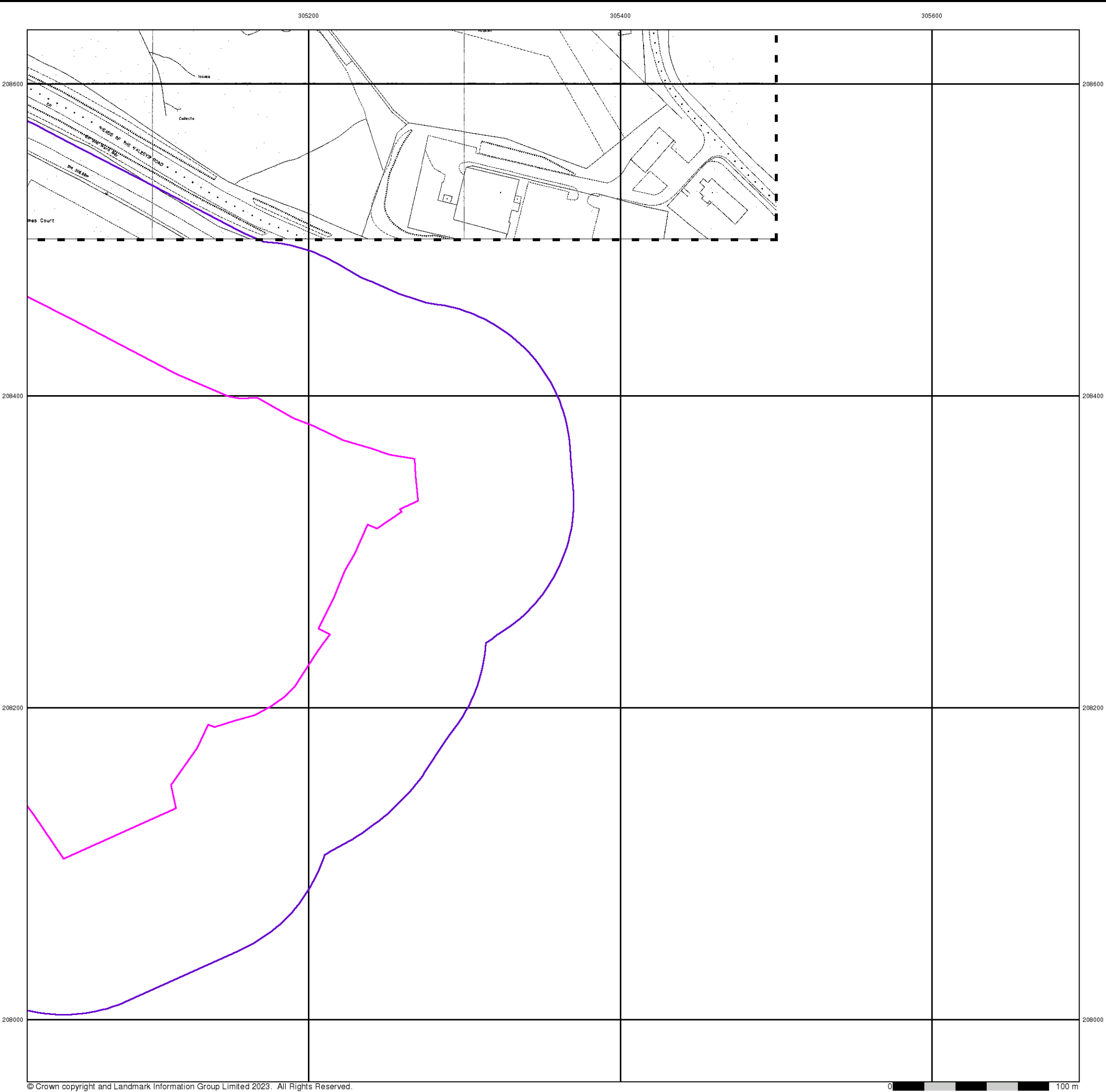
Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR TYDFIL, CF47 9BY



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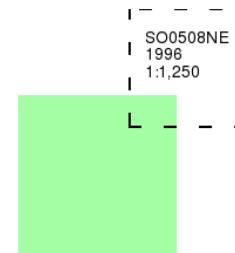
Large-Scale National Grid Data

Published 1996

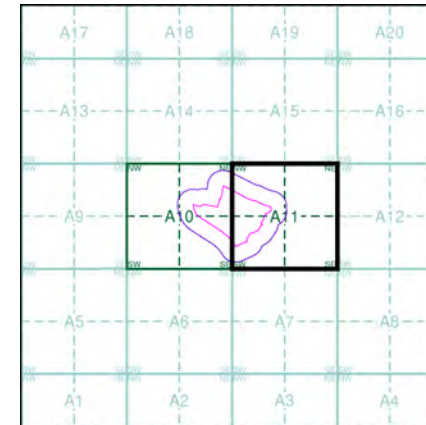
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A11



Order Details

Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

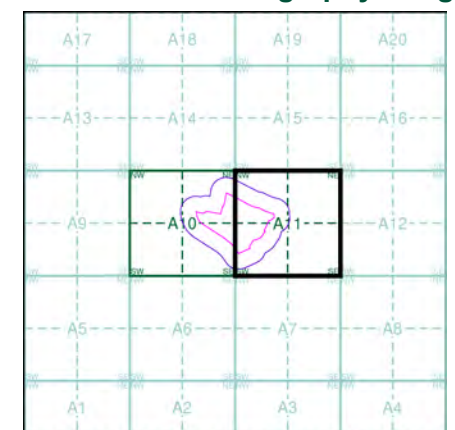
Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR
TYDFIL, CF47 9BY

Historical Aerial Photography

Published 2001

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

Historical Aerial Photography - Segment A11



Order Details

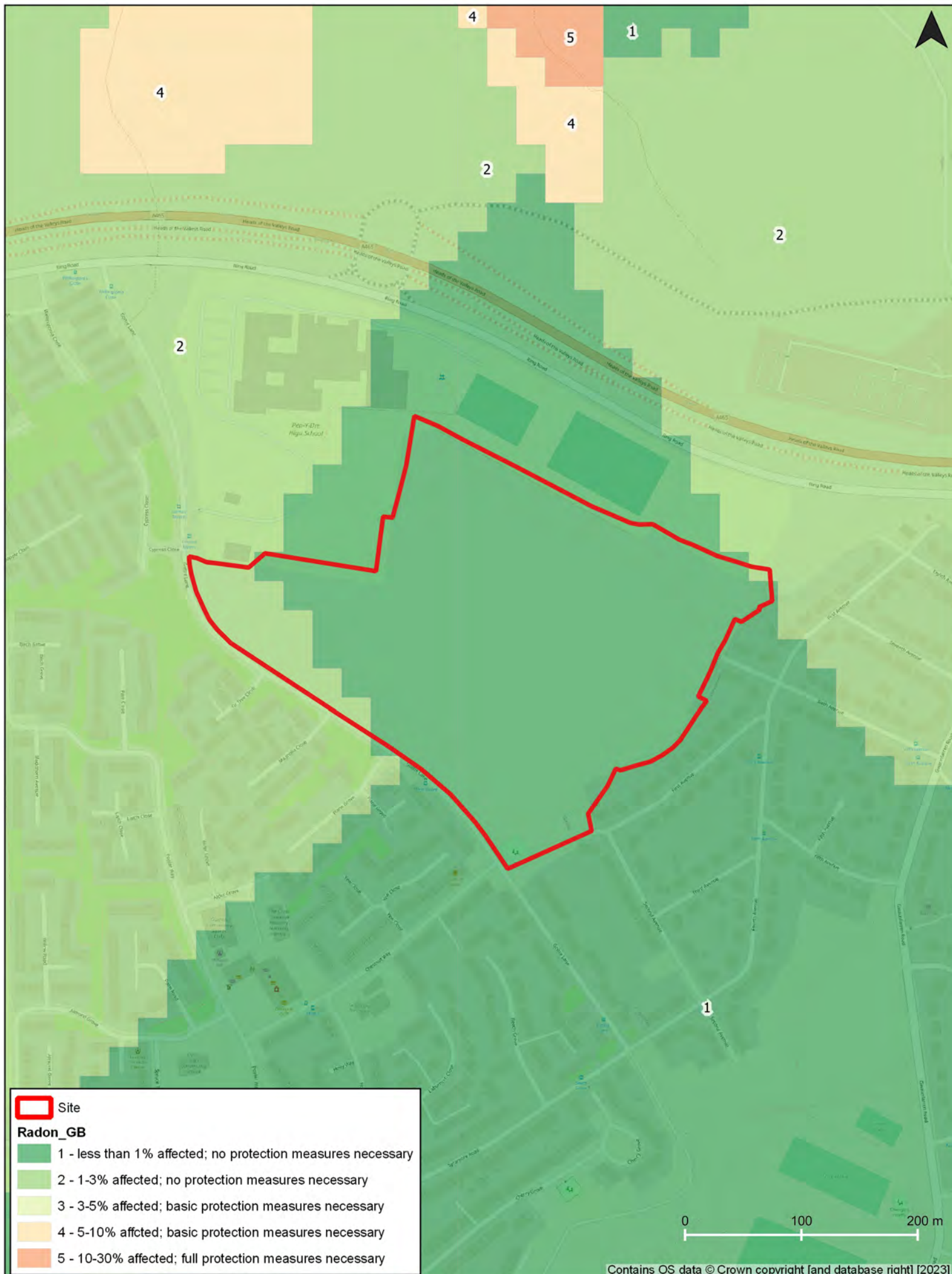
Order Number: 310553660_1_1
Customer Ref: 14209/LP
National Grid Reference: 305020, 208310
Slice: A
Site Area (Ha): 9.34
Search Buffer (m): 100

Site Details

Pen-Y-Dre High Comprehensive School, Gurnos, MERTHYR
TYDFIL, CF47 9BY

APPENDIX B

LANDMARK GEODATA RADON INFORMATION MAP



APPENDIX C

CONSULTANTS COAL MINING REPORT FROM THE COAL AUTHORITY



The Coal
Authority

Consultants Coal Mining Report

Pen Y Dre High School
Goitre Lane
Gurnos
Merthyr Tydfil
CF47 9BY

Date of enquiry:	27 April 2023
Date enquiry received:	27 April 2023
Issue date:	27 April 2023

Our reference:	51003352027001
Your reference:	14209/LP



Consultants

Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

INTEGRAL GEOTECHNIQUE (WALES) LTD.

Enquiry address

Pen Y Dre High School
Goitre Lane
Gurnos
Merthyr Tydfil
CF47 9BY

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

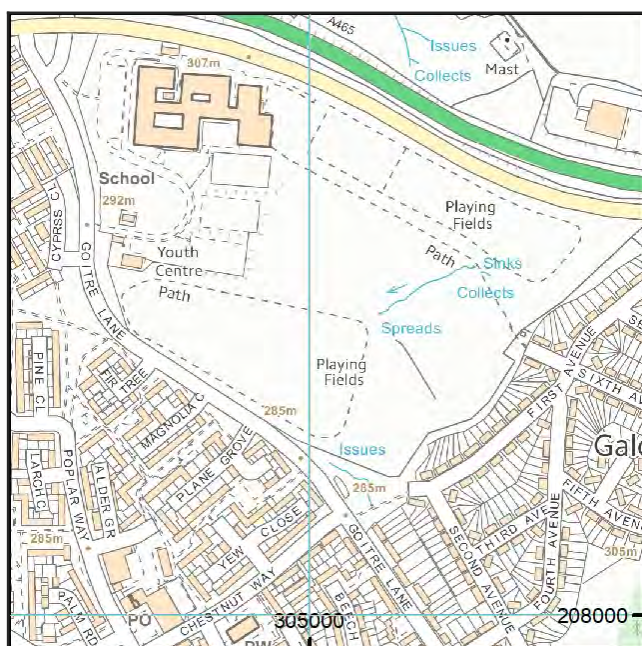
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

No past mining recorded.

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

PO0	SWR2510	
-----	---------	--

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

Based on the responses in this report, no further information has been highlighted.

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within 500m of the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

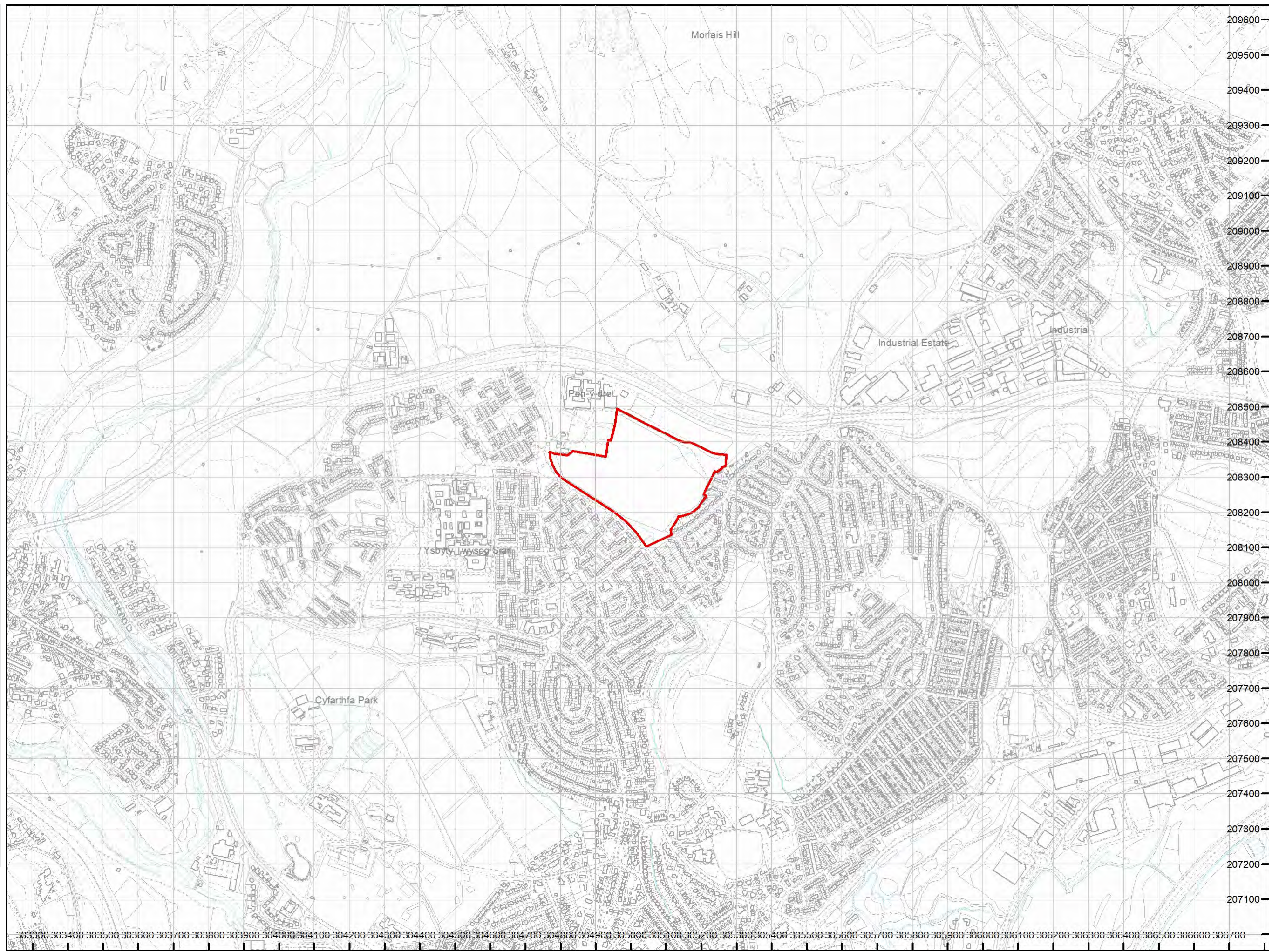
The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

Approximate position of the enquiry boundary shown 

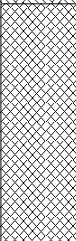
How to contact us

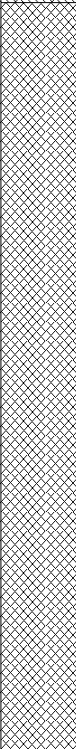
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com



APPENDIX D

TRIAL PIT LOGS

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Geotre Primary School			Project No.: 14209		Trial Pit No.: SA01 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Logged By: FG		Scale 1:25	
Equipment: JCB 4CX			Coordinates:			Dimensions 2.50m			
Date Excavated: 22/05/2023			Level:			Depth : 3.00m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.10	ES		0.30			Grass over soft brown and black mottled orange silty slightly gravelly CLAY with low cobble content of sub-angular and sub-rounded sandstone and limestone. Gravel is fine to coarse sub-angular limestone and sandstone. MADE GROUND: Soft to firm brown mottled orange and grey very clayey slightly gravelly SILT with low cobble content of sub-rounded limestone and sandstone. Gravel is fine to coarse sub-angular and sub-rounded of limestone and sandstone. Firm brown mottled grey silty slightly gravelly CLAY with low cobble and boulder content of sub-angular and sub-rounded sandstone and limestone. Gravel is fine to coarse sub-angular and sub-rounded of limestone and sandstone.			
			1.10						
2.00	B		3.00						
						End of Trialpit at 3.00 m			
Remarks: 1. Trial pit terminated at 3.0m below existing ground level. 2. Soil infiltration testing undertaken within trial pit.						Groundwater: 1. No groundwater encountered.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample	
						Stability: 1. Generally stable in the short term with local instability associated with cobble and boulder removal.			

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Geotre Primary School			Project No.: 14209		Trial Pit No.: SA02 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Logged By: FG		Scale 1:25	
Equipment: JCB 4CX			Coordinates:			Dimensions 3.00m			
Date Excavated: 22/05/2023			Level:			Depth : 3.00m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.40	ES		0.20			Grass over soft brown mottled orange brown silty gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse angular to sub-rounded of sandstone and limestone. MADE GROUND: Soft to firm brown and greyish brown silty gravelly CLAY with low cobble content of sub-angular and sub-rounded sandstone, limestone and brick. Gravel is fine to coarse sub-angular and sub-rounded of sandstone, limestone, bituminous material and fine ash.			
1.50	B								
			2.70			Firm becoming stiff brown mottled grey silty gravelly CLAY. Gravel is fine to coarse sub-angular and sub-rounded of sandstone and limestone.			
			3.00						
Remarks: 1. Trial pit terminated at 3.0m below existing ground level. 2. Soil infiltration testing undertaken within trial pit.			Groundwater: 1. No groundwater encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Geotre Primary School			Project No.: 14209		Trial Pit No.: SA03 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Logged By: FG		Scale 1:25	
Equipment: JCB 4CX			Coordinates:			Dimensions 2.30m			
Date Excavated: 22/05/2023			Level:			Depth : 3.50m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.40	ES		0.30			Grass over soft brown silty slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular of limestone.			
1.50	B					MADE GROUND: Soft to firm greyish brown and grey silty gravelly CLAY with moderate cobble and boulder content of sub-angular and sub-rounded sandstone and brick. Gravel is fine to coarse sub-angular and sub-rounded of sandstone, limestone, concrete and brick.			
			3.30			Firm brown mottled grey sandy gravelly CLAY with moderate cobble and boulder content of sub-rounded sandstone. Gravel is fine to coarse sub-rounded of sandstone.			
			3.50			End of Trialpit at 3.50 m			
Remarks: 1. Trial pit terminated at 3.5m below existing ground level. 2. Soil infiltration testing undertaken within trial pit.			Groundwater: 1. Moderate seepage encountered below 1.1m depth.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Generally stable in the short term with local instability associated with cobble and boulder removal.						

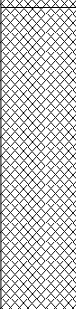
 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Geotre Primary School			Project No.: 14209		Trial Pit No.: SA04 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Logged By: FG		Scale 1:25	
Equipment: JCB 4CX			Coordinates:			Dimensions 2.70m			
Date Excavated: 23/05/2023			Level:			Depth : 3.00m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.40	ES		0.20			Grass over soft brown silty slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular of limestone and sandstone.			
			0.40			MADE GROUND: Soft greyish brown clayey slightly gravelly SILT. Gravel is fine to coarse sub-angular of fine ash, limestone and sandstone.			
						MADE GROUND: Loose black clayey sandy GRAVEL. Gravel is fine to coarse sub-angular of fine ash and clinker.			
0.70	ES								
1.00	B								
			3.00			End of Trialpit at 3.00 m			
Remarks: 1. Trial pit terminated at 3.0m below existing ground level. 2. Soil infiltration testing undertaken within trial pit.			Groundwater: 1. No groundwater encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Generally stable in the short term with local instability associated with cobble and boulder removal.						

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Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Logged By: FG		Scale 1:25	
Equipment: JCB 4CX			Coordinates:			Dimensions 2.70m			
Date Excavated: 23/05/2023			Level:			Depth : 3.80m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.35	ES		0.30			Grass over soft brown slightly silty gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular and sub-rounded sandstone and limestone.			
						MADE GROUND: Soft grey locally black silty gravelly CLAY with high cobble and boulder content of sub-angular and sub-rounded concrete, brick and sandstone. Gravel is fine to coarse angular to sub-rounded of sandstone, limestone, brick, concrete, fine ash and rare clinker. Inclusions of glass, timber and metal scrap.			
3.50	B		2.90			Soft blackish brown spongy fibrous PEAT.			
			3.40			Soft greyish brown clayey very sandy slightly gravelly SILT with moderate cobble and boulder content of sub-rounded sandstone and limestone. Gravel is fine to coarse sub-rounded of sandstone and limestone.			
			3.80		End of Trialpit at 3.80 m				
Remarks: 1. Trial pit terminated at 3.8m below existing ground level. 2. Soil infiltration testing undertaken within trial pit.			Groundwater: 1. Minor seepages encountered below 3.4m depth.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 11. Generally stable in the short term with local instability associated with cobble and boulder removal.						

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Location: Merthyr Tydfil						Client: Morgan Sindall PLC				Logged By: FG		Scale 1:25	
Equipment: JCB 4CX						Coordinates:				Dimensions 2.80m			
Date Excavated: 23/05/2023						Level:				Depth : 3.60m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description							
Depth (m)	Type	Results											
0.40	ES		0.20			Grass over soft brown silty gravelly CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular and sub-rounded of sandstone.							
			0.30			MADE GROUND: Loose to medium dense grey clayey silty GRAVEL. Gravel is fine to coarse sub-angular limestone and brick.							
						MADE GROUND: Soft grey and brownish grey silty slightly sandy gravelly CLAY with moderate cobble and boulder content of sub-angular and sub-rounded sandstone, limestone and brick. Gravel is fine to coarse angular to sub-rounded of sandstone, limestone, brick, concrete, vitreous slag and fine ash and clinker.							
			3.00			Soft blackish brown spongy fibrous PEAT.							
			3.30			Soft grey mottled blue, red and yellow clayey sandy gravelly SILT with moderate cobble and boulder content of sub-angular to rounded sandstone and limestone. Gravel is fine to coarse sub-angular to rounded of sandstone and, limestone.							
			3.60			End of Trialpit at 3.60 m							
Remarks: 1. Trial pit terminated at 3.6m below existing ground level. 2. Soil infiltration testing undertaken within trial pit.						Groundwater: 1. Minor seepages encountered below 3.3m depth.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample					

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Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Logged By: FG		Scale 1:25	
Equipment: JCB 4CX			Coordinates:			Dimensions 2.60m			
Date Excavated: 22/05/2023			Level:			Depth : 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description			
			0.30			Grass over soft brown silty gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular and sub-rounded of sandstone and limestone.			
			0.60			MADE GROUND: Loose to medium dense grey and black silty sandy GRAVEL with high cobble and boulder content of sub-angular brick sandstone and limestone. Gravel is fine to coarse sub-angular brick sandstone and limestone.			
						End of Trialpit at 0.60 m			
						1			
						2			
						3			
						4			
						5			
Remarks: 1. Trial pit terminated at 0.6m below existing ground level due to extremely fast groundwater inflow. 2. Soil infiltration testing not undertaken in pit.			Groundwater: 1. Extremely fast groundwater inflow encountered below 0.3m depth.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Generally stable in the short term with local instability associated with cobble and boulder removal.						

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Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Logged By: FG		Scale 1:25	
Equipment: JCB 4CX			Coordinates:			Dimensions 1.80m			
Date Excavated: 22/05/2023			Level:			Depth : 0.50m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
			0.20			Grass over soft brown silty gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular and sub-rounded of sandstone and limestone.			
			0.50			MADE GROUND: Loose to medium dense grey and black silty sandy GRAVEL with high cobble and boulder content of sub-angular brick sandstone and limestone. Gravel is fine to coarse sub-angular brick sandstone and limestone.			
						End of Trialpit at 0.50 m			
						1			
						2			
						3			
						4			
						5			
Remarks: 1. Trial pit terminated at 0.5m below existing ground level due to extremely fast groundwater inflows.			Groundwater: 1. Extremely fast groundwater inflow encountered below 0.2m depth.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Generally unstable below 0.2m depth associated with highly saturated granular soils.						

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Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Logged By: FG		Scale 1:25	
Equipment: JCB 4CX			Coordinates:			Dimensions 2.20m			
Date Excavated: 22/05/2023			Level:			Depth : 3.50m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.10	ES		0.30			Grass over soft brown slightly silty slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse angular and sub-rounded of sandstone and limestone.			
0.20	ES					MADE GROUND: Soft grey and brownish grey very silty gravelly CLAY with high cobble and boulder content of sub-angular and sub-rounded sandstone, limestone and brick. Gravel is fine to coarse sub-angular and sub-rounded sandstone and limestone and brick. <i>... Mexecon CBR at 0.5m depth = 0.5% / 4.8% / 1.1%</i>			
1.00	B		1.80			SUSPECTED MADE GROUND: Firm grey mottled brown silty gravelly CLAY with moderate cobble and boulder content of sub-angular limestone. Gravel is fine to coarse angular to sub-rounded of limestone.			
			3.00			Soft black fibrous spongy PEAT			
			3.30			Firm grey mottled brown silty gravelly CLAY with moderate cobble and boulder content of sub-angular limestone. Gravel is fine to coarse angular to sub-rounded of limestone.			
			3.50		End of Trialpit at 3.50 m				
Remarks: 1. Trial pit terminated at 3.5m below existing ground level.			Groundwater: 1. Minor seepage encountered at 3.5m depth.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Generally stable in the short term with local instability associated with cobble and boulder removal.						

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Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Logged By: FG		Scale 1:25	
Equipment: JCB 4CX				Coordinates:		Dimensions 2.80m			
Date Excavated: 22/05/2023				Level:		Depth : 3.30m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.30	ES		0.40			Grass over soft brown slightly silty slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular and sub-rounded limestone and sandstone.			
						MADE GROUND: Soft orangish brown and greyish brown clayey gravelly SILT with low cobble and boulder content of sub-angular sandstone. Gravel is fine to coarse angular to sub-rounded of sandstone and limestone.			
						... Mexecon CBR at 0.5m depth = 1.5% / 1.7% / 0.9%			
						MADE GROUND: Soft grey silty very gravelly CLAY with moderate cobble and boulder content of sub-angular and sub-rounded sandstone. Gravel is fine to coarse sub-angular and sub-rounded of sandstone, brick and fine ash.			
2.30			2.60			Soft brownish black spongy pseudofibrous PEAT			
						Soft grey silty very gravelly CLAY with moderate cobble and Boulder content of sub-angular and sub-rounded sandstone. Gravel is fine to coarse sub-angular and sub-rounded of sandstone.			
3.30			3.30			End of Trialpit at 3.30 m			
Remarks: 1. Trial pit terminated at 3.3m below existing ground level.						Groundwater: 1. No groundwater encountered.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample	
						Stability: 1. Generally stable in the short term with local instability associated with cobble and boulder removal.			

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Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Logged By: FG		Scale 1:25	
Equipment: JCB 4CX			Coordinates:			Dimensions 2.50m			
Date Excavated: 22/05/2023			Level:			Depth : 2.20m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.30	ES		0.20			Grass over soft brown slightly silty slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular and sub-rounded of sandstone and limestone. MADE GROUND: Firm grey slightly silty very gravelly CLAY with high cobble and boulder content of sub-angular and sub-rounded sandstone, limestone, concrete and brick. Gravel is fine to coarse angular to sub-rounded of sandstone, limestone, brick and concrete. Inclusions of timber posts, metal scrap, rebar and cable. ... Mexecon CBR at 0.5m depth = 2.4% / 3.1% / 2.%			
1.00	B		2.20						
						End of Trialpit at 2.20 m			
Remarks:			Groundwater:			Key:			
1. Trial pit terminated at 2.2m below existing ground level due to extremely fast groundwater inflows.			1. Extremely fast groundwater inflow encountered below 1.5m depth.			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability:						
			1. Unstable below 0.2m below existing ground level due to highly saturated made ground.						

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Geotre Primary School			Project No.: 14209		Trial Pit No.: TP05 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Logged By: FG		Scale 1:25	
Equipment: JCB 4CX			Coordinates:			Dimensions 2.40m			
Date Excavated: 23/05/2023			Level:			Depth : 4.10m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.40	ES		0.20			Grass over soft brown slightly silty slightly sandy slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular and sub-rounded of sandstone and limestone. MADE GROUND: Soft grey silty slightly gravelly CLAY. Gravel is fine to coarse sub-angular of sandstone and brick. MADE GROUND: Loose black sandy GRAVEL. Gravel is fine to coarse angular and sub-angular of charcoal, fine ash and clinker ... Mexecon CBR at 0.5m depth = 4.8% / 2.9% / 4.4% MADE GROUND: Firm grey and brownish grey silty gravelly CLAY with moderate cobble and boulder content of sub-angular and sub-rounded sandstone, limestone and brick. Gravel is fine to coarse sub-angular and sub-rounded of sandstone, limestone, brick, concrete, fine ash and clinker. Near surface inclusions of fabric, timber, glass and plastic.			
			0.30						
									
			0.60						
			4.10			End of Trialpit at 4.10 m			
Remarks: 1. Trial pit terminated at 4.1m below existing ground level.			Groundwater: 1. Minor seepages encountered at below 2.9m below existing ground level.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Generally stable in the short term with local instability associated with cobble and boulder removal.						

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Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Logged By: FG		Scale 1:25	
Equipment: JCB 4CX			Coordinates:			Dimensions 2.60m			
Date Excavated: 23/05/2023			Level:			Depth : 3.30m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
			0.20		 Grass over soft brown slightly silty gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular and sub-rounded of sandstone.				
					 MADE GROUND: Soft becoming firm grey and brownish grey slightly silty gravelly slightly sandy CLAY with moderate cobble and boulder content of sub-angular concrete, brick and sandstone. Gravel is fine to coarse sub-angular and sub-rounded of sandstone, limestone concrete, brick and vitreous slag. Near surface inclusions of glass, timber and fabric.				
					 ... Mexecon CBR at 0.5m depth = 1.1% / 1.3% / 1.2%				
			3.30		 End of Trialpit at 3.30 m				
Remarks: 1. Trial pit terminated at 3.3m below existing ground level due to suspected boulder obstruction.			Groundwater: 1. No groundwater encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Generally stable in the short term with local instability associated with cobble and boulder removal.						

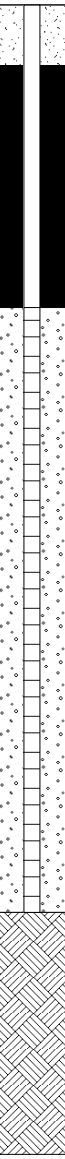
 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Geotre Primary School			Project No.: 14209		Trial Pit No.: TP07 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Logged By: FG		Scale 1:25	
Equipment: JCB 4CX			Coordinates:			Dimensions 2.80m			
Date Excavated: 23/05/2023			Level:			Depth : 4.00m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.10	ES		0.20			Grass over soft brown slightly silty slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular and sub-rounded of sandstone and limestone.			
						MADE GROUND: Soft grey slightly silty very gravelly CLAY with moderate cobble and boulder content of sub-angular and sub-rounded sandstone and limestone. Gravel is fine to coarse sub-angular and sub-rounded of sandstone, limestone, concrete and brick. Inclusions of timber, rebar, cables and glass.			
						... Mexecon CBR at 0.5m depth = 1.2% / 0.8% / 1.4%			
			3.40			MADE GROUND: Soft blackish brown spongy fibrous PEAT.			
			3.60			MADE GROUND: Firm grey slightly silty very gravelly CLAY with moderate cobble and boulder content of sub-angular and sub-rounded sandstone and limestone. Gravel is fine to coarse sub-angular and sub-rounded of sandstone, limestone, concrete and brick.			
			3.90			Soft to firm yellowish brown mottled grey and red clayey sandy slightly gravelly SILT with moderate cobble and boulder content of sub-angular to rounded sandstone and limestone.			
			4.00			Gravel is fine to coarse sub-angular to rounded of limestone and sandstone.			
End of Trialpit at 4.00 m									
Remarks: 1. Trial pit terminated at 4.0m below existing ground level.						Groundwater: 1. Minor seepage encountered below 2.2m depth.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample	
Stability: 1. Generally stable in the short term with local instability associated with cobble and boulder removal.									

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Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Logged By: FG		Scale: 1:25	
Equipment: JCB 4CX			Coordinates:			Dimensions: 2.40m			
Date Excavated: 23/05/2023			Level:			Depth : 4.00m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
			0.20			Grass over soft brown silty slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular of sandstone and limestone.			
						MADE GROUND: Loose grey and brownish grey slightly silty slightly sandy very gravelly CLAY with moderate cobble and boulder content of sub-angular sandstone and brick. Gravel is fine to coarse sub-angular and sub-rounded of sandstone, limestone, concrete, and brick.			
						... Mexecon CBR at 0.5m depth = 1.2% / 0.8% / 3.2%			
			1.20			MADE GROUND: Loose blackish grey slightly clayey gravelly SAND. Gravel is fine to coarse sub-angular and sub-rounded of sandstone, fine ash and clinker.			
			1.40			MADE GROUND: Medium dense grey slightly silty slightly sandy very gravelly CLAY with moderate cobble and boulder content of sub-angular sandstone and brick. Gravel is fine to coarse sub-angular and sub-rounded of sandstone, limestone, concrete, and brick.			
			1.90			MADE GROUND: Medium dense grey and brownish grey very silty sandy GRAVEL with high cobble and boulder content of sub-angular and sub-rounded sandstone and limestone. Gravel is fine to coarse sub-angular and sub-rounded of sandstone, limestone and brick.			
			4.00			End of Trialpit at 4.00 m			
Remarks: 1. Trial pit terminated at 4.0m below existing ground level.			Groundwater: 1. Multiple moderate seepages below 2.0m depth.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Generally stable in the short term with local instability associated with cobble and boulder removal.						

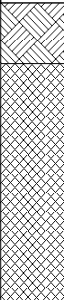
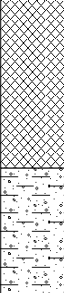
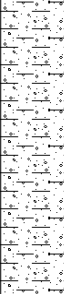
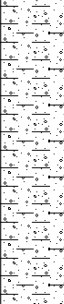
APPENDIX E

WINDOWLESS SAMPLE BOREHOLE LOGS

		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School		Project No.: 14209		Borehole No.: WS01 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Coordinates:		Hole Type: WLS	
Equipment: DART 554				Diameter of Casing:		Level:		Scale 1:25	
Diameter of Boring: 101+86+76+64mm				Depth of Casing:		Dates 18/05/2023 -		Logged By: FG	

Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20		Grass over soft brown slightly silty slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular of limestone.		
		0.30	ES			0.80	MADE GROUND: Soft brown locally mottled orange silty gravelly CLAY. Gravel is fine to coarse angular and sub-angular of limestone and vitreous slag.		
		1.00	C	N=5 (1,1/2,1,1,1)		1.50	MADE GROUND: Soft to firm brown mottled orange slightly silty gravelly CLAY. Gravel is fine to coarse sub-angular of limestone.	1	
		2.00	C	N=10 (1,2/2,2,3,3)			Firm brown mottled grey silty slightly gravelly CLAY with low cobble and boulder content of sub-angular and sub-rounded sandstone and limestone. Gravel is fine to coarse sub-angular and sub-rounded of limestone and sandstone.	2	
		3.00	C	N=13 (2,2/3,3,3,4)				3	
	3.40								
		3.80	C	50 (22,24/50 for 40mm)	3.80		End of Borehole at 3.80 m	4	
								5	

Remarks: 1. Refusal of windowless sampler at 3.8m below existing ground level. 2. Water strike encountered between 3.0m - 3.8m depth. 3. Water standing in borehole at 3.4m depth. 4. Installation of ground gas monitoring well within borehole.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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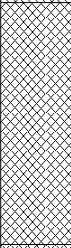
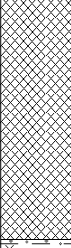
Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School			Project No.: 14209		Borehole No.: WS02 Sheet 1 of 1	
Location: Merthyr Tydfil			Client: Morgan Sindall PLC			Coordinates:		Hole Type: WLS
Equipment: DART 554			Diameter of Casing:			Level:		Scale 1:25
Diameter of Boring: 101+86+76+64+56mm			Depth of Casing:			Dates 18/05/2023 -		Logged By: FG
Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES		0.20			Grass over soft brown slightly silty slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular limestone.
								MADE GROUND: Soft brown silty gravelly CLAY with low cobble content of sub-angular limestone. Gravel is fine to coarse sub-angular of limestone.
		1.00	C	N=7 (1,1/2,2,2,1)	1.00			MADE GROUND: Soft brownish grey locally mottled red silty very slightly gravelly very slightly peaty CLAY. Gravel is fine to coarse sub-angular limestone and sandstone.
		2.00	C	N=15 (3,4/4,3,4,4)				
					2.50			Soft brown slightly sandy gravelly CLAY. Gravel is fine to coarse sub-angular of limestone and sandstone.
		3.00	C	N=6 (1,1/1,2,1,2)				
		4.00	C	N=24 (1,1/2,4,8,10)				
		4.70						
		4.90	C	N=50 (8,8/50 for 230mm)	4.90			End of Borehole at 4.90 m
Remarks: 1. Refusal of windowless sampler at 4.9m below existing ground level. 2. Water strike encountered between 4.0m - 4.9m depth. 3. Water standing in borehole at 4.7m depth.						Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone) W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
								



		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School		Project No.: 14209		Borehole No.: WS03 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Coordinates:		Hole Type: WLS	
Equipment: DART 554				Diameter of Casing:		Level:		Scale 1:25	
Diameter of Boring: 101+86+76mm				Depth of Casing:		Dates 18/05/2023 -		Logged By: FG	

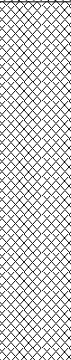
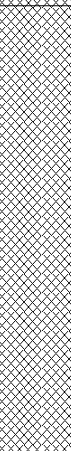
Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.35	ES		0.30		Grass over soft brown slightly silty slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular of limestone.		
		1.00	C	N=24 (2,3/2,2,3,17)			Firm becoming stiff orangish brown slightly silty slightly gravelly locally friable CLAY. Gravel is fine to coarse sub-angular of sandstone and limestone.	1	
		1.45	C	50 (18,4/50 for 60mm)				2	
					2.30		End of Borehole at 2.30 m	3	
								4	
								5	

Remarks: 1. Refusal of windowless sampler at 2.3m below existing ground level. 2. No groundwater encountered.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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Intégral Géotechnique		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School			Project No.: 14209		Borehole No.: WS04 Sheet 1 of 1		
Location: Merthyr Tydfil				Client: Morgan Sindall PLC			Coordinates:		Hole Type: WLS		
Equipment: DART 554				Diameter of Casing:			Level:		Scale 1:25		
Diameter of Boring: 101+96+86+76+64mm				Depth of Casing:			Dates 18/05/2023 -		Logged By: FG		
Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
		Depth (m)	Type	Results							
	0.60 				0.20			Grass over soft brown slightly silty slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular of limestone.			
								MADE GROUND: Soft blackish brown mottled black slightly silty slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular to sub-rounded of limestone, vitreous slag, fine ash and brick.			
		1.00 1.00	ES C	N=13 (2,2/2,3,4,4)	1.00			MADE GROUND: Medium dense black sandy GRAVEL. Gravel is fine to coarse angular of vitreous and vesicular slag, fine ash, clinker and brick.			
					1.80			Stiff brownish grey silty slightly gravelly CLAY. Gravel is fine to coarse sub-angular and sub-rounded of sandstone and limestone.			
		2.00	C	N=23 (7,5/6,5,6,6)							
		3.00	C	N=6 (1,2/2,2,1,1)	3.00			Poor recovery within liner between 3.0m - 4.0m depth.			
		4.00	C	N=9 (2,1/2,1,2,4)	4.00			Poor recovery within liner between 4.0m - 4.7m depth.			
		5.00	C	50 (11,15/50 for 105mm)	5.00			----- End of Borehole at 5.00 m -----			
Remarks:						Key:					
1. Refusal of windowless sampler at 5.0m below existing ground level.						D - Small disturbed sample			W - Water sample		
2. Water strike encountered between 1.0m - 1.45m depth.						B - Bulk disturbed sample			U - Undisturbed sample		
3. Water standing in borehole at 0.6m depth.						ES - Environmental soil sample			TCR - Total Core Recovery		
						SPT - Standard Penetration Test (split spoon)			SCR - Solid Core Recovery		
						CPT - Standard Penetration Test (solid cone)			RQD - Rock Quality Designation		
											



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Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Coordinates:		Hole Type: WLS	
Equipment: DART 554				Diameter of Casing:		Level:		Scale 1:25	
Diameter of Boring: 101+96+86+76+64mm				Depth of Casing:		Dates 18/05/2023 -		Logged By: FG	

Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description				
		Depth (m)	Type	Results								
		0.40	ES		0.30			Soft brown slightly silty slightly gravelly CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular of limestone.	1			
		1.00	C	N=4 (2,1/1,1,1,1)	1.50						MADE GROUND: Very soft to soft brownish grey and grey slightly silty slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-angular and sub-rounded of sandstone, limestone, brick and fine ash and clinker.	
		2.00	C	N=1 (1,0/0,1,0,0)	3.00			MADE GROUND: Very soft to soft grey gravelly CLAY. Gravel is fine to coarse sub-angular of limestone and sandstone.	2			
		3.00	C	N=7 (3,2/1,2,2,2)	5.00							
		4.00	C	N=5 (2,2/1,2,1,1)						4		
		5.00	C	N=11 (2,2/2,3,3,3)	5.00		End of Borehole at 5.00 m		5			

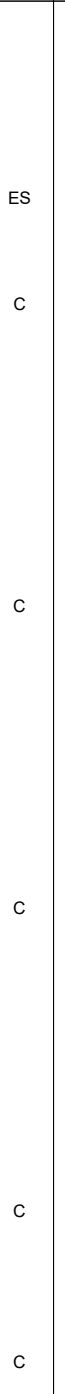
Remarks: 1. Refusal of windowless sampler at 5.0m below existing ground level. 2. Water strike encountered between 2.0m - 3.0m depth. 3. Water standing in borehole at 2.3m depth.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School		Project No.: 14209		Borehole No.: WS06 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Coordinates:		Hole Type: WLS	
Equipment: DART 554				Diameter of Casing:		Level:		Scale 1:25	
Diameter of Boring: 101+96+86+76+64mm				Depth of Casing:		Dates 18/05/2023 -		Logged By: FG	

Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
	0.60 	0.40	ES		0.30			Grass over soft brown silty gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular of limestone.	
								MADE GROUND: Soft grey very gravelly CLAY. Gravel is fin to coarse angular and sub-angular of sandstone, limestone, fine ash, clinker, vitreous and vesicular slag.	
		1.00	C	N=8 (2,1/1,2,3,2)	1.00			MADE GROUND: Soft to firm grey and brownish grey silty slightly gravelly CLAY. Gravel is fine and coarse sub-angular of sandstone and limestone.	1
		2.00	C	N=4 (1,1/1,1,1,1)					2
		3.00	C	N=6 (1,2/1,2,1,2)	3.00				Soft brown and grey slightly gravelly CLAY. Gravel is fine to coarse sub-angular and sub-rounded of limestone.
4.00	C	N=6 (2,2/1,2,2,1)				4			
		5.00	C	N=50 (5,6/7,15,15,13)	5.00			End of Borehole at 5.00 m	5

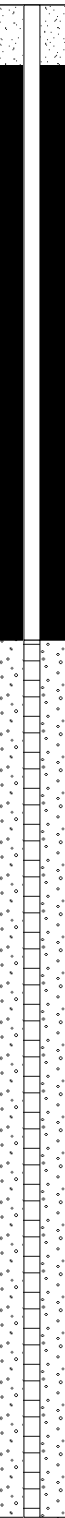
Remarks: 1. Refusal of windowless sampler at 5.0m below existing ground level. 2. Water strike encountered between 1.0m - 2.0m depth. 3. Water standing in borehole at 0.6m depth.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School		Project No.: 14209		Borehole No.: WS07 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Coordinates:		Hole Type: WLS	
Equipment: DART 554				Diameter of Casing:		Level:		Scale 1:25	
Diameter of Boring: 101+96+86+76+64mm				Depth of Casing:		Dates 18/05/2023 -		Logged By: FG	

Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.65	ES	N=10 (3,2/4,3,1,2)	0.60		Grass over soft brown silty gravelly CLAY with frequent roots and rootlets. Gravel is fine to coarse of limestone.	1	
							MADE GROUND: Soft brown slightly silty slightly gravelly CLAY. Gravel is fine to coarse sub-angular of limestone, fine ash and rare clinker.		
		1.00	C	N=4 (1,1/1,0,2,1)	3.00		MADE GROUND: Soft to firm greyish brown slightly silty slightly sandy slightly gravelly CLAY. Gravel fine to coarse sub-angular of limestone, brick, fine ash and clinker.		2
							MADE GROUND: Firm grey silty very slightly gravelly CLAY. Gravel is fine to coarse sub-rounded sandstone.		
		2.00	C	N=15 (2,2/5,4,3,3)	4.00		Soft black spongy fibrous PEAT with frequent decaying fibrous organic matter.		3
							MADE GROUND: Firm grey silty very slightly gravelly CLAY. Gravel is fine to coarse sub-rounded sandstone.		
		3.00	C	N=12 (3,2/2,3,3,4)	4.30		Firm to stiff orangish brown mottled brown slightly silty slightly gravelly CLAY. Gravel is fine to coarse sub-angular and sub-rounded sandstone and limestone.		4
							MADE GROUND: Firm grey silty very slightly gravelly CLAY. Gravel is fine to coarse sub-rounded sandstone.		
4.00	C	N=25 (8,7/8,5,6,6)	5.00			5			
4.50	C	N=50 (9,9/50 for 235mm)							
4.95	C								
End of Borehole at 5.00 m									

Remarks: 1. Refusal of windowless sampler at 5.0m below existing ground level. 2. Water strike encountered between 1.0m - 2.0m depth. 3. Water standing in borehole at 0.6m depth.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School		Project No.: 14209		Borehole No.: WS08 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Coordinates:		Hole Type: WLS	
Equipment: DART 554				Diameter of Casing:		Level:		Scale 1:25	
Diameter of Boring: 101+96+86+76+64mm				Depth of Casing:		Dates 19/05/2023 -		Logged By: FG	

Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30		Vegetation over soft brown slightly silty slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular of limestone.		
		0.40	ES				MADE GROUND: Soft black, brownish grey ad grey sandy very gravelly CLAY with occasional cobbles of sub-angular brick. Gravel is fine to coarse sub-angular brick. Gravel is fine to coarse sub-angular of sandstone, brick, fine ash and clinker, and vitreous and vesicular slag.		
		1.00	C	N=13 (3,2/2,3,4,4)	1.00		Very poor recovery between 1.0m and 2.0m. (Recovered as firm clayey gravelly cobble of fine to coarse sub-angular fine ash and clinker)	1	
		2.00	C	N=10 (3,1/3,2,2,3)	2.00		MADE GROUND: Firm locally soft greyish brown sandy slightly gravelly CLAY. Gravel is fine and medium sub-rounded sandstone and limestone.	2	
		3.00	C	N=13 (2,3/2,4,4,3)				3	
		4.00	C	N=5 (1,1/1,2,1,1)				4	
		4.80			4.80		Soft purplish black spongy fibrous PEAT.		
		5.00	C	N=19 (2,2/3,4,5,7)	5.00		End of Borehole at 5.00 m	5	

Remarks: 1. Refusal of windowless sampler at 5.0m below existing ground level. 2. Water strike encountered between 4.0m - 5.0m depth. 3. Water standing in borehole at 3.5m depth. 4. Installation of ground gas monitoring well within borehole.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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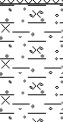
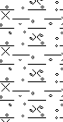
		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School		Project No.: 14209		Borehole No.: WS09 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Coordinates:		Hole Type: WLS	
Equipment: DART 554				Diameter of Casing:		Level:		Scale 1:25	
Diameter of Boring: 101+96+86mm				Depth of Casing:		Dates 19/05/2023 -		Logged By: FG	

Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
	 2.20				0.30		Grass over soft brown silty slightly sandy gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular of limestone.		
		0.50	ES			0.80		MADE GROUND: Soft brown mottled orange and red slightly silty slightly gravelly slightly sandy CLAY. Gravel is fine to coarse sub-angular of brick, concrete and limestone.	
		1.00	C	N=5 (2,1/1,2,0,2)	1.00		MADE GROUND: Soft brownish grey silty sandy gravelly CLAY with low cobble content of sub-angular concrete and limestone. Gravel is fine to coarse sub-angular of limestone, concrete, fine ash and rare clinker.	1	
					1.70		MADE GROUND: Soft greyish brown silty slightly gravelly CLAY. Gravel is fine to coarse sub-angular of sandstone and limestone.		
		2.00	C	N=9 (1,2/1,3,3,2)	2.00		Firm grey locally black slightly silty slightly gravelly peaty CLAY with frequent decaying fibrous organic matter. Gravel is fine to coarse sub-angular and sub-rounded of limestone.	2	
		3.00	C	50 (10,18/50 for 10mm)	3.00		Firm grey and brown slightly silty slightly sandy gravelly CLAY. Gravel is fine to coarse sub-angular and sub-rounded of sandstone and limestone.	3	
End of Borehole at 3.00 m								4	
								5	

Remarks: 1. Refusal of windowless sampler at 3.0m below existing ground level. 2. Water strike encountered between 2.0m - 3.0m depth. 3. Water standing in borehole at 2.2m depth.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation			
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		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School		Project No.: 14209		Borehole No.: WS10 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Coordinates:		Hole Type: WLS	
Equipment: DART 554				Diameter of Casing:		Level:		Scale 1:25	
Diameter of Boring: 101+96+86+76mm				Depth of Casing:		Dates 19/05/2023 -		Logged By: FG	

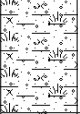
Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40	ES		0.20			Soft brown silty slightly gravelly organic rich CLAY with frequent roots and rootlets. Gravel is fine to coarse sub-angular of limestone.	
								MADE GROUND: Soft brown mottled orangish brown silty very slightly sandy CLAY.	
		1.00	C	N=7 (1,1/1,2,2,2)	0.80			Soft becoming stiff greyish brown slightly silty slightly gravelly CLAY. Gravel is fine to coarse sub-angular of limestone and sandstone.	1
		2.00	C	N=14 (3,6/3,4,4,3)					2
		3.00	C	N=33 (4,5/6,8,8,11)					3
		3.45	C	50 (12,15/50 for 105mm)	3.40			End of Borehole at 3.40 m	4
									5

Remarks: 1. Refusal of windowless sampler at 3.4m below existing ground level. 2. No groundwater encountered.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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APPENDIX F

SHELL AND AUGER BOREHOLE LOGS

		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School		Project No.: 14209		Borehole No.: BH01 Sheet 1 of 2	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Coordinates:		Hole Type: CP	
Equipment: Dando 2000				Diameter of Casing: 200mm		Level:		Scale 1:25	
Diameter of Boring: 115mm				Depth of Casing: 5.00m		Dates 07/06/2023 - 08/06/2023		Logged By: FG	

Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
	1.00	1.00	B	N=4 (3,2/1,0,1,2)	1.50		MADE GROUND: Grass over very soft to soft brown slightly silty gravelly CLAY with frequent rootlets and high cobble and boulder content of sub-angular and sub-rounded sandstone, mudstone, concrete and brick. Gravel is fine to coarse angular to sub-rounded of sandstone, mudstone, concrete, brick, fine ash and clinker. Inclusions of metal reinforcement bar. ... chiselling between 0.4m and 0.6m depth for 30 minutes on obstruction.	1	
	1.20	1.00	C						
		2.00	B	N=11 (2,2/3,2,3,3)	1.90	Soft becoming firm dark brown slightly sandy slightly gravelly peaty CLAY with occasional fibrous organic matter. Gravel is fine and medium angular of mudstone.	2		
		2.00	C						
		3.00	B	N=6 (1,2/1,1,2,2)	3.40	Firm becoming soft greyish brown silty gravelly CLAY with moderate cobble and boulder content of sub-angular to rounded sandstone. Gravel is fine to coarse sub-angular to rounded sandstone and mudstone.	3		
	3.00	C							
	4.00	B	N=35 (3,4/8,12,8,7)		Soft becoming stiff dark brown and greyish brown silty gravelly CLAY with high cobble and boulder content of sub-angular and sub-rounded sandstone. Gravel is fine to coarse sub-angular to rounded of sandstone and mudstone.	4			
	4.00	C							
		5.00	B			... chiselling between 4.5m and 4.7m depth for 2 hours on obstruction.	5		

Remarks: 1. Refusal of shell and auger borehole on suspected boulder obstruction or sandstone bedrock at 5.3m depth. 2. Water strike encountered at 1.2m depth rising to 1.0m depth after 20 minutes.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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Intégral Géotechnique		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School			Project No.: 14209		Borehole No.: BH01 Sheet 2 of 2	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC			Coordinates:		Hole Type: CP	
Equipment: Dando 2000				Diameter of Casing: 200mm			Level:		Scale 1:25	
Diameter of Boring: 115mm				Depth of Casing: 5.00m			Dates 07/06/2023 - 08/06/2023		Logged By: FG	
Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		5.00	C	50 (25 for 75mm/50 for 60mm)	5.30			... chiselling between 5.0m and 5.3m depth for 1 hour and 45 minutes on obstruction.		
								End of Borehole at 5.30 m		
Remarks: 1. Refusal of shell and auger borehole on suspected boulder obstruction or sandstone bedrock at 5.3m depth. 2. Water strike encountered at 1.2m depth rising to 1.0m depth after 20 minutes.										
Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)							W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation			
AGS										

		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School		Project No.: 14209		Borehole No.: BH02 Sheet 1 of 2	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Coordinates:		Hole Type: CP	
Equipment: Dando 2000				Diameter of Casing: 200mm		Level:		Scale 1:25	
Diameter of Boring: 115mm				Depth of Casing: 6.50m		Dates 08/06/2023 - 09/06/2023		Logged By: FG	

Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
	0.40						MADE GROUND: Grass over soft becoming stiff greyish brown very silty gravelly CLAY with high cobble and boulder content of sandstone and brick. Gravel is fine to coarse angular to sub-rounded of sandstone and brick. Inclusions of timber. <i>... chiselling between 0.4m and 0.8m depth for 2 hours on obstruction.</i>		
		1.00 1.00	B C	N=21 (4,10/5,11,1,4)				1	
		1.30							
		2.00 2.00	B C	N=32 (1,1/11,11,6,4)				2	
		2.80							
		3.00 3.00	B C	N=7 (1,0/1,2,2,2)			Firm greyish brown silty sandy gravelly CLAY with moderate cobble and boulder content of sub-angular to rounded sandstone. Gravel is fine to coarse sub-angular and sub-rounded of sandstone and mudstone.	3	
		4.00 4.00	B C	N=10 (1,1/2,2,3,3)				4	
		4.60					Firm becoming stiff dark brown and greyish brown silty sandy gravelly CLAY with high cobble and boulder content of sub-angular to rounded sandstone. Gravel is fine to coarse sub-angular to rounded sandstone and mudstone.		
		5.00	B					5	

Remarks: 1. Refusal of shell and auger borehole on suspected boulder obstruction or sandstone bedrock at 6.5m depth. 2. Installation of ground gas/water monitoring well within borehole. 3. Water strike encountered at 1.3m depth rising to 0.4m depth after 20 minutes.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School				Project No.: 14209		Borehole No.: BH02 Sheet 2 of 2			
Location: Merthyr Tydfil				Client: Morgan Sindall PLC				Coordinates:		Hole Type: CP	
Equipment: Dando 2000				Diameter of Casing: 200mm				Level:		Scale 1:25	
Diameter of Boring: 115mm				Depth of Casing: 6.50m				Dates 08/06/2023 - 09/06/2023		Logged By: FG	
Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		5.00	C	N=16 (2,4/4,3,4,5)				End of Borehole at 6.50 m			
		6.50 6.50	B C	50 (7,21/50 for 70mm)							
Remarks: 1. Refusal of shell and auger borehole on suspected boulder obstruction or sandstone bedrock at 6.5m depth. 2. Installation of ground gas/water monitoring well within borehole. 3. Water strike encountered at 1.3m depth rising to 0.4m depth after 20 minutes. Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone) W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation											

		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School		Project No.: 14209		Borehole No.: BH03 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Coordinates:		Hole Type: CP	
Equipment: Dando 2000				Diameter of Casing: 200mm		Level:		Scale 1:25	
Diameter of Boring: 115mm				Depth of Casing: 4.10m		Dates 12/06/2023 - 12/06/2023		Logged By: FG	

Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
	1.00  1.10	1.00 1.00	B C	N=25 (1,0/1,6,7,11)			MADE GROUND: Grass over soft brown slightly silty slightly sandy gravelly CLAY with frequent rootlets and high cobble and boulder content of sub-angular sandstone and vesicular slag. Gravel is fine to coarse sub-angular to rounded of sandstone, mudstone, concrete and vesicular slag.	1	
		2.00 2.00	B C	50 (25 for 50mm/50 for 10mm)	2.50		... chiselling between 2.0m and 2.4m depth for 1 hour on obstruction.	2	
		3.00 3.00	B C	N=69 (3,4/7,15,21,26)	2.90		Soft to firm greyish brown silty gravelly CLAY with moderate cobble and boulder content of sub-rounded sandstone. Gravel is fine to coarse angular to sub-rounded of sandstone and mudstone.	3	
		4.00 4.00	B C	50 (6,6/50 for 50mm)	4.10		Firm to stiff brown slightly silty slightly sandy gravelly CLAY with high cobble and boulder content of sub-angular and sub-rounded sandstone. Gravel is fine to coarse sub-angular and sub-rounded of sandstone and mudstone. ... chiselling between 3.2m and 3.6m depth for 1 hour on obstruction.	4	
							End of Borehole at 4.10 m	5	

Remarks: 1. Refusal of shell and auger borehole on suspected boulder obstruction obstruction or sandstone bedrock at 4.1m depth. 2. Water strike encountered at 1.1m depth rising to 1.0m depth after 20 minutes.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation	
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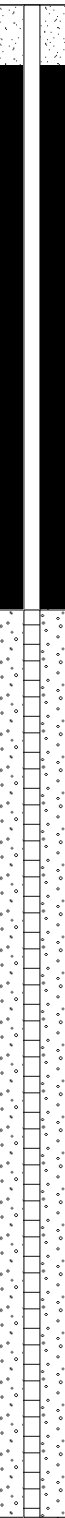


		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School			Project No.: 14209		Borehole No.: BH04 Sheet 1 of 1	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC			Coordinates:		Hole Type: CP	
Equipment: Dando 2000				Diameter of Casing: 200mm			Level:		Scale 1:25	
Diameter of Boring: 115mm				Depth of Casing: 4.00m			Dates 13/06/2023 - 14/06/2023		Logged By: FG	

Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		1.00 1.00	B C	N=7 (2,3/1,1,3,2)				1	
							... chiselling between 1.6m and 1.8m depth for 30 minutes on obstruction.		
							... chiselling between 2.0m and 2.4m depth for 1 hour and 30 minutes on obstruction.	2	
		2.00 2.00	B C	50 (50 for 75mm/50 for 60mm)	2.40		Soft brown silty slightly gravelly peaty CLAY. Gravel is fine to coarse sub-angular and sub-rounded sandstone and mudstone.		
					2.80		Firm brownish grey silty gravelly CLAY with high cobble and boulder content of sub-angular to rounded sandstone. Gravel is fine to coarse sub-angular and sub-rounded of sandstone and mudstone.		
		3.00 3.00	B C	N=15 (2,2/3,3,4,5)				3	
		4.00 4.00	B C	50 (50 for 75mm/50 for 5mm)	4.00		End of Borehole at 4.00 m	4	
								5	

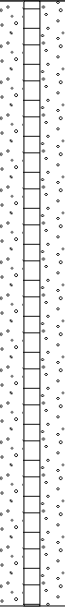
Remarks: 1. Refusal of shell and auger borehole on suspected boulder obstruction or sandstone bedrock at 4.0m depth. 2. No groundwater encountered.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School		Project No.: 14209		Borehole No.: BH05 Sheet 1 of 2	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Coordinates:		Hole Type: CP	
Equipment: Dando 2000				Diameter of Casing: 200mm		Level:		Scale 1:25	
Diameter of Boring: 115mm				Depth of Casing: 6.70m		Dates 14/06/2023 - 15/06/2023		Logged By: FG	

Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		1.00 1.00	B C	N=15 (4,5/4,3,4,4)			MADE GROUND: Grass over soft becoming firm brown silty slightly sandy gravelly CLAY with common roots and rootlets and high cobble and boulder content of sub-angular sandstone and brick. Gravel is fine to coarse sub-angular and sub-rounded of sandstone, mudstone, brick, and vitreous and vesicular slag. Inclusions of timber.	1	
		2.00 2.00	B C	N=56 (1,5/3,17,21,15)			... chiselling between 1.6m and 2.0m depth for 1 hour and 30 minutes on obstruction.	2	
		3.00 3.00	B C	N=4 (1,1/1,1,1,1)	2.70		Soft brown silty slightly gravelly peaty CLAY. Gravel is fine to coarse sub-angular and sub-rounded sandstone and mudstone.	3	
		4.00 4.00	B C	N=10 (1,2/3,2,3,2)	3.40		Firm brown slightly sandy gravelly CLAY with high cobble and boulder content of sub-angular and sub-rounded sandstone. Gravel is fine to coarse sub-angular to rounded of sandstone and mudstone.	4	
		5.00	B					5	

Remarks: 1. Refusal of shell and auger borehole on suspected boulder obstruction or sandstone bedrock at 7.1m depth. 2. Installation of ground gas/water monitoring well within borehole. 3. No groundwater encountered.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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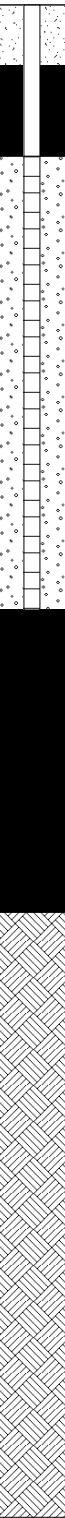
		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School			Project No.: 14209		Borehole No.: BH05 Sheet 2 of 2	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC			Coordinates:		Hole Type: CP	
Equipment: Dando 2000				Diameter of Casing: 200mm			Level:		Scale 1:25	
Diameter of Boring: 115mm				Depth of Casing: 6.70m			Dates 14/06/2023 - 15/06/2023		Logged By: FG	

Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		5.00	C	N=14 (2,3/3,4,3,4)					
		6.50	B						
	6.50	C	68 (4,4/68 for 145mm)						
					7.10		... chiselling between 6.7m and 7.1m depth for 2 hour on obstruction.		
							End of Borehole at 7.10 m		

Remarks: 1. Refusal of shell and auger borehole on suspected boulder obstruction or sandstone bedrock at 7.1m depth. 2. Installation of ground gas/water monitoring well within borehole. 3. No groundwater encountered.				Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)				W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation			
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		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name: Geotre Primary School		Project No.: 14209		Borehole No.: BH06 Sheet 1 of 3	
Location: Merthyr Tydfil				Client: Morgan Sindall PLC		Coordinates:		Hole Type: CP	
Equipment: Dando 2000				Diameter of Casing: 200mm		Level:		Scale 1:25	
Diameter of Boring: 115mm				Depth of Casing: 10.00m		Dates 16/06/2023 - 19/06/2023		Logged By: FG	

Well	Water Strikes	Samples & In situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		1.00 1.00	B C	N=4 (8,3/1,1,1,1)	2.50		MADE GROUND: Grass over soft becoming stiff brown and greyish brown slightly silty slightly sandy gravelly CLAY with moderate cobble and boulder content of sub-angular sandstone and brick. Gravel is fine to coarse sub-angular to rounded of sandstone, mudstone, brick, fine ash and vesicular slag. Inclusions of timber. ... chiselling between 0.4m and 0.7m depth for 30 minutes on obstruction.	1	
		2.00 2.00	B C	N=24 (1,1/1,7,4,12)				2	
		3.00 3.00	B C	50 (50 for 75mm/50 for 10mm)				3	
		4.00 4.00	B C	N=7 (1,2/1,2,2,2)				4	
		5.00	B					5	

Remarks: 1. Refusal of shell and auger borehole on suspected boulder obstruction or sandstone bedrock at 10.0m depth. 2. Installation of ground gas/water monitoring well within borehole. 3. Water strike encountered at 6.5m depth rising to 1.8m depth after 20 minutes.		Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample SPT - Standard Penetration Test (split spoon) CPT - Standard Penetration Test (solid cone)		W - Water sample U - Undisturbed sample TCR - Total Core Recovery SCR - Solid Core Recovery RQD - Rock Quality Designation		
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APPENDIX G

SOIL INFILTRATION TEST CALCULATION SHEETS

14209 - Proposed Geotre Primary School, Merthyr Tydfil

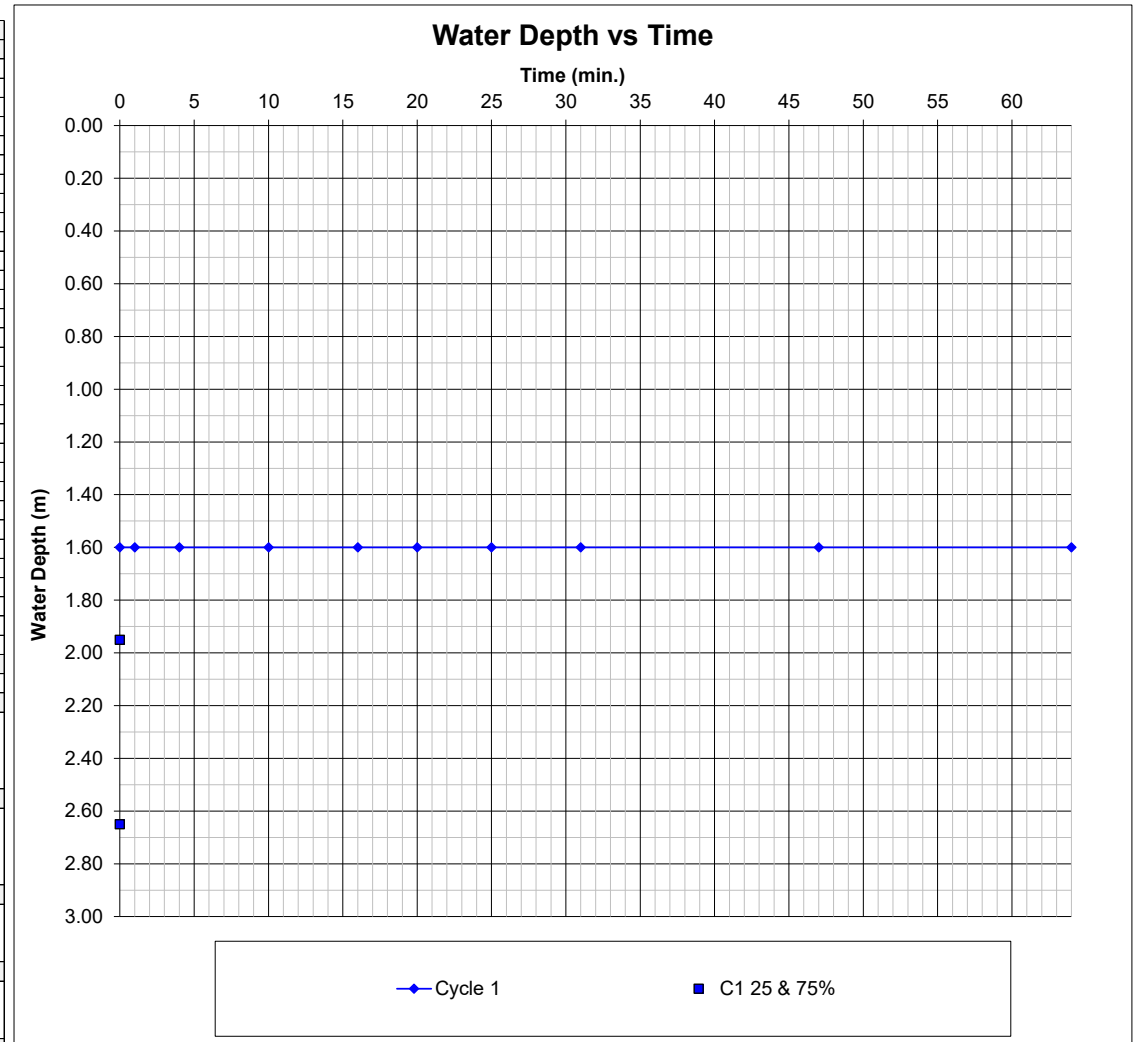
BRE365 SOIL INFILTRATION RATE TEST - SA02

14209 - Proposed Geotre Primary School, Merthyr Tydfil

Trial Pit Information	
Length (m)	3.00
Width (m)	0.60
Depth (m)	3.00
Groundwater	Dry
Weather Conditions	Cloudy
Date	22.05.2023

Remarks
1. Insufficient infiltration in order to calculate design infiltration rate. Test failed.

	Cycle 1	Cycle 2	Cycle 3
Final Excavation Depth (m)			
At end of testing cycle	3.00		
Water Depths (m)			
Water depth at start of test	1.60		
Water depth at end of test	1.60		
Effective depth (measured)	0.00		
% Effective storage depth	0.00		
Effective Storage Depths (m)			
Effective storage depth (100%)	1.40		
Effective storage depth (75%)	1.05		
Effective storage depth (50%)	0.70		
Effective storage depth (25%)	0.35		
Outflow Time (min)			
Time for measured outflow	64		
Time for 100% outflow			
Time for 75-25% outflow			
Volume of Outflow (m³)			
Over measured effective depth	0.00		
Over 100% effective depth	2.52		
From 75% - 25% effective depth	1.26		
Surface Area (m²)			
For 100% effective storage	11.88		
For 50% effective storage	6.84		
Over measured depth	1.80		
Soil Infiltration Rate (m/s)			
Over 100% effective depth			
Over measured depth			
Over 75% - 25% effective depth			



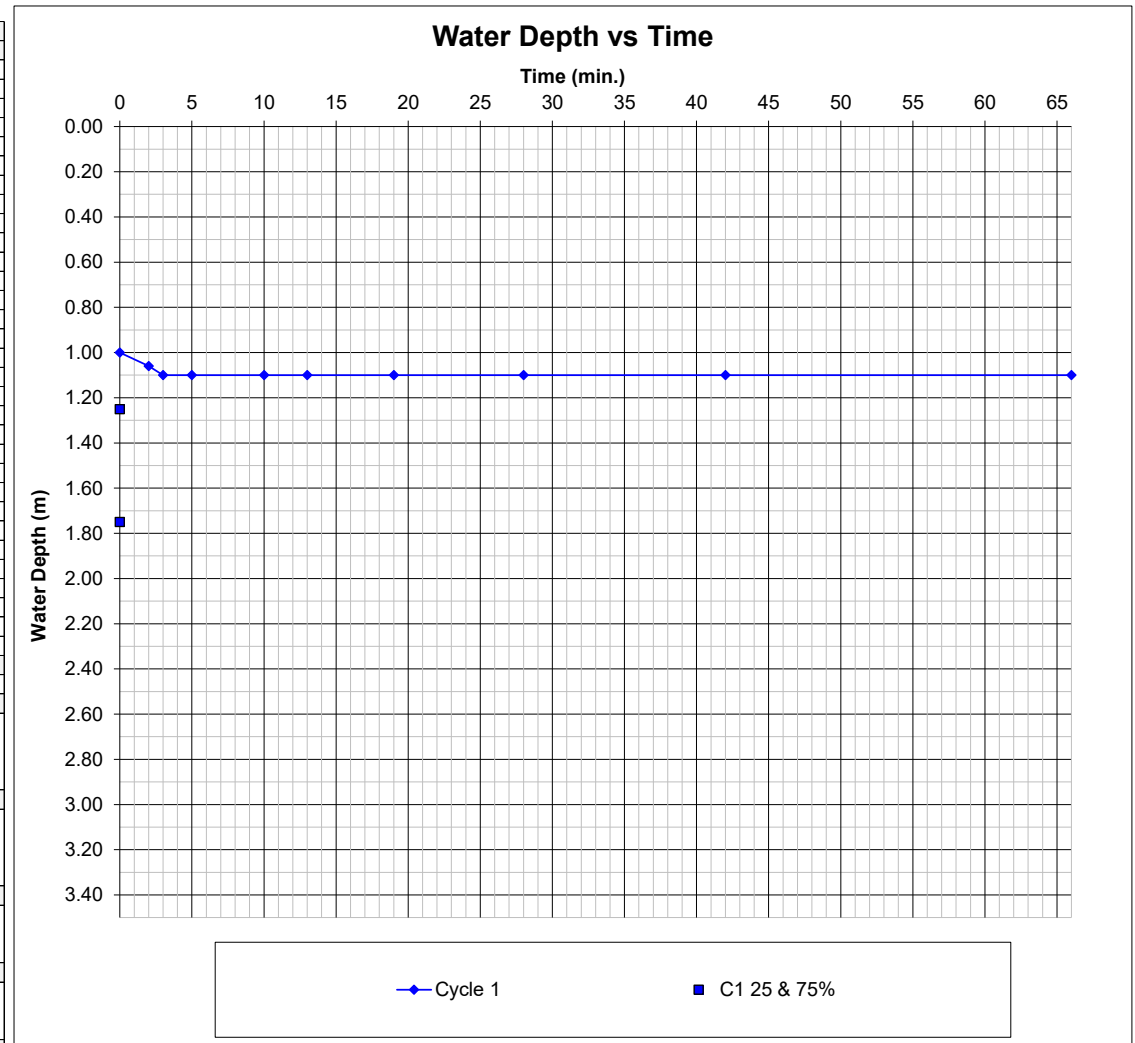
BRE365 SOIL INFILTRATION RATE TEST - SA03

14209 - Proposed Geotre Primary School, Merthyr Tydfil

Trial Pit Information	
Length (m)	2.30
Width (m)	0.60
Depth (m)	3.50
Groundwater	Seepage at 1.1m
Weather Conditions	Sunny
Date	22.05.2023

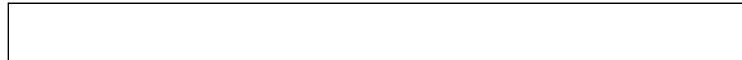
Remarks
1. Insufficient infiltration in order to calculate design infiltration rate. Test failed.

Final Excavation Depth (m)	Cycle 1	Cycle 2	Cycle 3
At end of testing cycle	2.00		
Water Depths (m)			
Water depth at start of test	1.00		
Water depth at end of test	1.10		
Effective depth (measured)	0.10		
% Effective storage depth	0.10		
Effective Storage Depths (m)			
Effective storage depth (100%)	1.00		
Effective storage depth (75%)	0.75		
Effective storage depth (50%)	0.50		
Effective storage depth (25%)	0.25		
Outflow Time (min)			
Time for measured outflow	66		
Time for 100% outflow			
Time for 75-25% outflow			
Volume of Outflow (m ³)			
Over measured effective depth	0.14		
Over 100% effective depth	1.38		
From 75% - 25% effective depth	0.69		
Surface Area (m ²)			
For 100% effective storage	7.18		
For 50% effective storage	4.28		
Over measured depth	1.96		
Soil Infiltration Rate (m/s)	Cycle 1	Cycle 2	Cycle 3
Over 100% effective depth			
Over measured depth			
Over 75% - 25% effective depth			



14209 - Proposed Geotre Primary School, Merthyr Tydfil

Final Excavation Depth (m)	Cycle 1	Cycle 2	Cycle 3
At end of testing cycle	3.00		
Water Depths (m)			
Water depth at start of test	1.80		
Water depth at end of test	1.80		
Effective depth (measured)	0.00		
% Effective storage depth	0.00		
Effective Storage Depths (m)			
Effective storage depth (100%)	1.20		
Effective storage depth (75%)	0.90		
Effective storage depth (50%)	0.60		
Effective storage depth (25%)	0.30		
Outflow Time (min)			
Time for measured outflow	61		
Time for 100% outflow			
Time for 75-25% outflow			
Volume of Outflow (m³)			
Over measured effective depth	0.00		
Over 100% effective depth	1.94		
From 75% - 25% effective depth	0.97		
Surface Area (m²)			
For 100% effective storage	9.54		
For 50% effective storage	5.58		
Over measured depth	1.62		
Soil Infiltration Rate (m/s)	Cycle 1	Cycle 2	Cycle 3
Over 100% effective depth			
Over measured depth			
Over 75% - 25% effective depth			



14209 - Proposed Geotre Primary School, Merthyr Tydfil

Remarks
1. Insufficient infiltration in order to calculate design infiltration rate. Test failed.

Water Depth vs Time

Time (min.)

Water Depth (m)

Legend:

- ◆— Cycle 1
- C1 25 & 75%

Time (min.)	Water Depth (m) - Cycle 1	Water Depth (m) - C1 25 & 75%
0	2.50	2.82
1	2.50	3.45
5	2.50	
15	2.50	
22	2.50	
30	2.50	
37	2.50	
45	2.50	

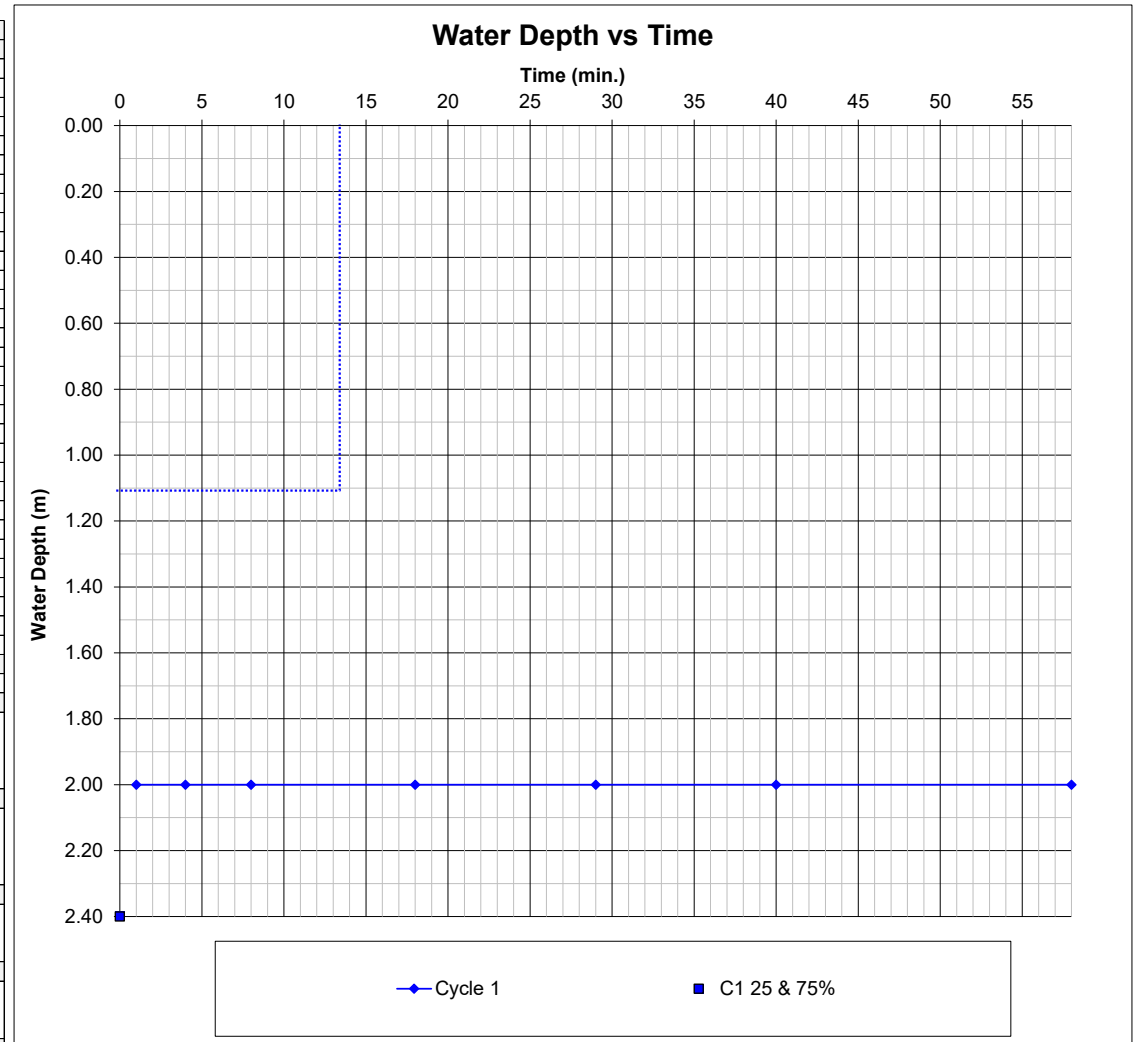
BRE365 SOIL INFILTRATION RATE TEST - SA06

14209 - Proposed Geotre Primary School, Merthyr Tydfil

Trial Pit Information	
Length (m)	2.80
Width (m)	0.60
Depth (m)	3.60
Groundwater	Seeages at 3.3m
Weather Conditions	Sunny
Date	23.05.2023

Remarks
1. Insufficient infiltration in order to calculate design infiltration rate. Test failed.

	Cycle 1	Cycle 2	Cycle 3
Final Excavation Depth (m)			
At end of testing cycle	3.60		
Water Depths (m)			
Water depth at start of test	2.00		
Water depth at end of test	2.00		
Effective depth (measured)	0.00		
% Effective storage depth	0.00		
Effective Storage Depths (m)			
Effective storage depth (100%)	1.60		
Effective storage depth (75%)	1.20		
Effective storage depth (50%)	0.80		
Effective storage depth (25%)	0.40		
Outflow Time (min)			
Time for measured outflow	58		
Time for 100% outflow			
Time for 75-25% outflow			
Volume of Outflow (m³)			
Over measured effective depth	0.00		
Over 100% effective depth	2.69		
From 75% - 25% effective depth	1.34		
Surface Area (m²)			
For 100% effective storage	12.56		
For 50% effective storage	7.12		
Over measured depth	1.68		
Soil Infiltration Rate (m/s)			
Over 100% effective depth			
Over measured depth			
Over 75% - 25% effective depth			



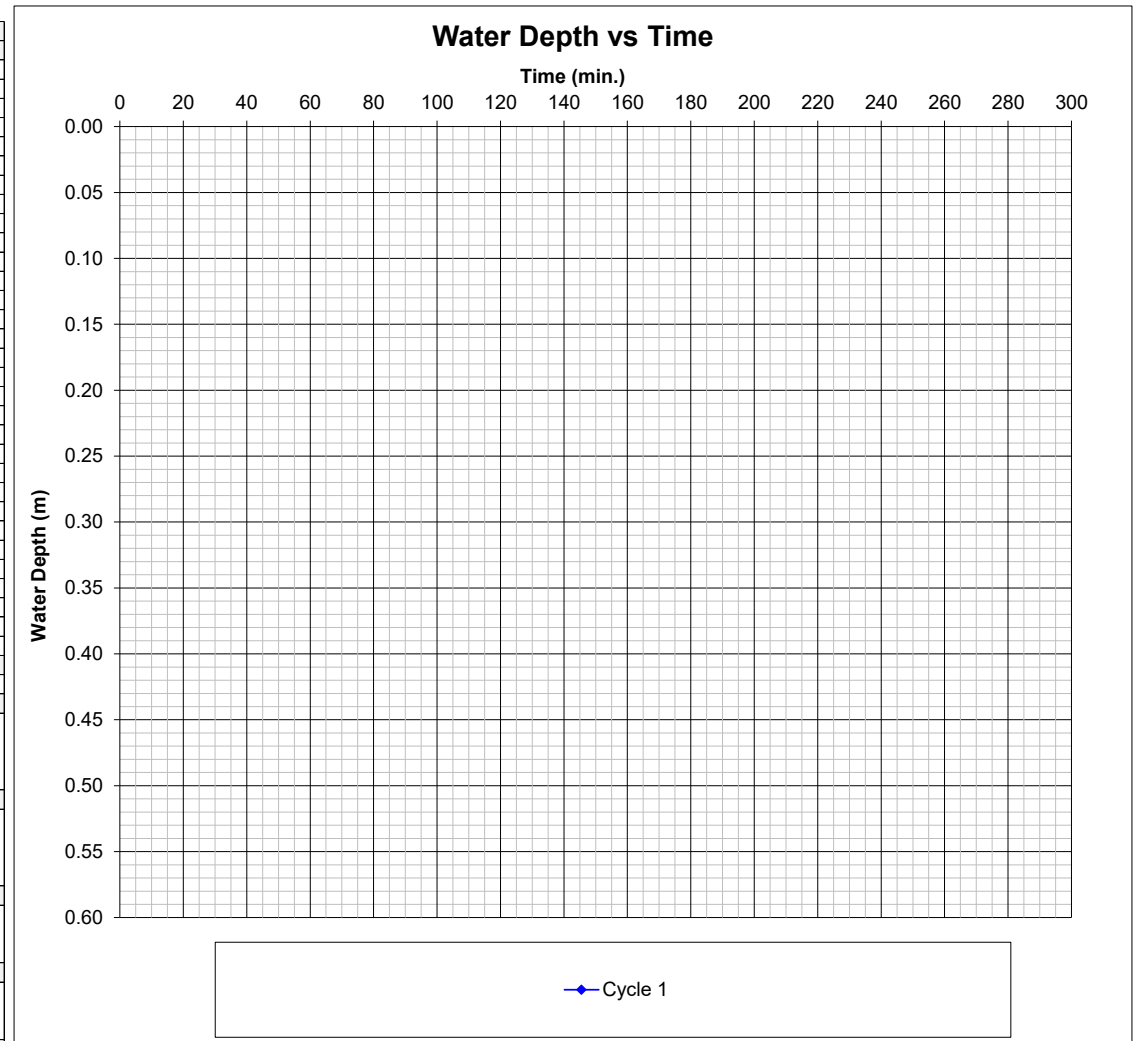
BRE365 SOIL INFILTRATION RATE TEST - SA07

14209 - Proposed Geotre Primary School, Merthyr Tydfil

Trial Pit Information	
Length (m)	2.60
Width (m)	0.60
Depth (m)	0.60
Groundwater	Inflow at 0.3m
Weather Conditions	Light Rain
Date	22.05.2023

Remarks
1. Insufficient infiltration in order to calculate design infiltration rate. Test failed.
2. Extremely fast groundwater inflow at 0.3m. Trial pit and soil infiltration testing abandoned.

Final Excavation Depth (m)	Cycle 1	Cycle 2	Cycle 3
At end of testing cycle			
Water Depths (m)			
Water depth at start of test			
Water depth at end of test			
Effective depth (measured)			
% Effective storage depth			
Effective Storage Depths (m)			
Effective storage depth (100%)			
Effective storage depth (75%)			
Effective storage depth (50%)			
Effective storage depth (25%)			
Outflow Time (min)			
Time for measured outflow			
Time for 100% outflow			
Time for 75-25% outflow			
Volume of Outflow (m³)			
Over measured effective depth			
Over 100% effective depth			
From 75% - 25% effective depth			
Surface Area (m²)			
For 100% effective storage			
For 50% effective storage			
Over measured depth			
Soil Infiltration Rate (m/s)	Cycle 1	Cycle 2	Cycle 3
Over 100% effective depth			
Over measured depth			
Over 75% - 25% effective depth			



APPENDIX H

LABORATORY CHEMICAL TEST RESULTS

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 Integral Geotechnique
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 CF83 2AX

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i2 Analytical Ltd.
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 Croxley Green
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 Watford,
 Herts,
 WD18 8YS

t: 01923 225404
 f: 01923 237404
 e: reception@i2analytical.com

Analytical Report Number : 23-37687

Replaces Analytical Report Number: 23-37687, issue no. 1

Additional analysis undertaken.

Asbestos Quantification added to sample 2703584 as per clients request

Project / Site name:	Proposed Geotre Primary School Marthyr Tydfill	Samples received on:	25/05/2023
Your job number:	14209	Samples instructed on/ Analysis started on:	06/06/2023
Your order number:	14209-FG	Analysis completed by:	19/06/2023
Report Issue Number:	2	Report issued on:	23/06/2023
Samples Analysed:	14 soil samples		

Signed: _____

Joanna Wawrzeczko
 Reporting Specialist
 For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
 leachates - 2 weeks from reporting
 waters - 2 weeks from reporting
 asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
 Application of uncertainty of measurement would provide a range within which the true result lies.
 An estimate of measurement uncertainty can be provided on request.

Sample Deviation Report



Analytical Report Number: 23-37687

Project / Site name: Proposed Geotire Primary School Marthyr Tydfill

Your Order No: 14209-FG

Lab Sample Number	2703580				2703581	2703582	2703583	2703584
Sample Reference	WS01				WS02	WS03	WS04	WS05
Sample Number	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.30				0.10	0.35	1.00	0.40
Date Sampled	18/05/2023				18/05/2023	18/05/2023	18/05/2023	18/05/2023
Time Taken	0900				0930	1030	1100	1130
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	92	< 0.1
Moisture Content	%	0.01	NONE	6.8	52	14	2.6	14
Total mass of sample received	kg	0.001	NONE	0.9	0.9	0.9	0.9	0.9

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	Chrysotile & Amosite
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	< 0.001
Asbestos Analyst ID	N/A	N/A	N/A	IZJ	IZJ	IZJ	IZJ	SCA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.3	6.3	5.8	10.1	8.2
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	620	1800	420	560	960
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.059	0.12	0.017	0.31	0.029
Sulphide	mg/kg	1	MCERTS	1000	1.7	5.7	U/S**	86
Total Sulphur	mg/kg	50	MCERTS	2800	720	290	9600	1000
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.7	-	1.1	0.3	2
Total Organic Carbon (TOC) - Manual	%	0.1	MCERTS	-	8.1	-	-	-
Loss on Ignition @ 450oC	%	0.2	MCERTS	2.1	17.2	3.9	0.6	10

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.1	< 0.05	< 0.05	0.14
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.11	< 0.05	< 0.05	0.08
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.11	< 0.05	< 0.05	0.08
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.29	0.05	< 0.05	0.92
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.05	< 0.05	< 0.05	0.21
Fluoranthene	mg/kg	0.05	MCERTS	0.06	0.3	0.07	< 0.05	1.8
Pyrene	mg/kg	0.05	MCERTS	0.07	0.26	0.05	< 0.05	1.4
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.05	0.23	< 0.05	< 0.05	1.2
Chrysene	mg/kg	0.05	MCERTS	0.07	0.27	< 0.05	< 0.05	1.2
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.09	0.45	< 0.05	< 0.05	1.6
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.12	< 0.05	< 0.05	0.46
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.06	0.24	< 0.05	< 0.05	0.9
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.16	< 0.05	< 0.05	0.51
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.07	< 0.05	< 0.05	0.2
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.21	< 0.05	< 0.05	0.62

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	2.97	< 0.80	< 0.80	11.2
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Sample Deviation Report



Analytical Report Number: 23-37687

Project / Site name: Proposed Geotre Primary School Marthyr Tydfill

Your Order No: 14209-FG

Lab Sample Number	2703580	2703581	2703582	2703583	2703584
Sample Reference	WS01	WS02	WS03	WS04	WS05
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.30	0.10	0.35	1.00	0.40
Date Sampled	18/05/2023	18/05/2023	18/05/2023	18/05/2023	18/05/2023
Time Taken	0900	0930	1030	1100	1130
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.2	10	13	4.3	18
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	2.3	0.51	0.41	5.4	1.6
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	1.3	0.3	0.3	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.6	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	2.1	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	11	16	14	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	16	22	17	8.3	76
Lead (aqua regia extractable)	mg/kg	1	MCERTS	23	58	41	3.6	130
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	0.6
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14	13	15	3.7	29
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	27	15	22	30	31
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	39	77	67	7.9	150

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Sample Deviation Report



Analytical Report Number: 23-37687

Project / Site name: Proposed Geotire Primary School Marthyr Tydfill

Your Order No: 14209-FG

Lab Sample Number	2703585				2703586	2703587	2703588	2703589
Sample Reference	WS06				WS09	WS10	SA03	TP03
Sample Number	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.40				0.50	0.40	0.40	0.30
Date Sampled	18/05/2023				19/05/2023	19/05/2023	22/05/2023	22/05/2023
Time Taken	1200				1000	1100	1130	1430
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	9.9	20	15	14
Total mass of sample received	kg	0.001	NONE	0.9	0.9	0.9	0.9	0.9

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	IZJ	IZJ	IZJ	IZJ	IZJ

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.7	8.5	7	8.5	8
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	1900	450	550	600	310
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.1	0.055	0.0065	0.043	0.018
Sulphide	mg/kg	1	MCERTS	6.6	34	8.5	43	14
Total Sulphur	mg/kg	50	MCERTS	900	340	330	700	310
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2.4	0.5	2	1.3	1.3
Total Organic Carbon (TOC) - Manual	%	0.1	MCERTS	-	-	-	-	-
Loss on Ignition @ 450oC	%	0.2	MCERTS	12	2.2	5	4.9	3.9

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.15	< 0.05	< 0.05	1.1	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.19	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.25	< 0.05	1.1	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.28	< 0.05	1	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.32	1	0.09	7.3	0.11
Anthracene	mg/kg	0.05	MCERTS	0.05	0.35	< 0.05	2	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.49	1.3	0.12	14	0.18
Pyrene	mg/kg	0.05	MCERTS	0.41	0.97	0.09	12	0.14
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.41	0.79	0.06	6.4	0.09
Chrysene	mg/kg	0.05	MCERTS	0.67	0.81	0.06	6	0.11
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.71	0.81	< 0.05	8.7	0.15
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.21	0.3	< 0.05	2.7	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.29	0.54	< 0.05	5	0.08
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.23	0.27	< 0.05	2.7	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.14	< 0.05	< 0.05	0.75	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.31	0.28	< 0.05	2.7	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	4.39	7.95	< 0.80	74.1	0.86
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Sample Deviation Report



Analytical Report Number: 23-37687

Project / Site name: Proposed Geotre Primary School Marthyr Tydfill

Your Order No: 14209-FG

Lab Sample Number				2703585	2703586	2703587	2703588	2703589
Sample Reference				WS06	WS09	WS10	SA03	TP03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.50	0.40	0.40	0.30
Date Sampled				18/05/2023	19/05/2023	19/05/2023	22/05/2023	22/05/2023
Time Taken				1200	1000	1100	1130	1430
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	11	27	14	13
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2	0.76	0.39	1.3	0.79
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	0.6	0.7	0.4	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	20	16	14	30	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	180	19	18	33	26
Lead (aqua regia extractable)	mg/kg	1	MCERTS	180	27	48	57	51
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	17	12	19	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	28	24	23	50	24
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	140	49	73	86	95

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Sample Deviation Report



Analytical Report Number: 23-37687

Project / Site name: Proposed Geotre Primary School Marthyr Tydfill

Your Order No: 14209-FG

Lab Sample Number				2703590	2703591	2703592	2703593
Sample Reference				SA04	SA06	TP04	TP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70	0.40	0.30	0.40
Date Sampled				23/05/2023	23/05/2023	23/05/2023	23/05/2023
Time Taken				0930	1130	1215	1300
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	27	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	18	13	18
Total mass of sample received	kg	0.001	NONE	0.9	0.9	0.9	0.9

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	MWI	MWI	MWI	MWI

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	12.1	9.1	7.9	7.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	6600	720	410	1300
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0095	0.41	0.13	0.18
Sulphide	mg/kg	1	MCERTS	49	56	43	12
Total Sulphur	mg/kg	50	MCERTS	2900	1200	760	940
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.6	1	0.9	5.1
Total Organic Carbon (TOC) - Manual	%	0.1	MCERTS	-	-	-	-
Loss on Ignition @ 450oC	%	0.2	MCERTS	3.9	2.8	2.5	21.3

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.15
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.14	0.11	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.15	0.07	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.16	0.31	0.42	0.72
Anthracene	mg/kg	0.05	MCERTS	0.05	0.05	0.1	0.12
Fluoranthene	mg/kg	0.05	MCERTS	0.18	0.12	0.61	0.96
Pyrene	mg/kg	0.05	MCERTS	0.17	0.12	0.48	0.85
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.09	< 0.05	0.35	0.56
Chrysene	mg/kg	0.05	MCERTS	0.12	0.06	0.37	0.71
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.12	< 0.05	0.41	0.8
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.06	< 0.05	0.18	0.25
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.07	< 0.05	0.29	0.53
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.18	0.33
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.05	0.09
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.19	0.4

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	1.02	0.95	3.81	6.47
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Sample Deviation Report



Analytical Report Number: 23-37687

Project / Site name: Proposed Geotre Primary School Marthyr Tydfill

Your Order No: 14209-FG

Lab Sample Number				2703590	2703591	2703592	2703593
Sample Reference				SA04	SA06	TP04	TP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70	0.40	0.30	0.40
Date Sampled				23/05/2023	23/05/2023	23/05/2023	23/05/2023
Time Taken				0930	1130	1215	1300
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	11	12	35
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.87	0.76	0.77	1.3
Boron (water soluble)	mg/kg	0.2	MCERTS	1.7	1.2	0.8	1.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	16	13	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	18	17	24	120
Lead (aqua regia extractable)	mg/kg	1	MCERTS	27	28	46	220
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	0.6
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	16	20	34
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	28	24	17	38
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	43	49	57	170

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-37687
Project / Site name: Proposed Geotre Primary School Marthyr Tydfill
Your Order No: 14209-FG

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/ weighing (%)	Total % Asbestos in Sample
2703584	WS05	0.40	121	Loose Fibres	Chrysotile & Amosite	< 0.001	< 0.001

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Sample Deviation Report



Analytical Report Number : 23-37687

Project / Site name: Proposed Geotre Primary School Marthyr Tydfill

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2703580	WS01	None Supplied	0.3	Brown clay and sand with gravel.
2703581	WS02	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
2703582	WS03	None Supplied	0.35	Brown loam and clay with gravel and vegetation.
2703583	WS04	None Supplied	1	Brown sand with gravel and stones.
2703584	WS05	None Supplied	0.4	Brown clay and sand with gravel.
2703585	WS06	None Supplied	0.4	Brown clay and sand with gravel and brick.
2703586	WS09	None Supplied	0.5	Brown loam and clay with gravel and vegetation.
2703587	WS10	None Supplied	0.4	Brown loam and clay with gravel and vegetation.
2703588	SA03	None Supplied	0.4	Brown clay and sand with gravel.
2703589	TP03	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
2703590	SA04	None Supplied	0.7	Brown clay and sand with gravel and stones.
2703591	SA06	None Supplied	0.4	Brown clay and sand with gravel.
2703592	TP04	None Supplied	0.3	Brown clay and sand with gravel.
2703593	TP05	None Supplied	0.4	Brown sand with gravel.

Sample Deviation Report



Analytical Report Number : 23-37687

Project / Site name: Proposed Geotre Primary School Marthyr Tydfil

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L023-PL	D	MCERTS

Sample Deviation Report



Analytical Report Number : 23-37687

Project / Site name: Proposed Geotre Primary School Marthyr Tydfil

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

****Despite repeating the analysis, the results remain contradictory.**

Sample Deviation Report

Analytical Report Number : 23-37687

Project / Site name: Proposed Geotre Primary School Marthyr Tydfill

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
SA03	None Supplied	S	2703588	c	Sulphide in soil	L010-PL	c
SA03	None Supplied	S	2703588	c	Total cyanide in soil	L080-PL	c
SA04	None Supplied	S	2703590	c	Sulphide in soil	L010-PL	c
SA04	None Supplied	S	2703590	c	Total cyanide in soil	L080-PL	c
SA06	None Supplied	S	2703591	c	Sulphide in soil	L010-PL	c
SA06	None Supplied	S	2703591	c	Total cyanide in soil	L080-PL	c
TP03	None Supplied	S	2703589	c	Sulphide in soil	L010-PL	c
TP03	None Supplied	S	2703589	c	Total cyanide in soil	L080-PL	c
TP04	None Supplied	S	2703592	c	Sulphide in soil	L010-PL	c
TP04	None Supplied	S	2703592	c	Total cyanide in soil	L080-PL	c
TP05	None Supplied	S	2703593	c	Sulphide in soil	L010-PL	c
TP05	None Supplied	S	2703593	c	Total cyanide in soil	L080-PL	c
WS01	None Supplied	S	2703580	c	Sulphide in soil	L010-PL	c
WS01	None Supplied	S	2703580	c	Total cyanide in soil	L080-PL	c
WS02	None Supplied	S	2703581	c	Sulphide in soil	L010-PL	c
WS02	None Supplied	S	2703581	c	Total cyanide in soil	L080-PL	c
WS03	None Supplied	S	2703582	c	Sulphide in soil	L010-PL	c
WS03	None Supplied	S	2703582	c	Total cyanide in soil	L080-PL	c
WS04	None Supplied	S	2703583	c	Sulphide in soil	L010-PL	c
WS04	None Supplied	S	2703583	c	Total cyanide in soil	L080-PL	c
WS05	None Supplied	S	2703584	c	Sulphide in soil	L010-PL	c
WS05	None Supplied	S	2703584	c	Total cyanide in soil	L080-PL	c
WS06	None Supplied	S	2703585	c	Sulphide in soil	L010-PL	c
WS06	None Supplied	S	2703585	c	Total cyanide in soil	L080-PL	c
WS09	None Supplied	S	2703586	c	Sulphide in soil	L010-PL	c
WS09	None Supplied	S	2703586	c	Total cyanide in soil	L080-PL	c
WS10	None Supplied	S	2703587	c	Sulphide in soil	L010-PL	c
WS10	None Supplied	S	2703587	c	Total cyanide in soil	L080-PL	c



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i2 Analytical Ltd.
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Watford,
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t: 01923 225404
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e: reception@i2analytical.com

Analytical Report Number : 23-37691

Project / Site name:	Proposed Geotre Primary School Marthyr Tydfill	Samples received on:	25/05/2023
Your job number:	14209	Samples instructed on / Analysis started on:	06/06/2023
Your order number:	14209-FG	Analysis completed by:	15/06/2023
Report Issue Number:	1	Report issued on:	15/06/2023
Samples Analysed:	2 10:1 WAC samples		

Signed: _____

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

i2 Analytical

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Waste Acceptance Criteria Analytical Results

Waste Acceptance Criteria Analytical Results							
Report No:	23-37691						
					Client: INTEGGEO		
Location	Proposed Geotre Primary School Marthyr Tydfill						
Lab Reference (Sample Number)	2703610 / 2703611				Landfill Waste Acceptance Criteria		
					Limits		
Sampling Date	22/05/2023				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TP02						
Depth (m)	0.10						
Solid Waste Analysis							
TOC (%)**	1.7				3%	5%	6%
Loss on Ignition (%) **	-				--	--	10%
BTEX (µg/kg)**##	< 5.0				6000	--	--
Sum of PCBs (mg/kg)**	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_ID_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.85				100	--	--
pH (units)**	-				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	-				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.0010			< 0.0100	0.5	2	25
Barium *	0.0118			0.0860	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	< 0.0004			< 0.0040	0.5	10	70
Copper *	0.0071			0.052	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0008			0.0058	0.5	10	30
Nickel *	0.0023			0.017	0.4	10	40
Lead *	0.0044			0.032	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0070			0.051	4	50	200
Chloride *	1.1			8.1	800	15000	25000
Fluoride*	0.20			1.5	10	150	500
Sulphate *	4.7			34	1000	20000	50000
TDS*	36			260	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	14.0			102	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.30						
Dry Matter (%)	83						
Moisture (%)	17						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.					* = UKAS accredited (liquid eluate analysis only)		
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation					** = MCERTS accredited		

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Waste Acceptance Criteria Analytical Results

Waste Acceptance Criteria Analytical Results							
Report No:	23-37691						
					Client: INTEGCEO		
Location	Proposed Geotre Primary School Marthyr Tydfill						
Lab Reference (Sample Number)	2703612 / 2703613				Landfill Waste Acceptance Criteria		
Sampling Date	23/05/2023				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	SA04						
Depth (m)	0.45						
Solid Waste Analysis							
TOC (%)**	5.0				3%	5%	6%
Loss on Ignition (%) **	-				--	--	10%
BTEX (µg/kg)**##	< 5.0				6000	--	--
Sum of PCBs (mg/kg)**	< 0.007				1	--	--
Mineral Oil (mg/kg) EH, ID, CU, AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	14.8				100	--	--
pH (units)**	-				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	-				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.0010			< 0.0100	0.5	2	25
Barium *	0.0250			0.187	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0014			0.010	0.5	10	70
Copper *	0.0039			0.029	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0018			0.0131	0.5	10	30
Nickel *	0.0010			0.0074	0.4	10	40
Lead *	0.0011			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0047			0.035	4	50	200
Chloride *	0.78			5.8	800	15000	25000
Fluoride*	0.42			3.1	10	150	500
Sulphate *	3.5			26	1000	20000	50000
TDS*	49			370	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	6.88			51.3	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.80						
Dry Matter (%)	73						
Moisture (%)	27						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.				* = UKAS accredited (liquid eluate analysis only)			
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation				** = MCERTS accredited			

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 23-37691

Project / Site name: Proposed Geotre Primary School Marthyr Tydfill

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2703610	TP02	None Supplied	0.1	Brown loam and clay with gravel and vegetation.
2703612	SA04	None Supplied	0.45	Brown clay and sand with gravel.

Analytical Report Number : 23-37691

Project / Site name: Proposed Geotre Primary School Marthyr Tydfill

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L076-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270.	L064-PL	D	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Total BTEX in soil (Poland)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073-PL	W	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil"	L039-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil"	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by EC probe using a factor of 0.6.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031	W	ISO 17025
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025

Analytical Report Number : 23-37691

Project / Site name: Proposed Geotre Primary School Marthyr Tydfill

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

- Quality control parameter has a high recovery (outside of limit); however the associated result is below the reporting limit, other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised.

Sample Deviation Report



Analytical Report Number : 23-37691

Project / Site name: Proposed Geotre Primary School Marthyr Tydfill

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
SA04	None Supplied	S	2703612	c	BTEX in soil (Monoaromatics)	L073B-PL	c
SA04	None Supplied	S	2703612	c	Total BTEX in soil (Poland)	L073-PL	c
TP02	None Supplied	S	2703610	c	BTEX in soil (Monoaromatics)	L073B-PL	c
TP02	None Supplied	S	2703610	c	Total BTEX in soil (Poland)	L073-PL	c

APPENDIX I

LABORATORY GEOTECHNICAL TEST RESULTS



Results Summary

Apex Testing Solutions Limited

Sturmi Way
Village Farm Industrial Estate
Pyle
Bridgend
CF33 6BZ

Telephone: 01656 746762

E-mail: andrew.grogan@apex-drilling.com

laura.davis@apex-drilling.com

<u>Reporting Details</u>		<u>Key Information</u>	
Company Name:	Integral Geotechnique	Site Name:	Proposed Geotre Primary School
Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX	Job Number:	D23259
Contact Name:	Finn	Date Received:	08/06/2023
Contact Number:		Job Coordinator:	L. Davies

Item No.	Tests Undertaken	Number of Tests
1	Water Content - ISO 17892 2014+A1:2022	6
2	Atterburg Limits (4 point) - BS1377-2: 1990	6
3	Particle Size Distribution - BS1377-2: 1990	4
4	OMC - BS1377-4: 1990 using 2.5kg Rammer in 1L mould	4

Results Issued: 14/06/2023

Comments

Results herein relate only to samples received in the laboratory and where not sampled by Apex Testing Solutions personnel relate to the samples as received.

Where tests are UKAS accredited any Opinion and/or Interpretation expressed herein are outside the scope of the UKAS Accreditation. The reports shall not be reproduced in full without the written approval of the laboratory.

Please contact the job coordinator should any further information be required.

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33174		
Site Ref / Hole ID:	SA01	Depth (m):	2.00
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown slightly sandy slightly gravelly CLAY
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	12 June 2023

Test Results

Moisture Content (%)	14.4
----------------------	------

Remarks:

QA Ref.		Apex Testing Solutions Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096		Approver	Date	Fig MC
EN ISO 17892-1:2014 A1:2022				<i>A Grogan</i> A Grogan, Laboratory Manager	12/06/2023	

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

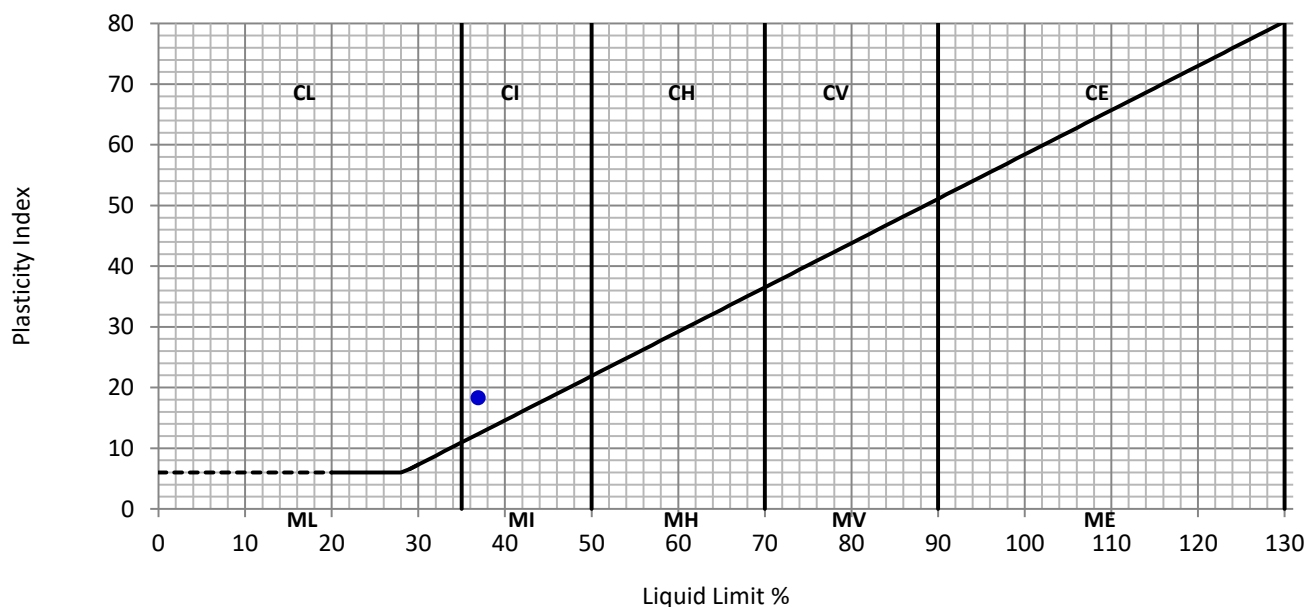
Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33174		

Site Ref / Hole ID:	SA01	Depth (m):	2.00
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown slightly sandy slightly gravelly CLAY
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	09 June 2023

Test Results

Liquid Limit	37	%
Plastic Limit	19	%
Plasticity Index	18	%

Preparation:	4.2.4 Sieved Specimen
Proportion retained on 425µm sieve:	24 %



Remarks:

QA Ref.

BS1377 - 2
Rev. 3.0



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle,
Bridgend, CF33 6BZ
Tel: 01656 746762 Fax: 01656 749096



7771

Approver

A Grogan

A Grogan, Laboratory Manager

Date

12/06/2023

Fig.

ATT

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33175		

Site Ref / Hole ID:	SA03	Depth (m):	1.50
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Grey sandy gravelly CLAY with medium cobble content
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	13 June 2023

Test Results

Moisture Content (%)

15.7

Remarks:

QA Ref.

EN ISO 17892-
1:2014 A1:2022



Apex Testing Solutions

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7771

Approver

A Grogan

A Grogan, Laboratory Manager

Date

13/06/2023

Fig

MC

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

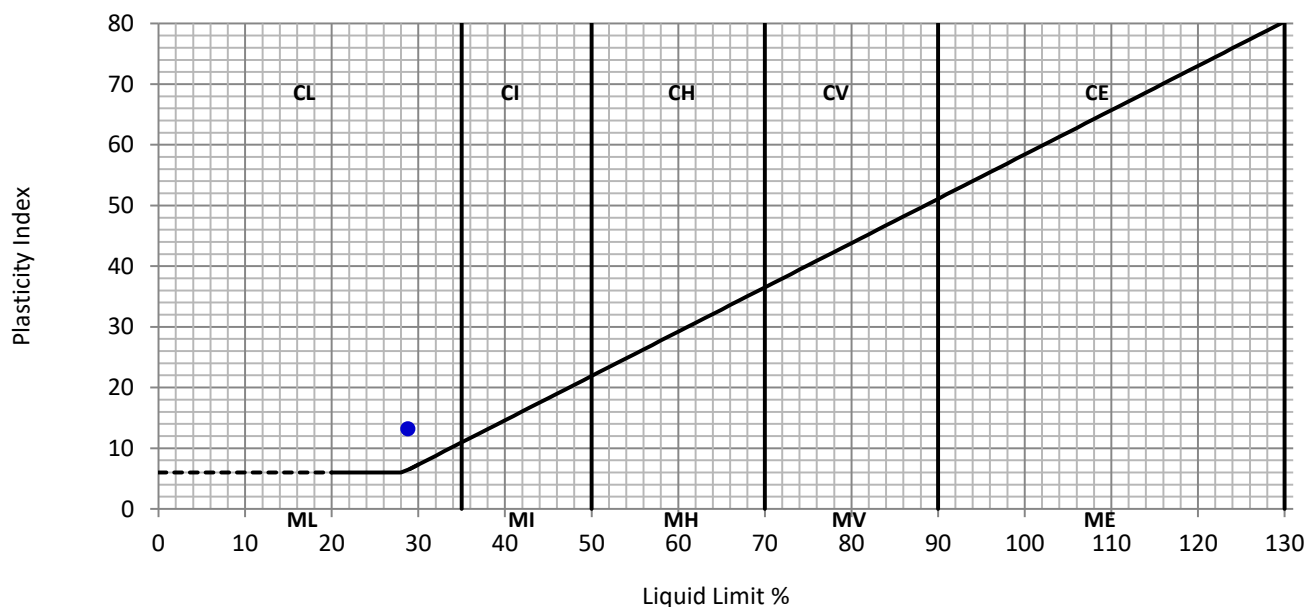
Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33175		

Site Ref / Hole ID:	SA03	Depth (m):	1.50
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Grey sandy gravelly CLAY with medium cobble content
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	09 June 2023

Test Results

Liquid Limit	29	%
Plastic Limit	16	%
Plasticity Index	13	%

Preparation:	4.2.4 Sieved Specimen
Proportion retained on 425µm sieve:	50 %



Remarks:

QA Ref.

BS1377 - 2
Rev. 3.0



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Approver

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G Llewellyn, Senior Technician

Date

13/06/2023

Fig.

ATT

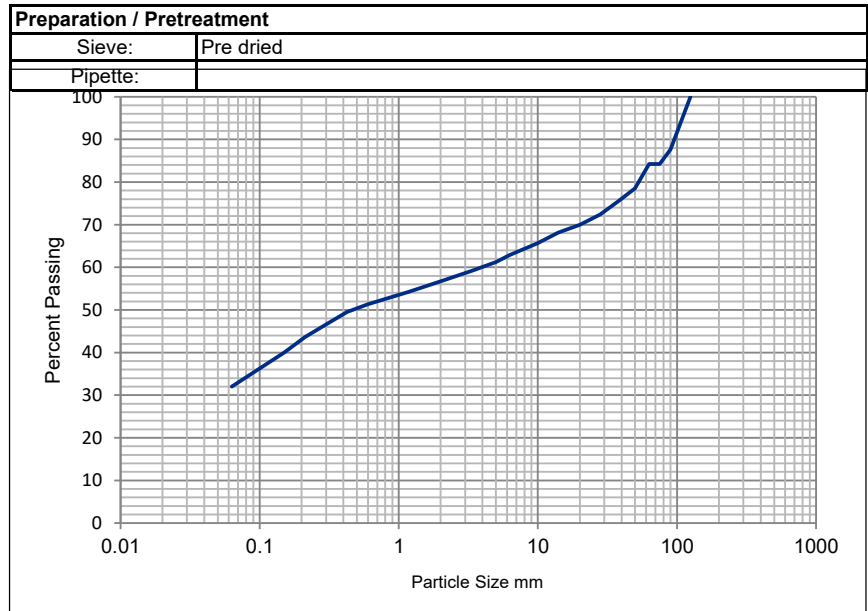
TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS1377:Part 2:1990

Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33175		

Site Ref / Hole ID:	SA03	Depth (m):	1.50
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Grey sandy gravelly CLAY with medium cobble content
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	13 June 2023

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	88
75	84
63	84
50	79
37.5	75
28	72
20	70
14	68
10	66
6.3	63
5.0	61
3.35	59
2.00	57
1.18	54
0.600	51
0.425	50
0.300	47
0.212	44
0.150	40
0.063	32



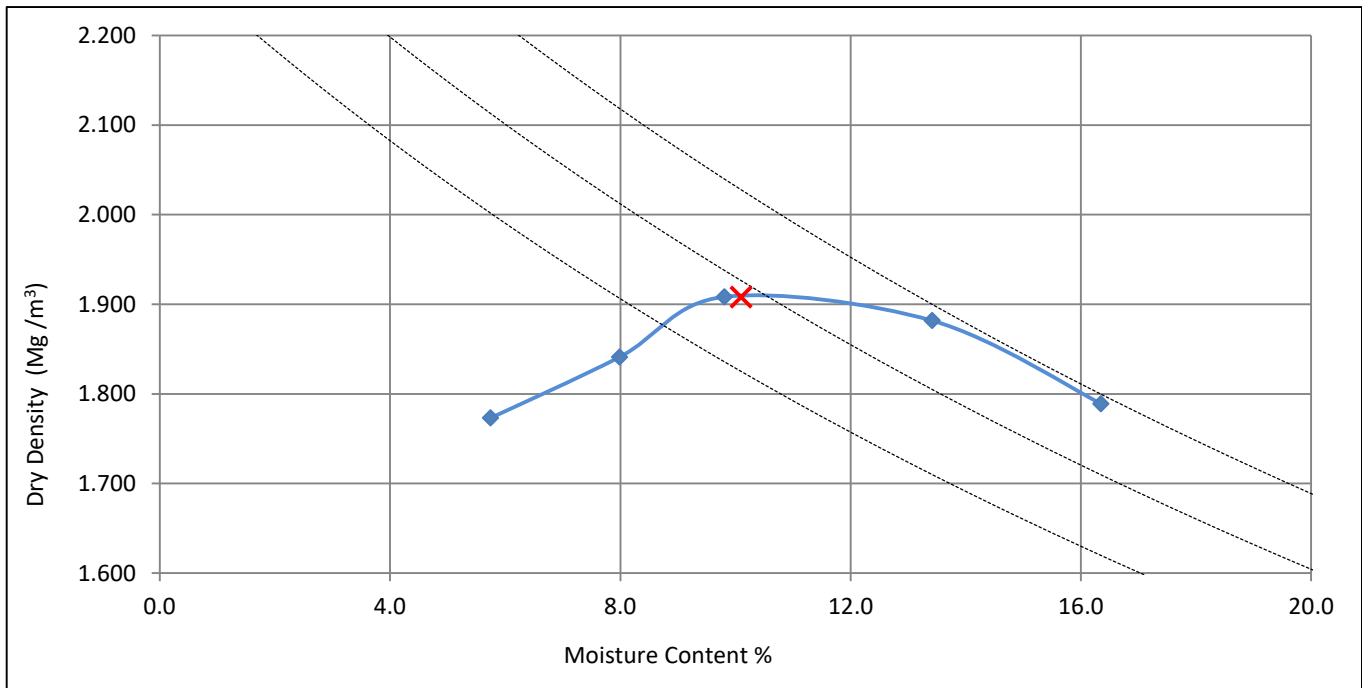
Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D ₆₀ / D ₁₀
Cobbles / Boulders	16	N/A	
Gravel	27		
Sand	25	Dry mass of sample, kg	
Silt / Clay	32	19.7	n/a

Remarks:

TEST REPORT
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377:Part 4:1990

Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33175		

Site Ref / Hole ID:	SA03	Depth (m):	1.50
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Grey sandy gravelly CLAY with medium cobble content
Location in Works:	N/A	Material Source:	Site Generated
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	13 June 2023



Test Method:	BS 1377: part 4: 1990: clause 3.3, 2.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, separate specimens tested

Particle Density, Mg/m³	2.55	assumed	Derived Parameters ✗
Material > 37.5mm	25	%	Maximum Dry Density, Mg/m³
Material < 37.5mm > 20mm	5	%	Optimum Moisture Content %

Remarks:	NMC = 15.7 % Tested a 'X' sample due to oversize material
----------	--

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No: D23259

Project Name: Proposed Goetre Primary School,
Merthyr Tydfil

Client: Integral Geotechnique

Address: 7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX

ATS Sample No: 33176

Site Ref / Hole ID: SA04

Sample No:

**Sampling Certificate
Received:** No

Depth (m): 1.00

Sample Type: Bulk

Material Description: Brownish grey sandy
gravelly CLAY

Location in Works: N/a

Material Source: Ex-Site

Date Sampled: Unknown

Material Supplier: Ex-Site

Sampled By: Client

Specification: BS1377

Date Received: 08 June 2023

Date Tested: 12 June 2023

Test Results

Moisture Content (%)

18.4

Remarks:

QA Ref.

EN ISO 17892-
1:2014 A1:2022



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A Grogan, Laboratory Manager

Date

12/06/2023

Fig

MC

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

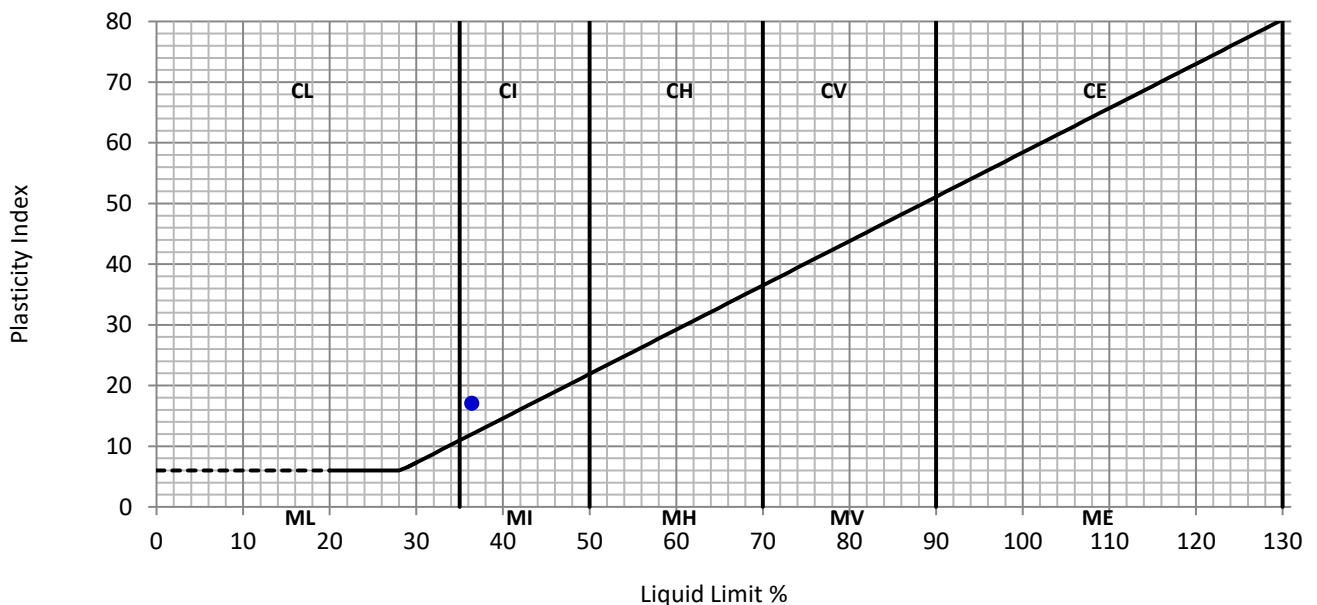
Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33176		

Site Ref / Hole ID:	SA04	Depth (m):	1.00
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brownish grey sandy gravelly CLAY
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	09 June 2023

Test Results

Liquid Limit	36	%
Plastic Limit	19	%
Plasticity Index	17	%

Preparation:	4.2.4 Sieved Specimen
Proportion retained on 425µm sieve:	51 %



Remarks:

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33177		

Site Ref / Hole ID:	SA05	Depth (m):	3.50
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Light brownish grey slightly gravelly sandy CLAY
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	13 June 2023

Test Results

Moisture Content (%)

18.9

Remarks:

QA Ref.

EN ISO 17892-1:2014 A1:2022



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A Grogan, Laboratory Manager

Date

13/06/2023

Fig

MC

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

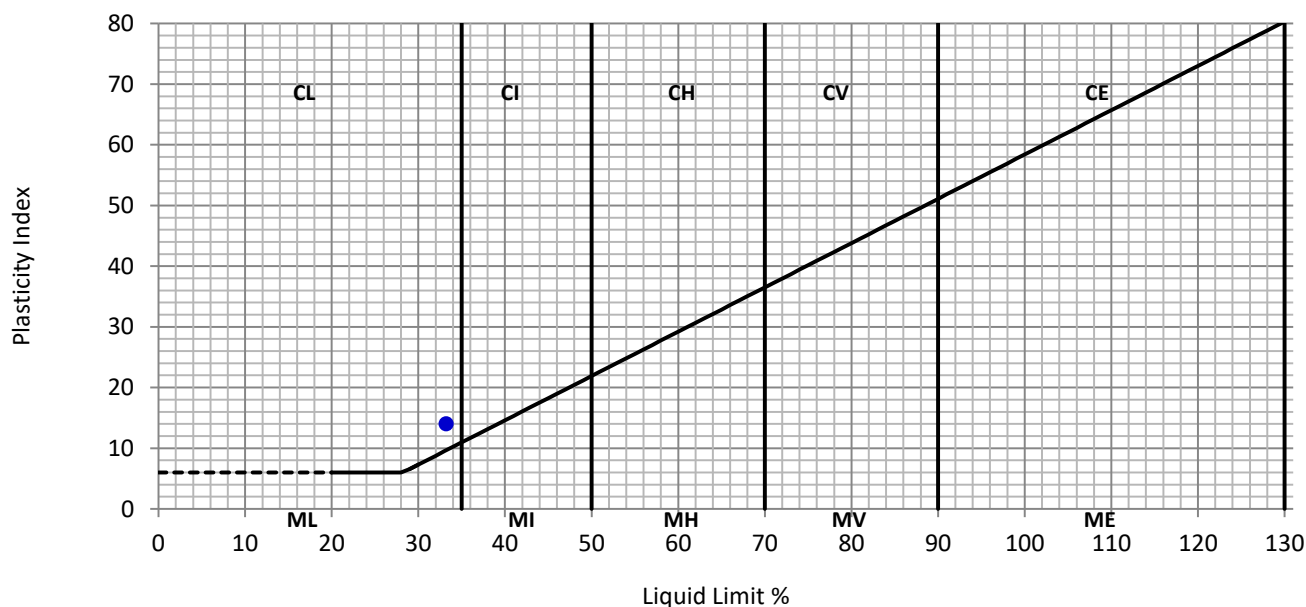
Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33177		

Site Ref / Hole ID:	SA05	Depth (m):	3.50
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Light brownish grey slightly gravelly sandy CLAY
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	12 June 2023

Test Results

Liquid Limit	33	%
Plastic Limit	19	%
Plasticity Index	14	%

Preparation:	4.2.4 Sieved Specimen
Proportion retained on 425µm sieve:	12 %



Remarks:

QA Ref.

BS1377 - 2
Rev. 3.0



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Approver

G Llewellyn

G Llewellyn, Senior Technician

Date

13/06/2023

Fig.

ATT

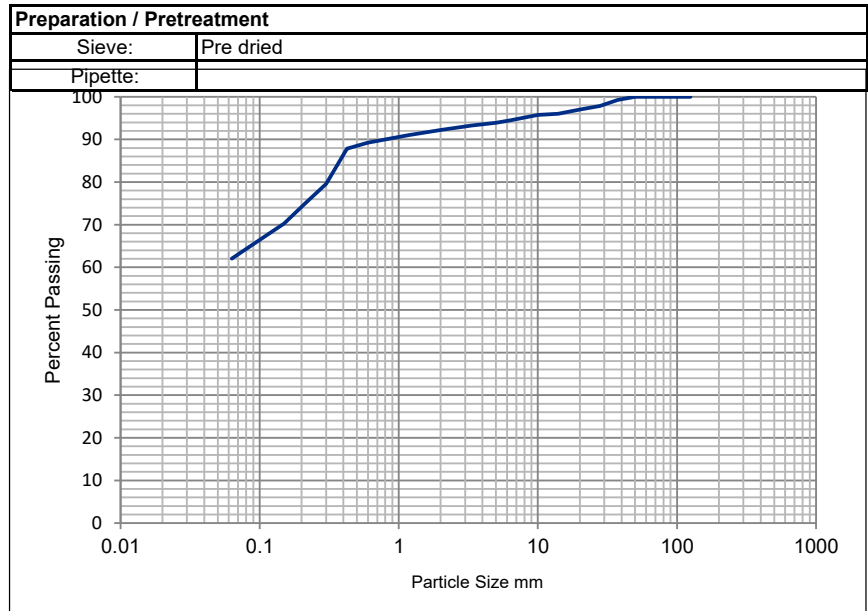
TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS1377:Part 2:1990

Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33177		

Site Ref / Hole ID:	SA05	Depth (m):	3.50
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Light brownish grey slightly gravelly sandy CLAY
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	13 June 2023

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	99
28	98
20	97
14	96
10	96
6.3	94
5.0	94
3.35	93
2.00	92
1.18	91
0.600	89
0.425	88
0.300	80
0.212	75
0.150	70
0.063	62



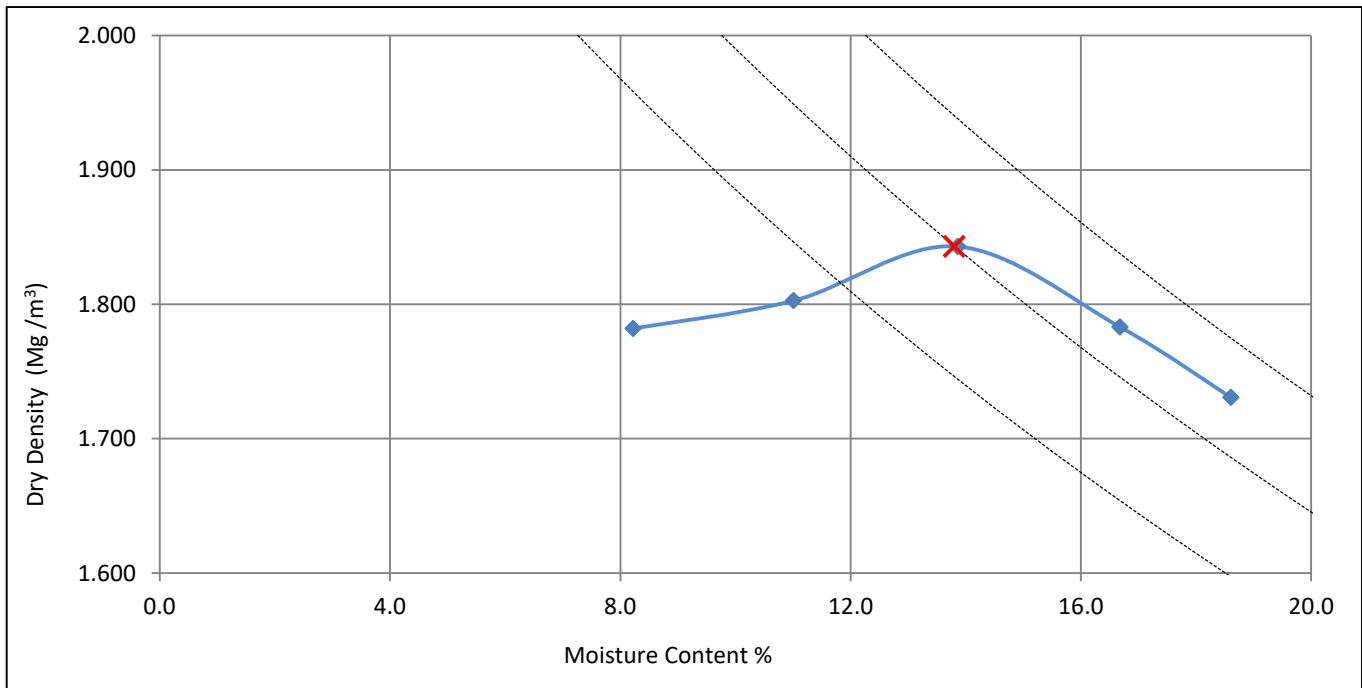
Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D ₆₀ / D ₁₀
Cobbles / Boulders	0	N/A	
Gravel	8		
Sand	30	Dry mass of sample, kg	
Silt / Clay	62	10.4	n/a

Remarks:

TEST REPORT
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377:Part 4:1990

Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33177		

Site Ref / Hole ID:	SA05	Depth (m):	3.50
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Light brownish grey slightly gravelly sandy CLAY
Location in Works:	N/A	Material Source:	Site Generated
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	12 June 2023



Test Method:	BS 1377: part 4: 1990: clause 3.3, 2.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, separate specimens tested

Particle Density, Mg/m³	2.65	assumed	Derived Parameters ✗
Material > 37.5mm	1	%	Maximum Dry Density, Mg/m³
Material < 37.5mm > 20mm	2	%	Optimum Moisture Content %

Remarks:	NMC = 18.9 %
----------	--------------

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33178		

Site Ref / Hole ID:	TP02	Depth (m):	1.50
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Dark brownish grey sandy gravelly CLAY with low cobble content
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	14 June 2023

Test Results

Moisture Content (%)

17.2

Remarks:

QA Ref.

EN ISO 17892-1:2014 A1:2022



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Approver

A Grogan

A Grogan, Laboratory Manager

Date

14/06/2023

Fig

MC

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

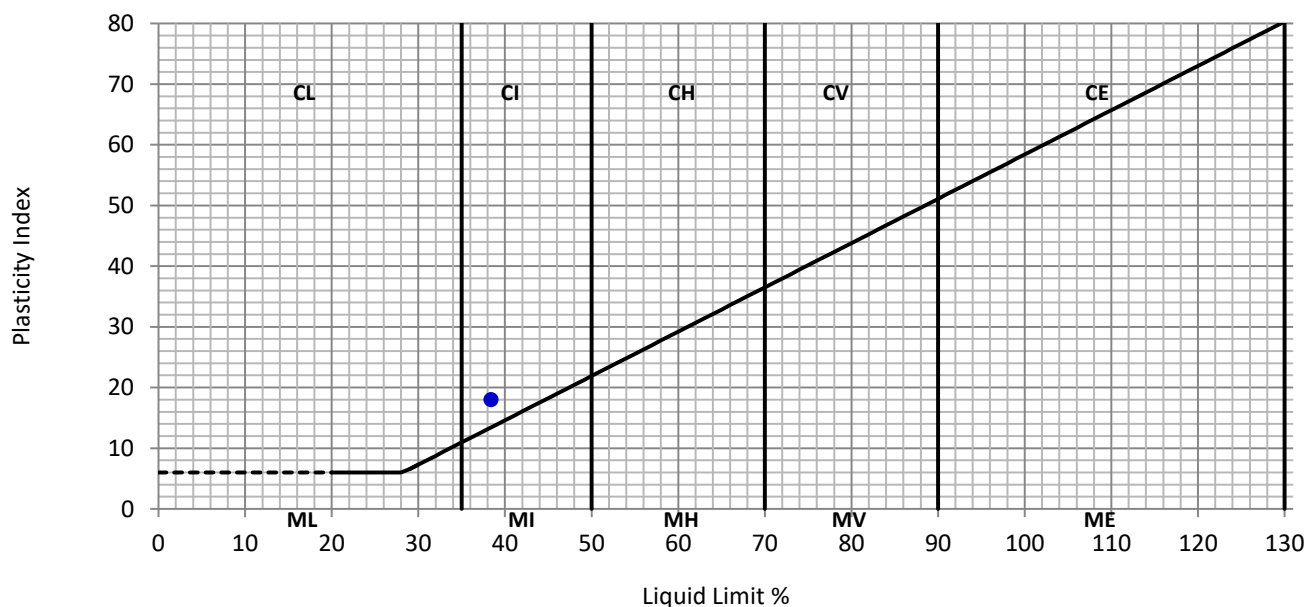
Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33178		

Site Ref / Hole ID:	TP02	Depth (m):	1.50
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Dark brownish grey sandy gravelly CLAY with low cobble content
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	12 June 2023

Test Results

Liquid Limit	38	%
Plastic Limit	20	%
Plasticity Index	18	%

Preparation:	4.2.4 Sieved Specimen
Proportion retained on 425µm sieve:	26 %



Remarks:

QA Ref.

BS1377 - 2
Rev. 3.0



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Date

14/06/2023

Fig.

ATT

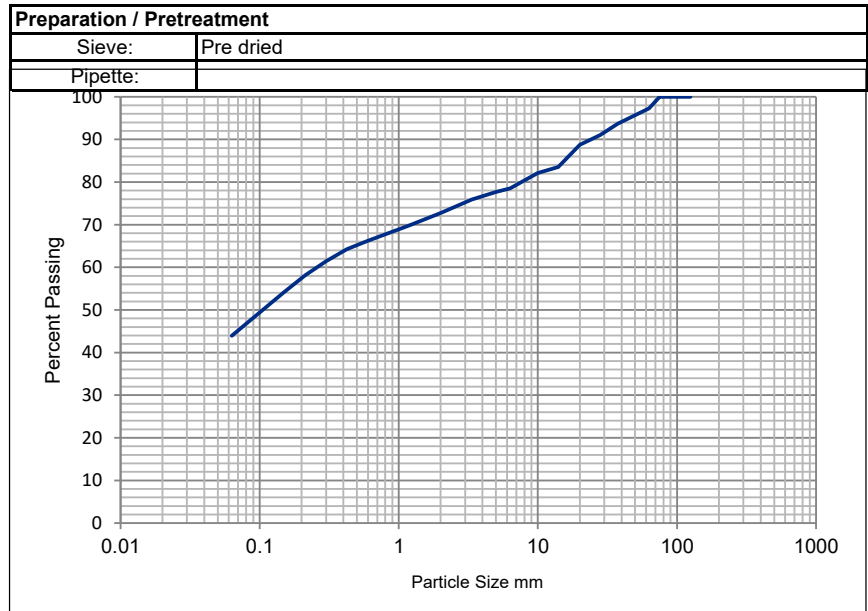
TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS1377:Part 2:1990

Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33178		

Site Ref / Hole ID:	TP02	Depth (m):	1.50
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Dark brownish grey sandy gravelly CLAY with low cobble content
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	14 June 2023

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	97
50	96
37.5	94
28	91
20	89
14	84
10	82
6.3	79
5.0	78
3.35	76
2.00	73
1.18	70
0.600	66
0.425	64
0.300	61
0.212	58
0.150	54
0.063	44



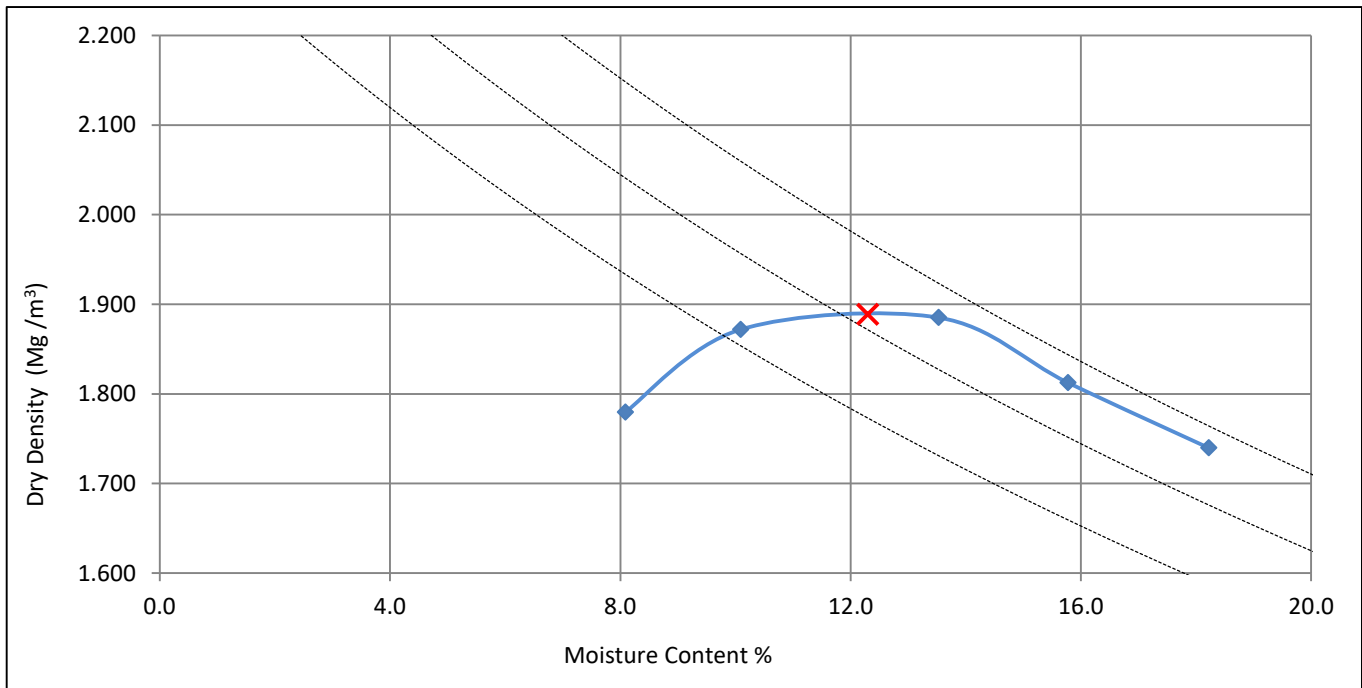
Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D ₆₀ / D ₁₀
Cobbles / Boulders	3	N/A	
Gravel	25		
Sand	29	Dry mass of sample, kg	
Silt / Clay	44	10.6	n/a

Remarks:

TEST REPORT
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377:Part 4:1990

Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33178		

Site Ref / Hole ID:	TP02	Depth (m):	1.50
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Dark brownish grey sandy gravelly CLAY with low cobble content
Location in Works:	N/A	Material Source:	Site Generated
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	13 June 2023



Test Method:	BS 1377: part 4: 1990: clause 3.3, 2.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, separate specimens tested

Particle Density, Mg/m³	2.60	assumed	Derived Parameters ✗
Material > 37.5mm	6	%	Maximum Dry Density, Mg/m³
Material < 37.5mm > 20mm	5	%	Optimum Moisture Content %

Remarks:	NMC = 17.1 % Tested as an X sample due to oversize
----------	---

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33179		

Site Ref / Hole ID:	TP04	Depth (m):	1.00
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Dark grey sandy clayey GRAVEL with low cobble content
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	14 June 2023

Test Results

Moisture Content (%)

16.4

Remarks:

QA Ref.

EN ISO 17892-1:2014 A1:2022



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Approver

A Grogan

A Grogan, Laboratory Manager

Date

14/06/2023

Fig

MC

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

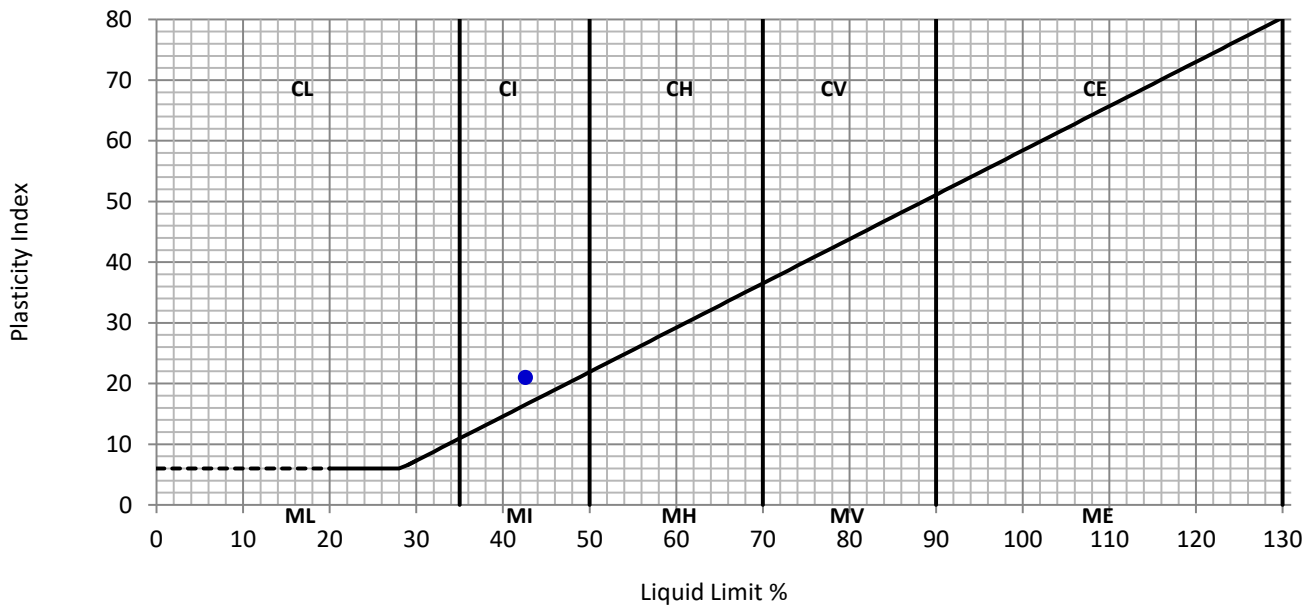
Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33179		

Site Ref / Hole ID:	TP04	Depth (m):	1.00
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Dark grey sandy clayey GRAVEL with low cobble content
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	12 June 2023

Test Results

Liquid Limit	43	%
Plastic Limit	22	%
Plasticity Index	21	%

Preparation:	4.2.4 Sieved Specimen
Proportion retained on 425µm sieve:	53 %



Remarks:

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS1377:Part 2:1990

Project No: D23259
Project Name: Proposed Goetre Primary School, Merthyr Tydfil

Client: Integral Geotechnique
Address: 7 Beddau Way
 Castlegate Business Park
 Caerphilly
 CF83 2AX

ATS Sample No: 33179

Site Ref / Hole ID: TP04

Depth (m): 1.00

Sample No:

Sample Type: Bulk

Sampling Certificate Received: No

Material Description: Dark grey sandy clayey GRAVEL with low cobble content

Location in Works: N/a

Material Source: Ex-Site

Date Sampled: Unknown

Material Supplier: Ex-Site

Sampled By: Client

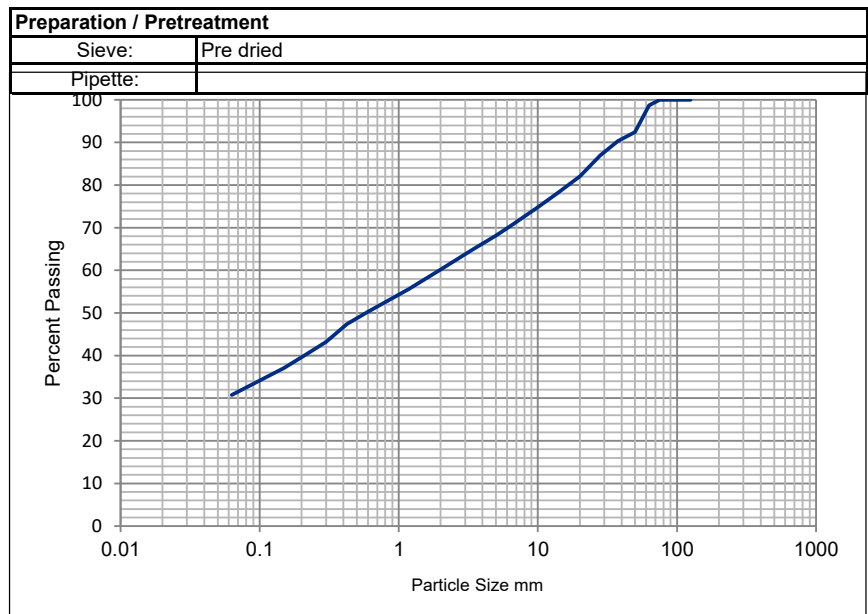
Specification: **BS1377**

Date Received: 08 June 2023

Date Tested: 14 June 2023

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	99
50	92
37.5	90
28	87
20	82
14	78
10	75
6.3	70
5.0	68
3.35	65
2.00	60
1.18	56
0.600	50
0.425	47
0.300	43
0.212	40
0.150	37
0.063	31



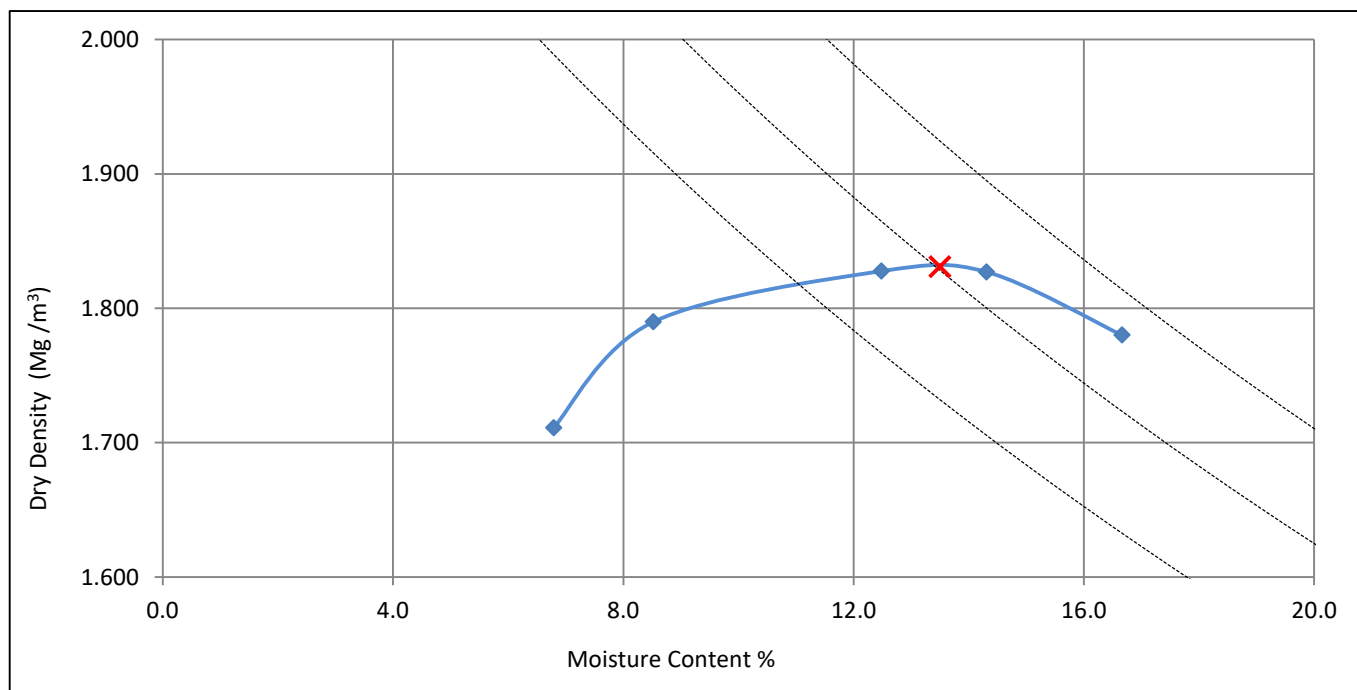
Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D ₆₀ / D ₁₀
Cobbles / Boulders	1	N/A	
Gravel	39		
Sand	29	Dry mass of sample, kg	
Silt / Clay	31	23.1	n/a

Remarks:

TEST REPORT
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377:Part 4:1990

Project No:	D23259	Client:	Integral Geotechnique
Project Name:	Proposed Goetre Primary School, Merthyr Tydfil	Address:	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	33179		

Site Ref / Hole ID:	TP04	Depth (m):	1.00
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Dark grey sandy clayey GRAVEL with low cobble content
Location in Works:	N/A	Material Source:	Site Generated
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	08 June 2023	Date Tested:	13 June 2023



Test Method:	BS 1377: part 4: 1990: clause 3.3, 2.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, separate specimens tested

Particle Density, Mg/m ³	2.60	assumed	Derived Parameters ✗
Material > 37.5mm	10	%	Maximum Dry Density, Mg/m ³
Material < 37.5mm > 20mm	8	%	Optimum Moisture Content %
			1.83
			14

Remarks:	NMC = 16.4 % Tested as an X sample due to oversize
----------	---

APPENDIX J

IN-SITU GAS AND GROUNDWATER MONITORING RESULTS

FIELD GAS MONITORING RESULTS - SUMMARY

Job No.: 14209
Site: Geotre School

Maximum Methane Concentration (%v/v)	Maximum Carbon Dioxide Concentration (%v/v)	Maximum Gas Concentration (%v/v)	Maximum Gas Flow Rate (l/hr)	GSV (l/hr)
0.40	0.80	0.80	<0.3	<0.0024

Methane							
Location	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Maximum
BH 02	0.30	0.20	0.20	0.10	0.10	0.10	0.30
BH 05	0.10	0.10	0.10	0.10	0.10	0.10	0.10
BH 06	0.30	0.40	0.30	0.40	0.20	0.10	0.40

Carbon Dioxide							
Location	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Maximum
BH 02	0.70	0.60	0.70	0.60	0.50	0.60	0.70
BH 05	0.20	0.30	0.20	0.10	0.20	0.30	0.30
BH 06	0.80	0.70	0.60	0.70	0.50	0.30	0.80

Oxygen							
Location	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Minimum
BH 02	18.80	17.80	18.10	17.80	18.10	18.90	17.80
BH 05	20.00	19.60	19.60	19.10	19.60	20.10	19.10
BH 06	17.20	18.20	19.20	19.30	20.10	19.60	17.20

Gas Flow Rate							
Location	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Maximum
BH 02	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30
BH 05	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30
BH 06	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30

FIELD GAS MONITORING RESULTS

Job No.: 14209
 Site: Geotre School
 Monitoring Date: 18.07.23
 Monitoring Round: 1

Monitoring Conditions

Weather: Cloudy
 Ambient Temp: 14 °C
 Instrument: GA5000

Barometric Pressure (mb)

On Arrival: 985
 During Monitoring: 985
 End of Monitoring: 985

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
BH 02	6.03	0.36	0.30	0.20	6.00	4.00	18.80	19.10	0.70	0.70	5.00	<1	<0.3	0.20
BH 05	6.58	1.03	0.10	0.10	2.00	2.00	20.00	20.10	0.20	0.20	2.00	<1	<0.3	0.10
BH 06	2.10	1.63	0.30	0.30	6.00	6.00	17.20	17.50	0.80	0.70	3.00	<1	<0.3	0.20

Typical Instrument Accuracy:

%CH ₄	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS	LEL = Lower Explosive Limit
%CO ₂	0-60% +/- 0.5%	H ₂ S	0-5000ppm +/- 2.0% FS	N/R = No Reading Taken
%O ₂	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h	FS = Full Scale

Notes:

FIELD GAS MONITORING RESULTS

Job No.: 14209
 Site: Geotre School
 Monitoring Date: 11.08.23
 Monitoring Round: 2

Monitoring Conditions

Weather: Sunny
 Ambient Temp: 22 °C
 Instrument: GA5000

Barometric Pressure (mb)

On Arrival: 1008
 During Monitoring: 1008
 End of Monitoring: 1008

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
BH 02	6.03	0.42	0.20	0.20	4.00	4.00	17.80	17.90	0.60	0.60	6.00	<1	<0.3	0.10
BH 05	6.58	1.01	0.10	0.10	2.00	2.00	19.60	19.60	0.30	0.30	1.00	<1	<0.3	0.10
BH 06	2.10	1.64	0.40	0.40	8.00	8.00	18.20	18.20	0.70	0.70	2.00	<1	<0.3	0.10

Typical Instrument Accuracy:

%CH ₄	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS	LEL = Lower Explosive Limit
%CO ₂	0-60% +/- 0.5%	H ₂ S	0-5000ppm +/- 2.0% FS	N/R = No Reading Taken
%O ₂	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h	FS = Full Scale

Notes:

FIELD GAS MONITORING RESULTS

Job No.: 14209
 Site: Geotre School
 Monitoring Date: 21.08.23
 Monitoring Round: 3

Monitoring Conditions

Weather: Cloudy
 Ambient Temp: 19 °C
 Instrument: GA5000

Barometric Pressure (mb)

On Arrival: 997
 During Monitoring: 997
 End of Monitoring: 997

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
BH 02	6.03	0.42	0.20	0.10	4.00	2.00	18.10	18.10	0.70	0.50	5.00	<1	<0.3	0.10
BH 05	6.58	1.02	0.10	0.10	2.00	2.00	19.60	19.40	0.20	0.20	2.00	<1	<0.3	0.10
BH 06	2.10	1.61	0.30	0.20	6.00	4.00	19.20	19.20	0.60	0.50	1.00	<1	<0.3	0.20

Typical Instrument Accuracy:

%CH ₄	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS	LEL = Lower Explosive Limit
%CO ₂	0-60% +/- 0.5%	H ₂ S	0-5000ppm +/- 2.0% FS	N/R = No Reading Taken
%O ₂	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h	FS = Full Scale

Notes:

FIELD GAS MONITORING RESULTS

Job No.: 14209
Site: Geotre School
Monitoring Date: 06.09.23
Monitoring Round: 4

Monitoring Conditions

Weather:	Sunny	
Ambient Temp:	27	°C
Instrument:	GA5000	

Barometric Pressure (mb)

On Arrival:	1005
During Monitoring:	1005
End of Monitoring:	1005

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
BH 02	6.03	0.48	0.10	0.10	2.00	2.00	17.80	17.80	0.60	0.60	4.00	<1	<0.3	0.20
BH 05	6.58	1.05	0.10	0.10	2.00	2.00	19.10	19.10	0.10	0.10	3.00	<1	<0.3	0.20
BH 06	2.10	1.64	0.40	0.30	8.00	6.00	19.30	19.70	0.70	0.70	1.00	<1	<0.3	0.10
Typical Instrument Accuracy:														
%CH ₄	0-70% +/- 0.5%		CO	0-500ppm +/- 2% FS										LEL = Lower Explosive Limit
%CO ₂	0-60% +/- 0.5%		H ₂ S	0-5000ppm +/- 2.0% FS										N/R = No Reading Taken
%O ₂	0-25% +/- 1.0%		Flow from borehole +/- 0.3l/h											FS = Full Scale
Notes:														

FIELD GAS MONITORING RESULTS

Job No.: 14209
 Site: Geotre School
 Monitoring Date: 01.10.23
 Monitoring Round: 5

Monitoring Conditions

Weather: Cloudy
 Ambient Temp: 18 °C
 Instrument: GA5000

Barometric Pressure (mb)

On Arrival: 996
 During Monitoring: 996
 End of Monitoring: 996

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
BH 02	6.03	0.47	0.10	0.10	2.00	2.00	18.10	18.10	0.50	0.50	5.00	<1	<0.3	0.30
BH 05	6.58	1.10	0.10	0.10	2.00	2.00	19.60	19.60	0.20	0.20	2.00	<1	<0.3	0.10
BH 06	2.10	1.61	0.20	0.20	4.00	4.00	20.10	20.10	0.50	0.50	<1	<1	<0.3	0.10

Typical Instrument Accuracy:

%CH ₄	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS	LEL = Lower Explosive Limit
%CO ₂	0-60% +/- 0.5%	H ₂ S	0-5000ppm +/- 2.0% FS	N/R = No Reading Taken
%O ₂	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h	FS = Full Scale

Notes:

FIELD GAS MONITORING RESULTS

Job No.: 14209
 Site: Geotre School
 Monitoring Date: 03.11.23
 Monitoring Round: 6

Monitoring Conditions

Weather: Cloudy
 Ambient Temp: 12 °C
 Instrument: GA5000

Barometric Pressure (mb)

On Arrival: 988
 During Monitoring: 988
 End of Monitoring: 988

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
BH 02	6.03	0.41	0.10	0.10	2.00	2.00	18.90	18.90	0.60	0.50	5.00	<1	<0.3	0.20
BH 05	6.58	0.98	0.10	0.10	2.00	2.00	20.10	20.10	0.30	0.30	1.00	<1	<0.3	0.20
BH 06	2.10	1.58	0.10	0.10	2.00	2.00	19.60	19.60	0.30	0.30	<1	<1	<0.3	0.10

Typical Instrument Accuracy:

%CH ₄	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS	LEL = Lower Explosive Limit
%CO ₂	0-60% +/- 0.5%	H ₂ S	0-5000ppm +/- 2.0% FS	N/R = No Reading Taken
%O ₂	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h	FS = Full Scale

Notes:

FIELD GAS MONITORING RESULTS - SUMMARY

Job No.: 14209
 Site: Goetre School Merthyr

Maximum Methane Concentration (%v/v)	Maximum Carbon Dioxide Concentration (%v/v)	Maximum Gas Concentration (%v/v)	Maximum Gas Flow Rate (l/hr)	GSV (l/hr)
2.20	3.60	3.60	<0.3	<0.0108

Methane							
Location	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Maximum
WS01	0.20	0.10	0.20	0.10	0.20	0.10	0.20
WS08	2.20	2.10	1.50	0.90	0.80	1.10	2.20

Carbon Dioxide							
Location	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Maximum
WS01	3.20	3.30	3.60	2.10	2.30	2.90	3.60
WS08	0.40	0.30	0.20	0.30	0.20	0.30	0.40

Oxygen							
Location	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Minimum
WS01	19.60	19.20	19.10	19.60	18.70	19.10	18.70
WS08	19.80	19.20	18.20	19.10	19.10	19.60	18.20

Gas Flow Rate							
Location	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Maximum
WS01	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30
WS08	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30

FIELD GAS MONITORING RESULTS

Job No.: 14209
Site: Goetre School Merthyr
Monitoring Date: 31.05.23
Monitoring Round: 1

Monitoring Conditions

Weather:	Cloudy	
Ambient Temp:	15	°C
Instrument:	GA5000	

Barometric Pressure (mb)

On Arrival:	1009
During Monitoring:	1009
End of Monitoring:	1009

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
WS01	4.03	1.52	0.20	0.20	4.00	4.00	19.60	19.60	3.20	3.10	2.00	<1	<0.3	<0.3
WS08	4.62	0.00	2.20	2.10	44.00	42.00	19.80	19.90	0.40	0.40	1.00	<1	<0.3	0.10
Typical Instrument Accuracy:														
%CH ₄	0-70% +/- 0.5%		CO	0-500ppm +/- 2% FS										LEL = Lower Explosive Limit
%CO ₂	0-60% +/- 0.5%		H ₂ S	0-5000ppm +/- 2.0% FS										N/R = No Reading Taken
%O ₂	0-25% +/- 1.0%		Flow from borehole +/- 0.3l/h											FS = Full Scale
Notes:														

FIELD GAS MONITORING RESULTS

Job No.: 14209
Site: Goetre School Merthyr
Monitoring Date: 14.06.23
Monitoring Round: 2

Monitoring Conditions

Weather:	Sunny	
Ambient Temp:	23	°C
Instrument:	GA5000	

Barometric Pressure (mb)

On Arrival:	1002
During Monitoring:	1002
End of Monitoring:	1002

Location	Well Base Level	Water Level	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
	(mbgl)	(mbgl)	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
WS01	4.03	1.53	0.10	0.10	2.00	2.00	19.20	19.30	3.30	3.30	1.00	<1	<0.3	<0.3
WS08	4.62	0.00	2.10	1.90	42.00	38.00	19.20	19.70	0.30	0.30	1.00	<1	<0.3	0.20
Typical Instrument Accuracy:														
%CH ₄	0-70% +/- 0.5%		CO	0-500ppm +/- 2% FS										
%CO ₂	0-60% +/- 0.5%		H ₂ S	0-5000ppm +/- 2.0% FS										
%O ₂	0-25% +/- 1.0%		Flow from borehole +/- 0.3l/h											
Notes:														

FIELD GAS MONITORING RESULTS

Job No.: 14209
Site: Goetre School Merthyr
Monitoring Date: 05.07.23
Monitoring Round: 3

Monitoring Conditions

Weather:	Cloudy	
Ambient Temp:	18	°C
Instrument:	GA5000	

Barometric Pressure (mb)

On Arrival:	995
During Monitoring:	995
End of Monitoring:	995

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)	
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady					
WS01	4.03	1.56	0.20	0.10	4.00	2.00	19.10	19.30	3.60	3.60	2.00	<1	<0.3	<0.3	
WS08	4.62	0.01	1.50	1.40	30.00	28.00	18.20	18.40	0.20	0.20	1.00	<1	<0.3	0.10	
Typical Instrument Accuracy:															
%CH ₄	0-70% +/- 0.5%		CO	0-500ppm +/- 2% FS										LEL = Lower Explosive Limit	
%CO ₂	0-60% +/- 0.5%		H ₂ S	0-5000ppm +/- 2.0% FS										N/R = No Reading Taken	
%O ₂	0-25% +/- 1.0%		Flow from borehole +/- 0.3l/h											FS = Full Scale	
Notes:															

FIELD GAS MONITORING RESULTS

Job No.: 14209
Site: Goetre School Merthyr
Monitoring Date: 18.07.23
Monitoring Round: 4

Monitoring Conditions

Weather:	Cloudy	
Ambient Temp:	14	°C
Instrument:	GA5000	

Barometric Pressure (mb)

On Arrival:	985
During Monitoring:	985
End of Monitoring:	985

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)	
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady					
WS01	4.03	1.42	0.10	0.10	2.00	2.00	19.60	19.70	2.10	2.10	1.00	<1	<0.3	<0.3	
WS08	4.62	0.30 AGL	0.90	0.90	18.00	18.00	19.10	19.10	0.30	0.30	1.00	<1	<0.3	0.20	
Typical Instrument Accuracy:															
%CH ₄	0-70% +/- 0.5%		CO	0-500ppm +/- 2% FS										LEL = Lower Explosive Limit	
%CO ₂	0-60% +/- 0.5%		H ₂ S	0-5000ppm +/- 2.0% FS										N/R = No Reading Taken	
%O ₂	0-25% +/- 1.0%		Flow from borehole +/- 0.3l/h											FS = Full Scale	
Notes:															

FIELD GAS MONITORING RESULTS

Job No.: 14209
Site: Goetre School Merthyr
Monitoring Date: 11.08.23
Monitoring Round: 5

Monitoring Conditions

Weather:	Sunny	
Ambient Temp:	22	°C
Instrument:	GA5000	

Barometric Pressure (mb)

On Arrival:	1008
During Monitoring:	1008
End of Monitoring:	1008

Location	Well Base Level	Water Level	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)	
	(mbgl)	(mbgl)	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady					
WS01	4.03	1.40	0.20	0.10	4.00	2.00	18.70	18.80	2.30	2.30	1.00	<1	<0.3	<0.3	
WS08	4.62	0.0	0.80	0.70	16.00	14.00	19.10	19.20	0.20	0.20	1.00	<1	<0.3	0.10	
Typical Instrument Accuracy:															
%CH ₄	0-70% +/- 0.5%		CO	0-500ppm +/- 2% FS										LEL = Lower Explosive Limit	
%CO ₂	0-60% +/- 0.5%		H ₂ S	0-5000ppm +/- 2.0% FS										N/R = No Reading Taken	
%O ₂	0-25% +/- 1.0%		Flow from borehole +/- 0.3l/h										FS = Full Scale		
Notes:															

FIELD GAS MONITORING RESULTS

Job No.: 14209
Site: Goetre School Merthyr
Monitoring Date: 21.08.23
Monitoring Round: 6

Monitoring Conditions

Weather:	Cloudy	
Ambient Temp:	18	°C
Instrument:	GA5000	

Barometric Pressure (mb)

On Arrival:	997
During Monitoring:	997
End of Monitoring:	997

Location	Well Base Level	Water Level	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)	
	(mbgl)	(mbgl)	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady					
WS01	4.03	1.49	0.10	0.10	2.00	2.00	19.10	19.10	2.90	2.80	3.00	<1	<0.3	<0.3	
WS08	4.62	0.00	1.10	1.10	22.00	22.00	19.60	19.60	0.30	0.30	1.00	<1	<0.3	0.20	
Typical Instrument Accuracy:															
%CH ₄	0-70% +/- 0.5%		CO	0-500ppm +/- 2% FS										LEL = Lower Explosive Limit	
%CO ₂	0-60% +/- 0.5%		H ₂ S	0-5000ppm +/- 2.0% FS										N/R = No Reading Taken	
%O ₂	0-25% +/- 1.0%		Flow from borehole +/- 0.3l/h										FS = Full Scale		
Notes:															

APPENDIX K

SUMMARY OF LABORATORY CHEMICAL TEST RESULTS

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 14209
 Site: Geotre Primary School, Merthyr Tydfil
 Soil Type: Topsoil, Natural Soils and Made Ground
 Soil Organic Matter: 1%

METALS AND SEMI-METALS

No.	Location	Soil Type	Depth (m)	Arsenic (mg/kg)	Boron (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (Elemental) (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
1	WS01	Made Ground	0.30	8.2	0.3	2.3	< 0.2	16	< 1.8	16	23	< 0.3	14	< 1.0	27	39
2	WS02	Topsoil	0.10	10	1.3	0.51	0.6	11	2.1	22	58	< 0.3	13	< 1.0	15	77
3	WS03	Natural	0.35	13	0.3	0.41	< 0.2	16	< 1.8	17	41	< 0.3	15	< 1.0	22	67
4	WS04	Made Ground	1.00	4.3	0.3	5.4	< 0.2	14	< 1.8	8.3	3.6	< 0.3	3.7	< 1.0	30	7.9
5	WS05	Made Ground	0.40	18	0.4	1.6	< 0.2	22	< 1.8	76	130	0.6	29	< 1.0	31	150
6	WS06	Made Ground	0.40	15	0.4	1.2	< 0.2	20	< 1.8	180	180	< 0.3	23	< 1.0	28	140
7	WS09	Made Ground	0.50	11	0.6	0.76	< 0.2	16	< 1.8	19	27	< 0.3	17	< 1.0	24	49
8	WS10	Made Ground	0.40	27	0.7	0.39	< 0.2	14	< 1.8	18	48	< 0.3	12	< 1.0	23	73
9	SA03	Made Ground	0.40	14	0.4	1.3	< 0.2	30	< 1.8	33	57	< 0.3	19	< 1.0	50	86
10	TP03	Topsoil	0.30	13	0.3	0.79	< 0.2	17	< 1.8	26	51	< 0.3	21	< 1.0	24	95
11	SA04	Made Ground	0.70	12	1.7	0.87	< 0.2	17	< 1.8	18	27	< 0.3	15	< 1.0	28	43
12	SA06	Made Ground	0.40	11	1.2	0.76	< 0.2	16	< 1.8	17	28	< 0.3	16	< 1.0	24	49
13	TP04	Made Ground	0.30	12	0.8	0.77	< 0.2	13	< 1.8	24	46	< 0.3	20	< 1.0	17	57
14	TP05	Made Ground	0.40	35	1.2	1.3	< 0.2	17	< 1.8	120	220	0.6	34	< 1.0	38	170
Screening Criteria Value				40.0	11000.0	1.7	85.0	-	6.0	7100.0	310.0	1.2	180.0	430.0	1200.0	40000.0
Source of Screening Criteria Value				S4UL	S4UL	S4UL	S4UL	-	S4UL	S4UL	C4SL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

INORGANIC CHEMICALS & OTHERS

Job No.: 14209
 Site: Geotre Primary School, Merthyr Tydfil
 Soil Type: Topsoil, Natural Soils and Made Ground
 Soil Organic Matter: 1%

No.	Location	Soil Type	Depth (m)	Cyanide (mg/kg)	Loss on ignition, dried solids (%)	Moisture content at 30 C (%)	Phenol (mg/kg)	pH (pH units)	Water Soluble Sulphate (g/l)	Sulphate Total as SO4 (mg/kg)	Sulphide (mg/kg)	Total Sulphur (mg/kg)	TOC by Ignition in O2 (%)	Equivalent SOM (%)	Asbestos in Soil	Asbestos Quantification (%)
1	WS01	Made Ground	0.30	< 1.0	2.10	6.80	< 1.0	8.30	0.059	620.00	1000.00	2800.00	0.70	1.20	Not-detected	-
2	WS02	Topsoil	0.10	< 1.0	17.20	52.00	< 1.0	6.30	0.120	1800.00	1.70	720.00	-	<0.1	Not-detected	-
3	WS03	Natural	0.35	< 1.0	3.90	14.00	< 1.0	5.80	0.017	420.00	5.70	290.00	1.10	1.89	Not-detected	-
4	WS04	Made Ground	1.00	< 1.0	0.60	2.60	< 1.0	10.10	0.310	560.00	U/S**	9600.00	0.30	0.52	Not-detected	-
5	WS05	Made Ground	0.40	< 1.0	10.00	14.00	< 1.0	8.20	0.029	960.00	86.00	1000.00	2.00	3.44	Detected	< 0.001
6	WS06	Made Ground	0.40	< 1.0	12.00	19.00	< 1.0	8.70	0.100	1900.00	6.60	900.00	2.40	4.13	Not-detected	-
7	WS09	Made Ground	0.50	< 1.0	2.20	9.90	< 1.0	8.50	0.055	450.00	34.00	340.00	0.50	0.86	Not-detected	-
8	WS10	Made Ground	0.40	< 1.0	5.00	20.00	< 1.0	7.00	0.007	550.00	8.50	330.00	2.00	3.44	Not-detected	-
9	SA03	Made Ground	0.40	< 1.0	4.90	15.00	< 1.0	8.50	0.043	600.00	43.00	700.00	1.30	2.24	Not-detected	-
10	TP03	Topsoil	0.30	< 1.0	3.90	14.00	< 1.0	8.00	0.018	310.00	14.00	310.00	1.30	2.24	Not-detected	-
11	SA04	Made Ground	0.70	< 1.0	3.90	12.00	< 1.0	12.10	0.010	6600.00	49.00	2900.00	0.60	1.03	Not-detected	-
12	SA06	Made Ground	0.40	< 1.0	2.80	18.00	< 1.0	9.10	0.410	720.00	56.00	1200.00	1.00	1.72	Not-detected	-
13	TP04	Made Ground	0.30	< 1.0	2.50	13.00	< 1.0	7.90	0.130	410.00	43.00	760.00	0.90	1.55	Not-detected	-
14	TP05	Made Ground	0.40	< 1.0	21.30	18.00	< 1.0	7.50	0.180	1300.00	12.00	940.00	5.10	8.77	Not-detected	-
Screening Criteria Value				34.0	-	-	440.0	-	-	-	-	-	-	-	-	0.001
Source of Screening Criteria Value				ATRISK	-	-	S4UL	-	-	-	-	-	-	-	-	IOM

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 14209
 Site: Geotre Primary School, Merthyr Tydfil
 Soil Type: Topsoil, Natural Soils and Made Ground
 Soil Organic Matter: 1%

POLYAROMATIC HYDROCARBONS (PAH)

No.	Location	Soil Type	Depth (m)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(ghi)perylene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo(ah)anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno(123cd)pyrene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
1	WS01	Made Ground	0.30	< 0.05	< 0.05	< 0.05	0.05	0.06	0.09	< 0.05	< 0.05	0.07	< 0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05	0.07
2	WS02	Topsoil	0.10	0.11	< 0.05	0.05	0.23	0.24	0.45	0.21	0.12	0.27	0.07	0.3	0.11	0.16	0.1	0.29	0.26
3	WS03	Natural	0.35	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07	< 0.05	< 0.05	< 0.05	0.05	0.05
4	WS04	Made Ground	1.00	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
5	WS05	Made Ground	0.40	0.08	< 0.05	0.21	1.2	0.9	1.6	0.62	0.46	1.2	0.2	1.8	0.08	0.51	0.14	0.92	1.4
6	WS06	Made Ground	0.40	< 0.05	< 0.05	0.05	0.41	0.29	0.71	0.31	0.21	0.67	0.14	0.49	< 0.05	0.23	0.15	0.32	0.41
7	WS09	Made Ground	0.50	0.25	< 0.05	0.35	0.79	0.54	0.81	0.28	0.3	0.81	< 0.05	1.3	0.28	0.27	< 0.05	1	0.97
8	WS10	Made Ground	0.40	< 0.05	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05	0.06	< 0.05	0.12	< 0.05	< 0.05	< 0.05	0.09	0.09
9	SA03	Made Ground	0.40	1.1	0.19	2	6.4	5	8.7	2.7	2.7	6	0.75	14	1	2.7	1.1	7.3	12
10	TP03	Topsoil	0.30	< 0.05	< 0.05	< 0.05	0.09	0.08	0.15	< 0.05	< 0.05	0.11	< 0.05	0.18	< 0.05	< 0.05	< 0.05	0.11	0.14
11	SA04	Made Ground	0.70	< 0.05	< 0.05	0.05	0.09	0.07	0.12	< 0.05	0.06	0.12	< 0.05	0.18	< 0.05	< 0.05	< 0.05	0.16	0.17
12	SA06	Made Ground	0.40	0.14	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	< 0.05	0.12	0.15	< 0.05	< 0.05	0.31	0.12
13	TP04	Made Ground	0.30	0.11	< 0.05	0.1	0.35	0.29	0.41	0.19	0.18	0.37	0.05	0.61	0.07	0.18	< 0.05	0.42	0.48
14	TP05	Made Ground	0.40	< 0.05	< 0.05	0.12	0.56	0.53	0.8	0.4	0.25	0.71	0.09	0.96	< 0.05	0.33	0.15	0.72	0.85
Screening Criteria Value				3000.0	2900.0	31000.0	11.0	3.2	3.9	360.0	110.0	30.0	0.31	1500.0	2800.0	45.0	2.3	1300.0	3700.0
Source of Screening Criteria Value				S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

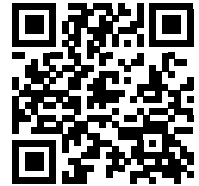
APPENDIX L

HAZWASTEONLINE PRELIMINARY WASTE CLASSIFICATION REPORT

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



RYGX1-3MY7S-GODMK

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

Job name

14209 Geotre Primary School Development

Description/Comments

Project

14209 Geotre Primary School Development

Site

14209 Geotre Primary School Development

Classified by

Name: **Jack Jones**
 Date: **18 Aug 2023 15:10 GMT**
 Telephone: **02920 807991**
 Company: **Intégral Géotechnique (Wales) Limited**
Intégral House, 7 Beddau Way, Castlegate
Business Park
Caerphilly
CF83 2AX

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

Course	Date
Hazardous Waste Classification	50% complete

Purpose of classification

2 - Material Characterisation

Address of the waste

Geotre Primary School, Merthyr Tydfil

Post Code N/A

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Development of a new primary school.

Description of the specific process, sub-process and/or activity that created the waste

Development of a new primary school.

Description of the waste

Made ground soils.

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS01	0.30	Non Hazardous		3
2	WS04	1.00	Non Hazardous		5
3	WS05	0.40	Non Hazardous		7
4	WS06	0.40	Non Hazardous		9
5	WS09	0.50	Non Hazardous		11
6	WS10	0.40	Non Hazardous		13
7	SA03	0.40	Non Hazardous		15
8	SA04	0.70	Hazardous	HP 8	17
9	SA06	0.40	Non Hazardous		19
10	TP04	0.30	Non Hazardous		21
11	TP05	0.40	Non Hazardous		23

Related documents

#	Name	Description
1	Made Ground	waste stream template used to create this Job

Report

Created by: Jack Jones

Created date: 18 Aug 2023 15:10 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	25
Appendix B: Rationale for selection of metal species	26
Appendix C: Version	27

Classification of sample: WS01

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS01	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.30 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
6.8%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 6.8% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
2	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
3	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
4	arsenic { arsenic trioxide }	215-481-4	1327-53-3		8.2 mg/kg	1.32	10.827 mg/kg		0.00108 %		
5	benzo[a]anthracene	200-280-6	56-55-3		0.05 mg/kg		0.05 mg/kg		0.000005 %		
6	benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		0.06 mg/kg		0.06 mg/kg		0.000006 %		
7	benzo[b]fluoranthene	205-911-9	205-99-2		0.09 mg/kg		0.09 mg/kg		0.000009 %		
8	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
9	benzo[k]fluoranthene	205-916-6	207-08-9		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
10	beryllium { beryllium oxide }	215-133-1	1304-56-9		2.3 mg/kg	2.775	6.383 mg/kg		0.000638 %		
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		0.3 mg/kg	13.43	4.029 mg/kg		0.000403 %		
12	cadmium { cadmium sulfide }	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg		<0.00002 %		<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		16 mg/kg	1.462	23.385 mg/kg		0.00234 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg		<0.000346 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
15	chrysene 601-048-00-0	205-923-4	218-01-9		0.07 mg/kg		0.07 mg/kg	0.000007 %			
16	copper { copper(II) chloride dihydrate } 231-210-2	10125-13-0			16 mg/kg	2.683	42.924 mg/kg	0.00429 %			
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
18	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
19	fluoranthene 205-912-4	206-44-0			0.06 mg/kg		0.06 mg/kg	0.000006 %			
20	fluorene 201-695-5	86-73-7			<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
21	indeno[123-cd]pyrene 205-893-2	193-39-5			<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
22	lead { lead chromate } 082-004-00-2	231-846-0	7758-97-6	1	23 mg/kg	1.56	35.876 mg/kg	0.0023 %			
23	mercury { mercury dichloride } 080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
24	naphthalene 601-052-00-2	202-049-5	91-20-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
25	nickel { nickel dihydroxide } 028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		14 mg/kg	1.579	22.113 mg/kg	0.00221 %			
26	pH PH				8.3 pH		8.3 pH	8.3 pH			
27	phenanthrene 201-581-5	85-01-8			<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
28	phenol 604-001-00-2	203-632-7	108-95-2		<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
29	pyrene 204-927-3	129-00-0			0.07 mg/kg		0.07 mg/kg	0.000007 %			
30	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %			<LOD
31	zinc { zinc chromate } 024-007-00-3	236-878-9	13530-65-9		39 mg/kg	2.774	108.192 mg/kg	0.0108 %			
Total:									0.025 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS04

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS04	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2.6%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 2.6% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
2	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
3	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
4	arsenic { arsenic trioxide }	215-481-4	1327-53-3		4.3 mg/kg	1.32	5.677 mg/kg		0.000568 %		
5	benzo[a]anthracene	200-280-6	56-55-3		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
6	benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
7	benzo[b]fluoranthene	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
8	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
9	benzo[k]fluoranthene	205-916-6	207-08-9		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
10	beryllium { beryllium oxide }	215-133-1	1304-56-9		5.4 mg/kg	2.775	14.987 mg/kg		0.0015 %		
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		0.3 mg/kg	13.43	4.029 mg/kg		0.000403 %		
12	cadmium { cadmium sulfide }	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg		<0.00002 %		<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		14 mg/kg	1.462	20.462 mg/kg		0.00205 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg		<0.000346 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
15	chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-048-00-0	205-923-4	218-01-9								
16	copper { copper(II) chloride dihydrate }				8.3 mg/kg	2.683	22.267 mg/kg	0.00223 %			
		231-210-2	10125-13-0								
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
		006-007-00-5									
18	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
19	fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-912-4	206-44-0								
20	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-695-5	86-73-7								
21	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-893-2	193-39-5								
22	lead { lead chromate }			1	3.6 mg/kg	1.56	5.615 mg/kg	0.00036 %			
	082-004-00-2	231-846-0	7758-97-6								
23	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
24	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
25	nickel { nickel dihydroxide }				3.7 mg/kg	1.579	5.844 mg/kg	0.000584 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
26	pH		PH		10.1 pH		10.1 pH	10.1 pH			
27	phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-581-5	85-01-8								
28	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
29	pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		204-927-3	129-00-0								
30	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %			<LOD
		034-002-00-8									
31	zinc { zinc chromate }				7.9 mg/kg	2.774	21.916 mg/kg	0.00219 %			
	024-007-00-3	236-878-9	13530-65-9								
Total:									0.0108 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS05

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS05	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.40 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
14%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 14% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		0.08 mg/kg		0.08 mg/kg		0.000008 %		
2	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
3	anthracene	204-371-1	120-12-7		0.21 mg/kg		0.21 mg/kg		0.000021 %		
4	arsenic { arsenic trioxide }	215-481-4	1327-53-3		18 mg/kg	1.32	23.766 mg/kg		0.00238 %		
5	benzo[a]anthracene	200-280-6	56-55-3		1.2 mg/kg		1.2 mg/kg		0.00012 %		
6	benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		0.9 mg/kg		0.9 mg/kg		0.00009 %		
7	benzo[b]fluoranthene	205-911-9	205-99-2		1.6 mg/kg		1.6 mg/kg		0.00016 %		
8	benzo[ghi]perylene	205-883-8	191-24-2		0.62 mg/kg		0.62 mg/kg		0.000062 %		
9	benzo[k]fluoranthene	205-916-6	207-08-9		0.46 mg/kg		0.46 mg/kg		0.000046 %		
10	beryllium { beryllium oxide }	215-133-1	1304-56-9		1.6 mg/kg	2.775	4.441 mg/kg		0.000444 %		
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		0.4 mg/kg	13.43	5.372 mg/kg		0.000537 %		
12	cadmium { cadmium sulfide }	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg		<0.00002 %		<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		22 mg/kg	1.462	32.154 mg/kg		0.00322 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg		<0.000346 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	chrysene				1.2 mg/kg		1.2 mg/kg	0.00012 %		
	601-048-00-0	205-923-4	218-01-9							
16	copper { copper(II) chloride dihydrate }				76 mg/kg	2.683	203.89 mg/kg	0.0204 %		
		231-210-2	10125-13-0							
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
		006-007-00-5								
18	dibenz[a,h]anthracene				0.2 mg/kg		0.2 mg/kg	0.00002 %		
	601-041-00-2	200-181-8	53-70-3							
19	fluoranthene				1.8 mg/kg		1.8 mg/kg	0.00018 %		
		205-912-4	206-44-0							
20	fluorene				0.08 mg/kg		0.08 mg/kg	0.000008 %		
		201-695-5	86-73-7							
21	indeno[123-cd]pyrene				0.51 mg/kg		0.51 mg/kg	0.000051 %		
		205-893-2	193-39-5							
22	lead { lead chromate }			1	130 mg/kg	1.56	202.776 mg/kg	0.013 %		
	082-004-00-2	231-846-0	7758-97-6							
23	mercury { mercury dichloride }				0.6 mg/kg	1.353	0.812 mg/kg	0.0000812 %		
	080-010-00-X	231-299-8	7487-94-7							
24	naphthalene				0.14 mg/kg		0.14 mg/kg	0.000014 %		
	601-052-00-2	202-049-5	91-20-3							
25	nickel { nickel dihydroxide }				29 mg/kg	1.579	45.805 mg/kg	0.00458 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
26	pH		PH		8.2 pH		8.2 pH	8.2 pH		
27	phenanthrene				0.92 mg/kg		0.92 mg/kg	0.000092 %		
		201-581-5	85-01-8							
28	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
29	pyrene				1.4 mg/kg		1.4 mg/kg	0.00014 %		
		204-927-3	129-00-0							
30	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
		034-002-00-8								
31	zinc { zinc chromate }				150 mg/kg	2.774	416.122 mg/kg	0.0416 %		
	024-007-00-3	236-878-9	13530-65-9							
Total:								0.0882 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS06

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS06	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.40 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
19%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 19% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
2	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
3	anthracene	204-371-1	120-12-7		0.05 mg/kg		0.05	mg/kg	0.000005 %		
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	15 mg/kg	1.32	19.805	mg/kg	0.00198 %		
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.41 mg/kg		0.41	mg/kg	0.000041 %		
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.29 mg/kg		0.29	mg/kg	0.000029 %		
7	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.71 mg/kg		0.71	mg/kg	0.000071 %		
8	benzo[ghi]perylene	205-883-8	191-24-2		0.31 mg/kg		0.31	mg/kg	0.000031 %		
9	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.21 mg/kg		0.21	mg/kg	0.000021 %		
10	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9	1.2 mg/kg	2.775	3.33	mg/kg	0.000333 %		
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		0.4 mg/kg	13.43	5.372	mg/kg	0.000537 %		
12	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	<0.2 mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		20 mg/kg	1.462	29.231	mg/kg	0.00292 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1.8 mg/kg	1.923	<3.462	mg/kg	<0.000346 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
15	chrysene 601-048-00-0	205-923-4	218-01-9		0.67 mg/kg		0.67 mg/kg	0.000067 %			
16	copper { copper(II) chloride dihydrate } 231-210-2	10125-13-0			180 mg/kg	2.683	482.897 mg/kg	0.0483 %			
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
18	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		0.14 mg/kg		0.14 mg/kg	0.000014 %			
19	fluoranthene 205-912-4	206-44-0			0.49 mg/kg		0.49 mg/kg	0.000049 %			
20	fluorene 201-695-5	86-73-7			<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
21	indeno[123-cd]pyrene 205-893-2	193-39-5			0.23 mg/kg		0.23 mg/kg	0.000023 %			
22	lead { lead chromate } 082-004-00-2	231-846-0	7758-97-6	1	180 mg/kg	1.56	280.767 mg/kg	0.018 %			
23	mercury { mercury dichloride } 080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
24	naphthalene 601-052-00-2	202-049-5	91-20-3		0.15 mg/kg		0.15 mg/kg	0.000015 %			
25	nickel { nickel dihydroxide } 028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		23 mg/kg	1.579	36.328 mg/kg	0.00363 %			
26	pH PH				8.7 pH		8.7 pH	8.7 pH			
27	phenanthrene 201-581-5	85-01-8			0.32 mg/kg		0.32 mg/kg	0.000032 %			
28	phenol 604-001-00-2	203-632-7	108-95-2		<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
29	pyrene 204-927-3	129-00-0			0.41 mg/kg		0.41 mg/kg	0.000041 %			
30	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %			<LOD
31	zinc { zinc chromate } 024-007-00-3	236-878-9	13530-65-9		140 mg/kg	2.774	388.381 mg/kg	0.0388 %			
Total:									0.116 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS09

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS09	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
9.9%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 9.9% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	acenaphthene	201-469-6	83-32-9		0.25 mg/kg		0.25 mg/kg	0.000025 %		
2	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
3	anthracene	204-371-1	120-12-7		0.35 mg/kg		0.35 mg/kg	0.000035 %		
4	arsenic { arsenic trioxide }	215-481-4	1327-53-3		11 mg/kg	1.32	14.524 mg/kg	0.00145 %		
5	benzo[a]anthracene	200-280-6	56-55-3		0.79 mg/kg		0.79 mg/kg	0.000079 %		
6	benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		0.54 mg/kg		0.54 mg/kg	0.000054 %		
7	benzo[b]fluoranthene	205-911-9	205-99-2		0.81 mg/kg		0.81 mg/kg	0.000081 %		
8	benzo[ghi]perylene	205-883-8	191-24-2		0.28 mg/kg		0.28 mg/kg	0.000028 %		
9	benzo[k]fluoranthene	205-916-6	207-08-9		0.3 mg/kg		0.3 mg/kg	0.00003 %		
10	beryllium { beryllium oxide }	215-133-1	1304-56-9		0.76 mg/kg	2.775	2.109 mg/kg	0.000211 %		
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		0.6 mg/kg	13.43	8.058 mg/kg	0.000806 %		
12	cadmium { cadmium sulfide }	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		16 mg/kg	1.462	23.385 mg/kg	0.00234 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	chrysene				0.81 mg/kg		0.81 mg/kg	0.000081 %		
	601-048-00-0	205-923-4	218-01-9							
16	copper { copper(II) chloride dihydrate }				19 mg/kg	2.683	50.972 mg/kg	0.0051 %		
		231-210-2	10125-13-0							
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
		006-007-00-5								
18	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
19	fluoranthene				1.3 mg/kg		1.3 mg/kg	0.00013 %		
		205-912-4	206-44-0							
20	fluorene				0.28 mg/kg		0.28 mg/kg	0.000028 %		
		201-695-5	86-73-7							
21	indeno[123-cd]pyrene				0.27 mg/kg		0.27 mg/kg	0.000027 %		
		205-893-2	193-39-5							
22	lead { lead chromate }			1	27 mg/kg	1.56	42.115 mg/kg	0.0027 %		
	082-004-00-2	231-846-0	7758-97-6							
23	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
24	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
25	nickel { nickel dihydroxide }				17 mg/kg	1.579	26.851 mg/kg	0.00269 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
26	pH		PH		8.5 pH		8.5 pH	8.5 pH		
27	phenanthrene				1 mg/kg		1 mg/kg	0.0001 %		
		201-581-5	85-01-8							
28	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
29	pyrene				0.97 mg/kg		0.97 mg/kg	0.000097 %		
		204-927-3	129-00-0							
30	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
		034-002-00-8								
31	zinc { zinc chromate }				49 mg/kg	2.774	135.933 mg/kg	0.0136 %		
	024-007-00-3	236-878-9	13530-65-9							
Total:								0.0305 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS10

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS10	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.40 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
20%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 20% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
2	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
3	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
4	arsenic { arsenic trioxide }	215-481-4	1327-53-3		27 mg/kg	1.32	35.649 mg/kg		0.00356 %		
5	benzo[a]anthracene	200-280-6	56-55-3		0.06 mg/kg		0.06 mg/kg		0.000006 %		
6	benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
7	benzo[b]fluoranthene	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
8	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
9	benzo[k]fluoranthene	205-916-6	207-08-9		<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
10	beryllium { beryllium oxide }	215-133-1	1304-56-9		0.39 mg/kg	2.775	1.082 mg/kg		0.000108 %		
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		0.7 mg/kg	13.43	9.401 mg/kg		0.00094 %		
12	cadmium { cadmium sulfide }	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg		<0.00002 %		<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		14 mg/kg	1.462	20.462 mg/kg		0.00205 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg		<0.000346 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
15	chrysene				0.06 mg/kg		0.06 mg/kg	0.000006 %			
	601-048-00-0	205-923-4	218-01-9								
16	copper { copper(II) chloride dihydrate }				18 mg/kg	2.683	48.29 mg/kg	0.00483 %			
		231-210-2	10125-13-0								
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
		006-007-00-5									
18	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
19	fluoranthene				0.12 mg/kg		0.12 mg/kg	0.000012 %			
		205-912-4	206-44-0								
20	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-695-5	86-73-7								
21	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-893-2	193-39-5								
22	lead { lead chromate }			1	48 mg/kg	1.56	74.871 mg/kg	0.0048 %			
	082-004-00-2	231-846-0	7758-97-6								
23	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
24	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
25	nickel { nickel dihydroxide }				12 mg/kg	1.579	18.954 mg/kg	0.0019 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
26	pH		PH		7 pH		7 pH	7pH			
27	phenanthrene				0.09 mg/kg		0.09 mg/kg	0.000009 %			
		201-581-5	85-01-8								
28	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
29	pyrene				0.09 mg/kg		0.09 mg/kg	0.000009 %			
		204-927-3	129-00-0								
30	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %			<LOD
		034-002-00-8									
31	zinc { zinc chromate }				73 mg/kg	2.774	202.513 mg/kg	0.0203 %			
	024-007-00-3	236-878-9	13530-65-9								
Total:									0.0394 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: SA03

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
SA03	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.40 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
15%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 15% No Moisture Correction applied (MC)

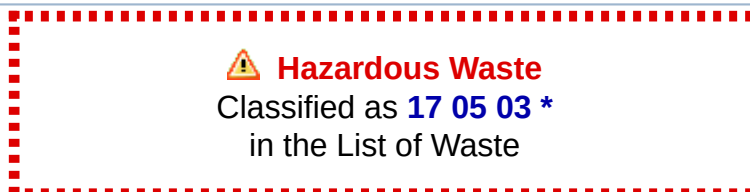
#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		1.1 mg/kg		1.1 mg/kg		0.00011 %		
2	acenaphthylene	205-917-1	208-96-8		0.19 mg/kg		0.19 mg/kg		0.000019 %		
3	anthracene	204-371-1	120-12-7		2 mg/kg		2 mg/kg		0.0002 %		
4	arsenic { arsenic trioxide }	215-481-4	1327-53-3		14 mg/kg	1.32	18.485 mg/kg		0.00185 %		
5	benzo[a]anthracene	200-280-6	56-55-3		6.4 mg/kg		6.4 mg/kg		0.00064 %		
6	benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		5 mg/kg		5 mg/kg		0.0005 %		
7	benzo[b]fluoranthene	205-911-9	205-99-2		8.7 mg/kg		8.7 mg/kg		0.00087 %		
8	benzo[ghi]perylene	205-883-8	191-24-2		2.7 mg/kg		2.7 mg/kg		0.00027 %		
9	benzo[k]fluoranthene	205-916-6	207-08-9		2.7 mg/kg		2.7 mg/kg		0.00027 %		
10	beryllium { beryllium oxide }	215-133-1	1304-56-9		1.3 mg/kg	2.775	3.608 mg/kg		0.000361 %		
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		0.4 mg/kg	13.43	5.372 mg/kg		0.000537 %		
12	cadmium { cadmium sulfide }	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg		<0.00002 %		<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		30 mg/kg	1.462	43.847 mg/kg		0.00438 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg		<0.000346 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	chrysene				6 mg/kg		6 mg/kg	0.0006 %		
	601-048-00-0	205-923-4	218-01-9							
16	copper { copper(II) chloride dihydrate }				33 mg/kg	2.683	88.531 mg/kg	0.00885 %		
		231-210-2	10125-13-0							
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
		006-007-00-5								
18	dibenz[a,h]anthracene				0.75 mg/kg		0.75 mg/kg	0.000075 %		
	601-041-00-2	200-181-8	53-70-3							
19	fluoranthene				14 mg/kg		14 mg/kg	0.0014 %		
		205-912-4	206-44-0							
20	fluorene				1 mg/kg		1 mg/kg	0.0001 %		
		201-695-5	86-73-7							
21	indeno[123-cd]pyrene				2.7 mg/kg		2.7 mg/kg	0.00027 %		
		205-893-2	193-39-5							
22	lead { lead chromate }			1	57 mg/kg	1.56	88.909 mg/kg	0.0057 %		
	082-004-00-2	231-846-0	7758-97-6							
23	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
24	naphthalene				1.1 mg/kg		1.1 mg/kg	0.00011 %		
	601-052-00-2	202-049-5	91-20-3							
25	nickel { nickel dihydroxide }				19 mg/kg	1.579	30.01 mg/kg	0.003 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
26	pH		PH		8.5 pH		8.5 pH	8.5 pH		
27	phenanthrene				7.3 mg/kg		7.3 mg/kg	0.00073 %		
		201-581-5	85-01-8							
28	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
29	pyrene				12 mg/kg		12 mg/kg	0.0012 %		
		204-927-3	129-00-0							
30	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
		034-002-00-8								
31	zinc { zinc chromate }				86 mg/kg	2.774	238.577 mg/kg	0.0239 %		
	024-007-00-3	236-878-9	13530-65-9							
Total:								0.0567 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: SA04



Sample details

Sample name:	LoW Code:
SA04	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.70 m	Entry:
Moisture content:	17 05 03 * (Soil and stones containing hazardous substances)
12%	
(no correction)	

Hazard properties

HP 8: Corrosive "waste which on application can cause skin corrosion"

pH; pH "Assumed to be irritant/corrosive because of pH value"

Because of determinand:

pH: (conc.: 12.1 pH)

Determinands

Moisture content: **12% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
2	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
3	anthracene	204-371-1	120-12-7		0.05 mg/kg		0.05 mg/kg	0.000005 %			
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4		12 mg/kg	1.32	15.844 mg/kg	0.00158 %			
5	benzo[a]anthracene	601-033-00-9	200-280-6		0.09 mg/kg		0.09 mg/kg	0.000009 %			
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.07 mg/kg		0.07 mg/kg	0.000007 %			
7	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.12 mg/kg		0.12 mg/kg	0.000012 %			
8	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
9	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.06 mg/kg		0.06 mg/kg	0.000006 %			
10	beryllium { beryllium oxide }	004-003-00-8	215-133-1		0.87 mg/kg	2.775	2.415 mg/kg	0.000241 %			
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		1.7 mg/kg	13.43	22.831 mg/kg	0.00228 %			
12	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %			<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		17 mg/kg	1.462	24.846 mg/kg	0.00248 %			
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %			<LOD
15	chrysene	601-048-00-0	205-923-4	218-01-9	0.12 mg/kg		0.12 mg/kg	0.000012 %			
16	copper { copper(II) chloride dihydrate }	231-210-2	10125-13-0		18 mg/kg	2.683	48.29 mg/kg	0.00483 %			
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
18	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
19	fluoranthene		205-912-4	206-44-0	0.18 mg/kg		0.18 mg/kg	0.000018 %			
20	fluorene		201-695-5	86-73-7	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
21	indeno[123-cd]pyrene		205-893-2	193-39-5	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
22	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	27 mg/kg	1.56	42.115 mg/kg	0.0027 %			
23	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7	<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
24	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
25	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]	15 mg/kg	1.579	23.692 mg/kg	0.00237 %			
26	pH			PH	12.1 pH		12.1 pH	12.1 pH			
27	phenanthrene		201-581-5	85-01-8	0.16 mg/kg		0.16 mg/kg	0.000016 %			
28	phenol	604-001-00-2	203-632-7	108-95-2	<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
29	pyrene		204-927-3	129-00-0	0.17 mg/kg		0.17 mg/kg	0.000017 %			
30	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %			<LOD
31	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9	43 mg/kg	2.774	119.288 mg/kg	0.0119 %			
Total:									0.0294 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: SA06

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
SA06	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.40 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
18%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 18% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	acenaphthene	201-469-6	83-32-9		0.14 mg/kg		0.14 mg/kg	0.000014 %		
2	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
3	anthracene	204-371-1	120-12-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
4	arsenic { arsenic trioxide }	215-481-4	1327-53-3		11 mg/kg	1.32	14.524 mg/kg	0.00145 %		
5	benzo[a]anthracene	200-280-6	56-55-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
6	benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
7	benzo[b]fluoranthene	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
8	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
9	benzo[k]fluoranthene	205-916-6	207-08-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
10	beryllium { beryllium oxide }	215-133-1	1304-56-9		0.76 mg/kg	2.775	2.109 mg/kg	0.000211 %		
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		1.2 mg/kg	13.43	16.116 mg/kg	0.00161 %		
12	cadmium { cadmium sulfide }	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		16 mg/kg	1.462	23.385 mg/kg	0.00234 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
15	chrysene				0.06 mg/kg		0.06 mg/kg	0.000006 %			
	601-048-00-0	205-923-4	218-01-9								
16	copper { copper(II) chloride dihydrate }				17 mg/kg	2.683	45.607 mg/kg	0.00456 %			
		231-210-2	10125-13-0								
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
		006-007-00-5									
18	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
19	fluoranthene				0.12 mg/kg		0.12 mg/kg	0.000012 %			
		205-912-4	206-44-0								
20	fluorene				0.15 mg/kg		0.15 mg/kg	0.000015 %			
		201-695-5	86-73-7								
21	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-893-2	193-39-5								
22	lead { lead chromate }			1	28 mg/kg	1.56	43.675 mg/kg	0.0028 %			
	082-004-00-2	231-846-0	7758-97-6								
23	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
24	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
25	nickel { nickel dihydroxide }				16 mg/kg	1.579	25.272 mg/kg	0.00253 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
26	pH		PH		9.1 pH		9.1 pH	9.1 pH			
27	phenanthrene				0.31 mg/kg		0.31 mg/kg	0.000031 %			
		201-581-5	85-01-8								
28	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
29	pyrene				0.12 mg/kg		0.12 mg/kg	0.000012 %			
		204-927-3	129-00-0								
30	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %			<LOD
		034-002-00-8									
31	zinc { zinc chromate }				49 mg/kg	2.774	135.933 mg/kg	0.0136 %			
	024-007-00-3	236-878-9	13530-65-9								
Total:									0.0301 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP04

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP04	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.30 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
13%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 13% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		0.11 mg/kg		0.11 mg/kg	0.000011 %			
2	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
3	anthracene	204-371-1	120-12-7		0.1 mg/kg		0.1 mg/kg	0.00001 %			
4	arsenic { arsenic trioxide }	215-481-4	1327-53-3		12 mg/kg	1.32	15.844 mg/kg	0.00158 %			
5	benzo[a]anthracene	200-280-6	56-55-3		0.35 mg/kg		0.35 mg/kg	0.000035 %			
6	benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		0.29 mg/kg		0.29 mg/kg	0.000029 %			
7	benzo[b]fluoranthene	205-911-9	205-99-2		0.41 mg/kg		0.41 mg/kg	0.000041 %			
8	benzo[ghi]perylene	205-883-8	191-24-2		0.19 mg/kg		0.19 mg/kg	0.000019 %			
9	benzo[k]fluoranthene	205-916-6	207-08-9		0.18 mg/kg		0.18 mg/kg	0.000018 %			
10	beryllium { beryllium oxide }	215-133-1	1304-56-9		0.77 mg/kg	2.775	2.137 mg/kg	0.000214 %			
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		0.8 mg/kg	13.43	10.744 mg/kg	0.00107 %			
12	cadmium { cadmium sulfide }	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %			<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		13 mg/kg	1.462	19 mg/kg	0.0019 %			
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %			<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	chrysene 601-048-00-0	205-923-4	218-01-9		0.37 mg/kg		0.37 mg/kg	0.000037 %		
16	copper { copper(II) chloride dihydrate } 231-210-2	10125-13-0			24 mg/kg	2.683	64.386 mg/kg	0.00644 %		
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
18	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		0.05 mg/kg		0.05 mg/kg	0.000005 %		
19	fluoranthene 205-912-4	206-44-0			0.61 mg/kg		0.61 mg/kg	0.000061 %		
20	fluorene 201-695-5	86-73-7			0.07 mg/kg		0.07 mg/kg	0.000007 %		
21	indeno[123-cd]pyrene 205-893-2	193-39-5			0.18 mg/kg		0.18 mg/kg	0.000018 %		
22	lead { lead chromate } 082-004-00-2	231-846-0	7758-97-6	1	46 mg/kg	1.56	71.751 mg/kg	0.0046 %		
23	mercury { mercury dichloride } 080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
24	naphthalene 601-052-00-2	202-049-5	91-20-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
25	nickel { nickel dihydroxide } 028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		20 mg/kg	1.579	31.59 mg/kg	0.00316 %		
26	pH PH				7.9 pH		7.9 pH	7.9 pH		
27	phenanthrene 201-581-5	85-01-8			0.42 mg/kg		0.42 mg/kg	0.000042 %		
28	phenol 604-001-00-2	203-632-7	108-95-2		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
29	pyrene 204-927-3	129-00-0			0.48 mg/kg		0.48 mg/kg	0.000048 %		
30	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
31	zinc { zinc chromate } 024-007-00-3	236-878-9	13530-65-9		57 mg/kg	2.774	158.126 mg/kg	0.0158 %		
Total:								0.036 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP05

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP05	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.40 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
18%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 18% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
2	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
3	anthracene	204-371-1	120-12-7		0.12 mg/kg		0.12 mg/kg	0.000012 %			
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	35 mg/kg	1.32	46.211 mg/kg	0.00462 %			
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.56 mg/kg		0.56 mg/kg	0.000056 %			
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.53 mg/kg		0.53 mg/kg	0.000053 %			
7	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.8 mg/kg		0.8 mg/kg	0.00008 %			
8	benzo[ghi]perylene	205-883-8	191-24-2		0.4 mg/kg		0.4 mg/kg	0.00004 %			
9	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.25 mg/kg		0.25 mg/kg	0.000025 %			
10	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9	1.3 mg/kg	2.775	3.608 mg/kg	0.000361 %			
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		1.2 mg/kg	13.43	16.116 mg/kg	0.00161 %			
12	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %			<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		17 mg/kg	1.462	24.846 mg/kg	0.00248 %			
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %			<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	chrysene				0.71 mg/kg		0.71 mg/kg	0.000071 %		
	601-048-00-0	205-923-4	218-01-9							
16	copper { copper(II) chloride dihydrate }				120 mg/kg	2.683	321.931 mg/kg	0.0322 %		
		231-210-2	10125-13-0							
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
		006-007-00-5								
18	dibenz[a,h]anthracene				0.09 mg/kg		0.09 mg/kg	0.000009 %		
	601-041-00-2	200-181-8	53-70-3							
19	fluoranthene				0.96 mg/kg		0.96 mg/kg	0.000096 %		
		205-912-4	206-44-0							
20	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
21	indeno[123-cd]pyrene				0.33 mg/kg		0.33 mg/kg	0.000033 %		
		205-893-2	193-39-5							
22	lead { lead chromate }			1	220 mg/kg	1.56	343.159 mg/kg	0.022 %		
	082-004-00-2	231-846-0	7758-97-6							
23	mercury { mercury dichloride }				0.6 mg/kg	1.353	0.812 mg/kg	0.0000812 %		
	080-010-00-X	231-299-8	7487-94-7							
24	naphthalene				0.15 mg/kg		0.15 mg/kg	0.000015 %		
	601-052-00-2	202-049-5	91-20-3							
25	nickel { nickel dihydroxide }				34 mg/kg	1.579	53.703 mg/kg	0.00537 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
26	pH		PH		7.5 pH		7.5 pH	7.5 pH		
27	phenanthrene				0.72 mg/kg		0.72 mg/kg	0.000072 %		
		201-581-5	85-01-8							
28	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
29	pyrene				0.85 mg/kg		0.85 mg/kg	0.000085 %		
		204-927-3	129-00-0							
30	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
		034-002-00-8								
31	zinc { zinc chromate }				170 mg/kg	2.774	471.605 mg/kg	0.0472 %		
	024-007-00-3	236-878-9	13530-65-9							
Total:								0.117 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

• **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

• **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

• **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **boron tribromide/trichloride/trifluoride (combined)** (CAS Number: 10294-33-4, 10294-34-5, 7637-07-2)

Description/Comments: Combines the hazard statements and the average of the conversion factors for boron tribromide, boron trichloride and boron trifluoride

Data source: N/A

Data source date: 06 Aug 2015

Hazard Statements: EUH014 , Acute Tox. 2; H330 , Acute Tox. 2; H300 , Skin Corr. 1A; H314 , Skin Corr. 1B; H314

• **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **copper(II) chloride dihydrate** (EC Number: 231-210-2, CAS Number: 10125-13-0)

Description/Comments: C&L for copper (II) chloride (anhydrous) CAS 7447-39-4

Data source:

Data source date: 03 Nov 2016

Hazard Statements: Skin Irrit. 2; H315 , Acute Tox. 4; H302 , Eye Dam. 1; H318 , Acute Tox. 4; H312 , STOT SE 3; H335 , Eye Irrit. 2; H319 , Acute Tox. 3; H301 , Acute Tox. 4; H332 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex**

GB MCL index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

• **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

■ **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

■ **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

■ **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on hazard statements

beryllium {beryllium oxide}

Worst case species based on hazard statements

boron {boron tribromide/trichloride/trifluoride (combined)}

Worst case species based on hazard statements

cadmium {cadmium sulfide}

Worst case species based on hazard statements

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Worst case species based on hazard statements

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case species based on hazard statements

copper {copper(II) chloride dihydrate}

test

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Worst case species

lead {lead chromate}

Worst case species based on hazard statements

mercury {mercury dichloride}

Worst case species based on hazard statements

nickel {nickel dihydroxide}

Worst case species based on hazard statements

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Worst case species based on hazard statements

zinc {zinc chromate}

Worst case species based on hazard statements

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**

HazWasteOnline Classification Engine Version: 2023.226.5717.10536 (14 Aug 2023)

HazWasteOnline Database: 2023.226.5717.10536 (14 Aug 2023)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

FIGURES

Site Location

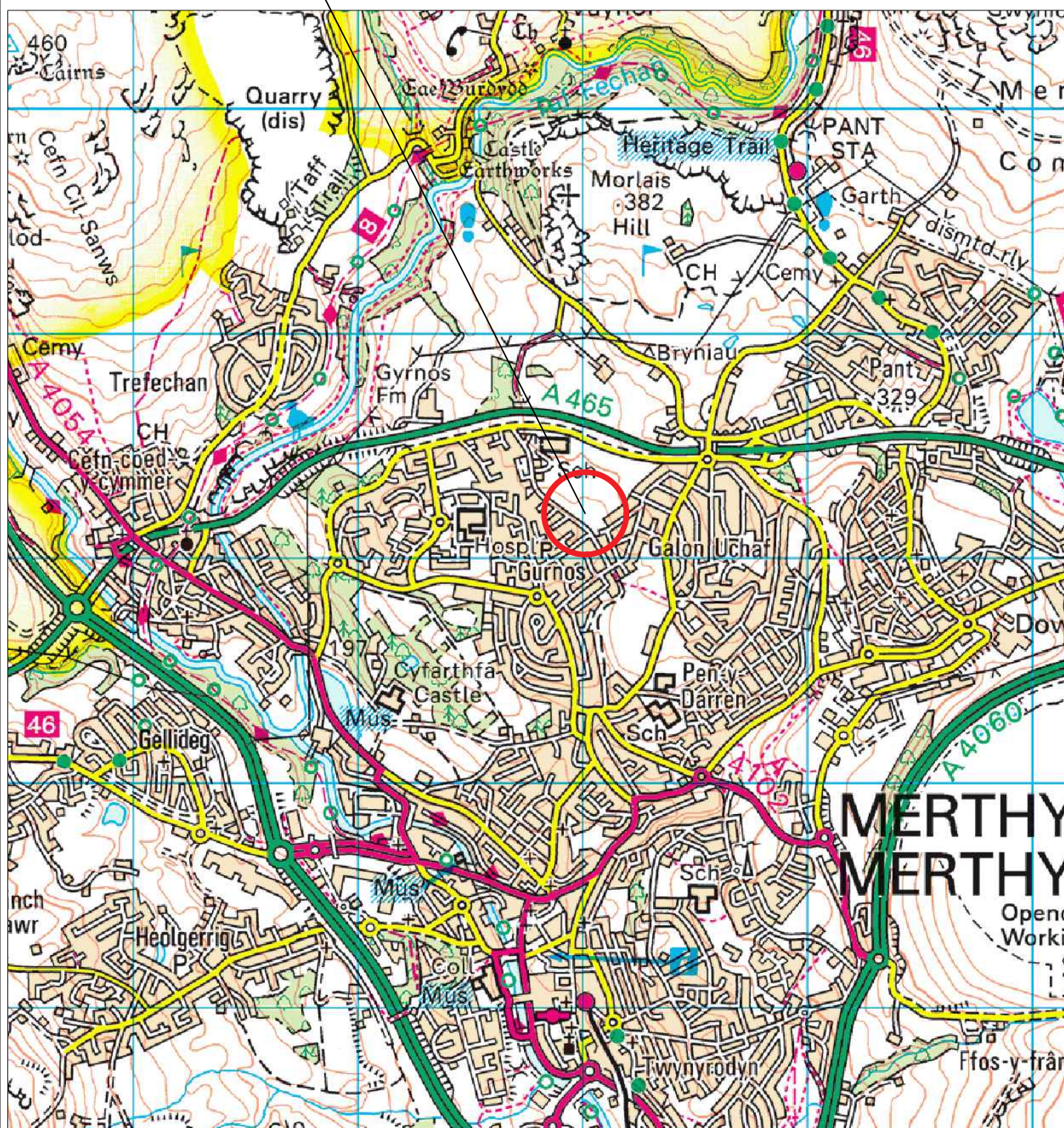


Figure 1: Site Location

Project: Proposed Geotre Primary School

Job no.: 14209

Client: Morgan Sindall

Scale: 1:25,000 at A4

Intégral
Géotechnique

Integral House,
7 Beddau Way,
Castlegate Business Park,
Caerphilly,
CF83 2AX.
Tel: 029 2080 7991

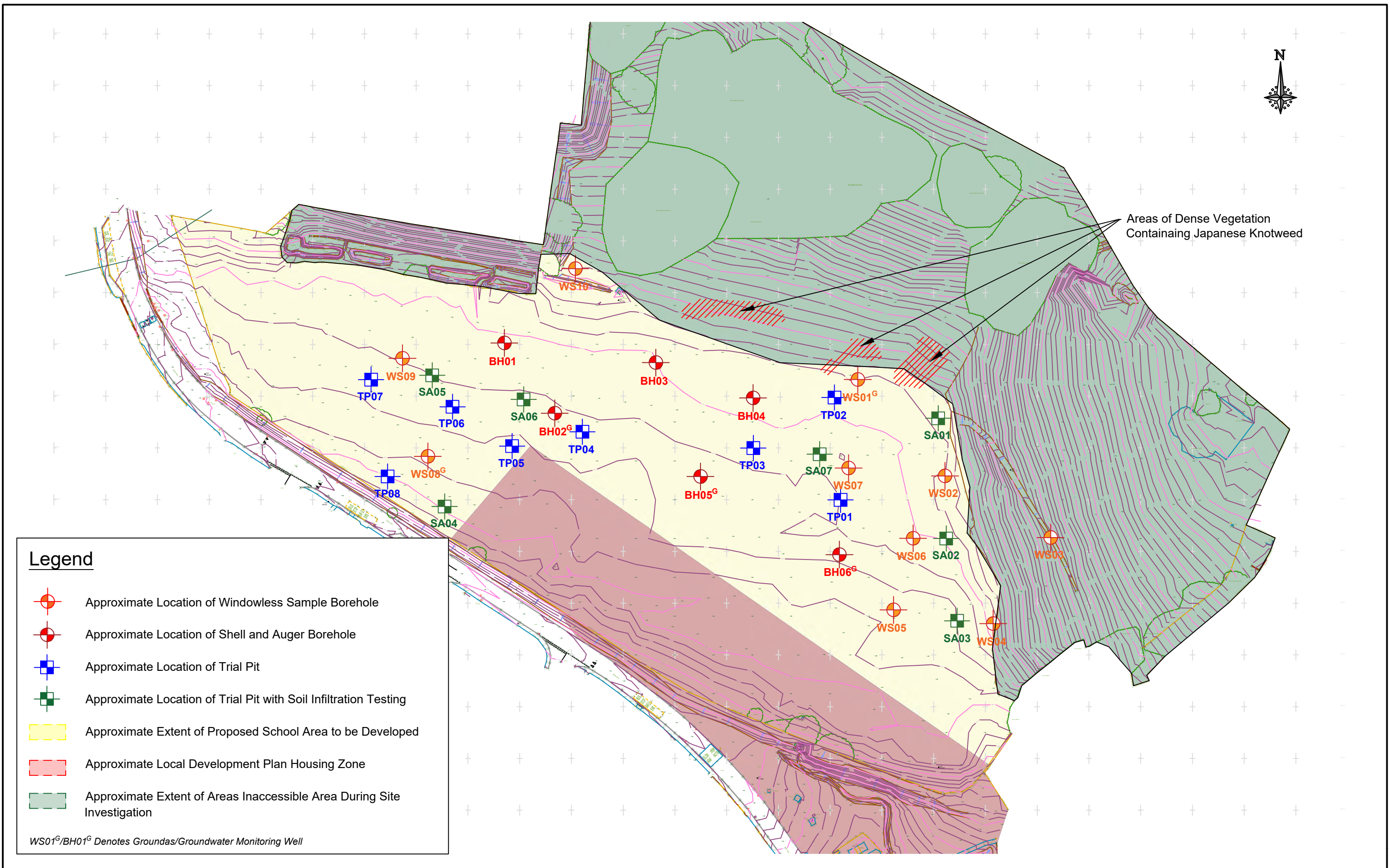


Figure 2: Site Plan

Project: Proposed Geotre Primary School, Merthyr Tydfil

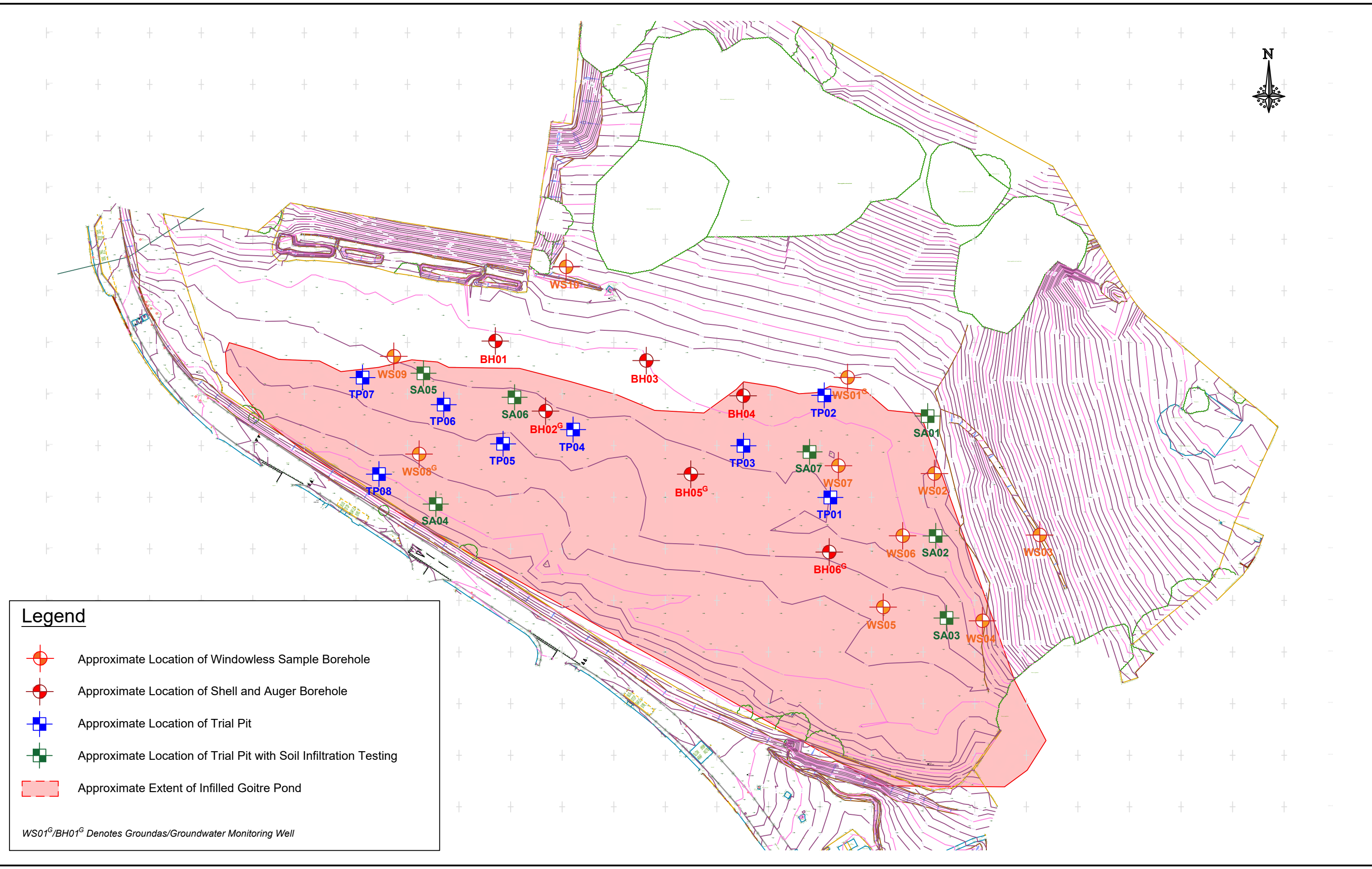
Client: Morgan Sindall

Job No.: 14209

Scale: 1/ 1,200 at A3

Intégral
Géotechnique

Integral House,
7 Beddau Way,
Castlegate Business Park,
Caerphilly,
CF83 2AX.
Tel: 029 2080 7991



Appendix E

WLGA 'Requirements for the Chemical Testing of Imported Materials for Various End Uses and Validation of Cover Systems 2013



WLGA • CLILC

Requirements for the Chemical Testing of Imported Materials for Various End Uses and Validation of Cover Systems



Prepared by
Welsh Land Contamination Working Group

This guidance is primarily for property owners, developers, environmental consultants, architects and surveyors who require information to assist their submissions to the Local Planning Authority (LPA)/ Contaminated Land Officer (CLO)/ Environmental Health Officer (EHO) in support of planning conditions applicable to the importation of soils, stones or any other similar materials to a development, for the purposes of garden, landscape or engineering use.

It is strongly recommended that, before importing any material to site, the intended sampling regime for that material is discussed and agreed in advance with the Local Authority LPA/CLO/EHO

The process for ensuring all information is submitted in relation to the relevant planning condition is outlined in **TABLE 1** in a series of step by step actions. Adherence to these will greatly assist the LPA/ CLO/EHO to effectively make final recommendation for discharge and will also ensure that contaminative risks from imported materials are avoided.

STEP 1.

Please use **Table 2**, below as an initial screening tool to use when assessing what testing requirements will be required when considering importing material for use at a development site. The Colour Coding is explained as follows:

Green – Usually no testing required go to **Step 3** –*However this category does not include soils being imported from 'greenfield sites'. Where such sources are identified the developer must initially consult with the CLO/EHO, and as a minimum provide Site Investigation data from the proposed site demonstrating chemical testing of the identified soils. Based on the data the CLO/EHO will agree the requirements for further testing (if deemed necessary) in line with Step 2.*

Yellow - Chemical Testing Required. **Go to Step 2** for specific requirements.

Amber - Where it is proposed to import waste/ processed waste materials chemical testing is required, **Go Step 2. However**, in addition to the chemical testing required, please provide exemption reference number/ Environmental Permit Number/ or waste protocol being used, **PRIOR TO THE COMMENCEMENT OF ANY IMPORTATION.**

Red – Importation of such materials prohibited.

Step 2.

Please refer to Table 3. This details the specific sampling frequencies and analytical requirements, which are dependent on the required quantities and the proposed end use of the development

Step 3.

Please complete and sign the attached declaration form with all necessary information in support of the relevant planning condition number. Failure to complete all sections of this form will result in delays when discharging the relevant planning condition

Table 1 – Process for Submitting Relevant Information on Imported Materials

STEP	RESPONSIBILITY	TASK	REQUIREMENT
1	APPLICANT	Submit information relating to proposed materials for import	Application needs to complete an Imported Materials Declaration Form, which can be found at the end of this document.
2		Sampling of intended material(s) (topsoil, subsoil, stone, aggregates etc)	Either the supplier or importer must arrange for a suitably competent third party to undertake necessary sampling of intended materials prior to their importation to the development in line with the sampling frequency of TABLE 3 . Imported Materials Declaration form to be completed and returned to CLO/EHO.
		Notify intentions to use "Other" Imported Materials (if applicable)	Imported Materials Declaration completed to notify CLO/EHO of the type of materials such as by-products of any chemical manufacturing or processing e.g. furnace slag must be submitted. Such products must be subject to additional laboratory testing to those set out in TABLE 3 to determine for example a product's chemical stability/leachability etc. Additional testing proposals must be submitted to and agreed with CLO/EHO prior to importation to ensure that potential contaminative risks are avoided.
3	LABORATORY	Analysis of submitted samples	Analysis of submitted samples for determinands relevant to the specific development as outlined in TABLE 3 . All analysis (where applicable) must be subject to MCERTS accreditation(*) at a certified laboratory.
4	APPLICANT	Employ a suitably qualified consultant to review analysis	Submission of a report interpreting the laboratory results and a conclusion on the suitability for the sampled material(s) to be used for the intended purpose at the development site.
5	CLO/EHO	Review the consultant's comments and raw data	If satisfactory partial discharge to be recommended of relevant planning condition.
6	APPLICANT	Notify CLO/EHO following import completion	Confirm the total volume and type(s) of material imported to site to CLO/EHO.
7	CLO/EHO	Check receipt of all required information	Consideration to be given to discharge planning condition in full.

^(e) Further information is available from Natural Resources Wales at www.naturalresourceswales.gov.uk
Telephone: 0300 065 3000.

TABLE 2. Screening Tool to Assess if Chemical Testing is Required

Nature of Imported Materials	Comments	Chemical Testing required
Bagged or bulk bag quantities of soils / compost and sand.	Applicable only to materials available from retail outlets such as garden centres, DIY Superstores, builder's merchants. All other sources will require testing in accordance with TABLE 3 overleaf, unless otherwise agreed with a CLO/EHO.	TESTING NOT REQUIRED
Bagged / bulk quantities of aggregate, gravel and stone.	Applicable only to material available from retail outlets such as garden centres, DIY Superstores, builder's merchants. All other sources will require testing in accordance with TABLE 2 overleaf, unless otherwise agreed with a CLO/EHO	
Naturally sourced materials.	Includes quarry products and peat which have accompanying British Standard certification.	
Recycled, sieved, blended or screened soils, stones or aggregates.	Testing required regardless of whether these are from one source or several sources / suppliers.	TESTING REQUIRED
By products from industrial processes. Mechanically screened and sorted demolition wastes.	Additional testing to that in TABLE 3 will be required to determine the suitability of these materials for specific uses prior to CLO/EHO acceptance for import. This is likely to include leachability testing in line with WAC testing or Remedial Targets Methodology Appendix B Leachate testing.	
Any Unprocessed / unsorted demolition wastes. Any materials originating from a site confirmed as being contaminated or potentially contaminated	Where potential waste materials or previously contaminated materials are to be imported and processed for reuse the Developer must ensure that such materials are suitable for use in accordance with the Definition of Waste: Development Industry Code of Practice V2. Prior to any importation the developer MUST provide details of an exemption reference number/ Environmental Permit Number/ or waste protocol being used. Under no circumstances should such materials be imported without the above documents being provided, and formal written agreement received from the relevant CLO/EHO and or Environment Agency officer. Additional testing to that in TABLE 3 will be required to determine the suitability of these materials for specific uses prior to CLO/EHO acceptance for import. This is likely to include leachability testing in line with WAC testing or Remedial Targets Methodology Appendix B Leachate testing.	TESTING REQUIRED
Materials containaing Japanese Knotweed stems, leaves and rhizome infested soils	It is an offence under the Wildlife and Countryside Act 1981 to spread this invasive weed.	IMPORTATION PROHIBITED

TABLE 3 – Sampling Frequencies and Analytical Requirements for Imported Materials

	DEVELOPMENT TYPE				
	Residential	Allotments	Parks, Play Areas, & POSs	Commercial & Industrial	
				With Landscaping	Hardstand Only
QUANTITY TO BE IMPORTED	NUMBER OF SAMPLES REQUIRED				
Less than 20m ³	Please contact CLO/EHO to agree sampling requirements				
Between 20m ³ - 250m ³	4	4	3	2	2
More than 250m ³	4 per 250m ³	4 per 250m ³	4 per 250m ³	4 per 250m ³	4 per 250m ³
>1000m ³	Where significant volumes of subsoil/topsoil are required, it is appreciated that laboratory costs for suitable frequency of analysis could be cost prohibitive. As such an appropriate sampling scheme should be agreed with the CLO/EHO.				
DETERMINAND	LABORATORY ANALYSIS				
Arsenic / Cadmium/ Chromium (Total) / Lead / Mercury and Selenium					Optional
Boron / Copper / Nickel and Zinc				Optional	Optional
Speciated PAHs					Optional
TPH ⁽¹⁾ Phenol & Asbestos					

(1) Further testing will be required for BTEX compounds if significantly elevated concentrations are present in the sample(s) tested.

IMPORTED MATERIALS DECLARATION FORM

1.	Planning Permission Number	2.	Development Address		
3.	Proposed use(s) of ALL imported material(s)	4.	Description of material imported	British Standard Certification supplied	
				Yes	No
☐	Engineering use/works (e.g. backfill, sub formation, foundation)	☐	Topsoil	☐	☐
☐	Domestic Garden use (inc. crop growing)	☐	Subsoil	☐	☐
☐	Landscaping (play areas, communal areas, roadside)	☐	Aggregate	☐	☐
☐	Other <i>Please specify</i>	☐	Quarry stone	☐	☐
			Other (<i>Please specify</i>) _____	☐	☐
5.	Origin of Imported Material(s) ☐				
☐	Greenfield Site (<i>Please specify</i>) _____				
☐	Brownfield Site (<i>Please specify</i>) _____				
☐	Recycling / Process supplier (<i>Please specify</i>) _____				
	Other (<i>Please specify</i>) _____				
6.	Volume(s) of Material to be Imported	7.	No of samples taken (per source)		
☐	Less than 20m ³	☐	2-3		
☐	Between 20m ³ - 100m ³	☐	4-6		
☐	More than 100m ³	☐	More than 6 (<i>please specify</i>) (NB: All analyses (where applicable) must be subject to MCERTS accreditation ^(c) at a certified laboratory)		
8.	Suitability of Use				
Confirmation that soil imported does not contain any evidence of Japanese Knotweed stems, leaves and rhizomes. YES ☐ NO ☐					
Confirmation the imported soil does not contain any unprocessed / unsorted demolition waste YES ☐ NO ☐					
Confirmation that the soil imported does not contain contaminated or potentially contaminated by chemical or radioactive substances YES ☐ NO ☐					
Confirmation that the soils imported is suitable for use for the intended purpose on site YES ☐ NO ☐					
Signed:.....Date:.....					
Name:.....Position:.....					
Company Name and Address					

Validation of Capping Systems

Capping Systems are an engineered remediation solution frequently used to address contamination issues on development sites. They offer a simplistic and effective method to ensure that the risks from any residual contamination to future site users are adequately managed ensuring minimal long term exposure.

In essence capping systems or clean cover systems, as they are also referred to, involve the placement of a predetermined thickness of certified clean subsoil and/ or topsoil over areas of insitu contamination. They are predominately used when concentrations of contaminants are marginally in excess of SGVs/GACs. Where significantly elevated concentrations are identified or when hydrocarbon and other organic contaminants are present the use of a cover system as a single remediation method is not normally viable, and additional remediation technique(s) are likely to be required. A detailed assessment of the nature and extent of contamination must be undertaken by a suitably qualified consultant or specialist to determine if a capping system in isolation is a sufficient remedial solution.

Whenever capping systems are used the quantity of material to be imported will be dependant on the size of the garden and depth of cover material required. Full design details of the cover system including the proposed depth cover and risk assessment supporting why it is sufficient, must be detailed in a Remediation Strategy for the site and agreed with the LPA/CLO/EHO prior to the commencement of the verification of imported materials. The required depth will be dependant upon the type and concentration of contaminant(s) that will remain in situ and the proposed end use of the site. Whether any additional design measures are required as part of the cover system, such as a warning geomembrane or capillary break layer should also be clearly considered and details provided.

If the purpose of importing materials is for any other reason then the depth of cover may not need to be approved by the LPA/CLO/EHO although you are advised to check.

CIRIA Special Publication 124 'Barriers liners and cover systems for containment and control of land contamination', 1996 and CIRIA Special Publication 106 'Remedial Treatment for contaminated land', 1996 both provide advice on the provision of imported material as a cover/barrier to contaminated ground. The BRE document 'Cover systems for land regeneration - thickness of cover systems for contaminated land', 2004 also provides advice on designing a cover system although this document is heavily caveated and was designed for use in limited scenarios as detailed in the document (which should be read fully).

Verification of Capping Thickness

Capping systems need to be validated to demonstrate that the agreed thickness of clean cover has been achieved and this must be undertaken by a suitably experienced consultant or specialist. There are three main elements that must be verified to prove that the capping system is suitable:

- Details of the origin of the capping material (as detailed earlier in this document)
- Confirmation that the agreed capping thickness has been achieved
- Chemical analysis results which confirm that material used in the cover system are certified clean and free from contamination. (as detailed earlier in this document)

The most common and simplistic way of verifying capping thickness is by the excavation of trial holes (usually hand dug) within completed areas. A verification report should document all trial holes (including a plan showing their location) and the confirmation of thickness should be confirmed through a log which should describe the material encountered in accordance with BS5930. The log descriptions should be supported with photographs of the trial holes with a scale reference (tape measure/ staff) to fully demonstrate the capping thickness.

Alternatively, on some sites it may be convenient to use data from level surveys made before and after cover system placement from which the thickness of cover materials can be calculated.

For housing developments the frequency of thickness verification will be dependant on the number of plots and also whether the capping material came from a variety of sources/locations. Table 4 below provides a **suggested minimum frequency** based on plot numbers. However advice and approval should always be sought from the LPA/CLO/EHO before commencing work.

Table 4. Verification of Capping Thickness

Development Size	Frequency for Verification
1- 5 Plots	1 per plot
5-20 Plots	1 in every 2 plots
20-30 Plots	1 in every 3 plots
> 30 Plots	1 in every 4 plots
Adapted from NHBC Technical Extra Note Issue 8 Nov 2012	