PT-CE Ltd

PODE HOLE QUARRY

Environmental Setting and Installation Design

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WSP

WSP House
70 Chancery Lane
London
WC2A 1AF

Phone: +44 20 7314 5000

WSP.com

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Signature	 White, Nicola (UKNEW850) 2025.10.14 14:42:07 +01'00'			
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CONTENTS

TABLES

APPENDICES

1 INTRODUCTION

1.1 TERMS OF REFERENCE

This Environmental Setting and Installation Design (ESID) Report has been prepared by WSP UK Ltd (WSP), on behalf of PT-CE Ltd (PT-CE), in support of its application for an Environmental Permit (EP) for waste Deposit for Recovery (DfR) (hereafter referred to as the 'permit application') for Pode Hole Quarry, The Causeway, Thorney, Peterborough PE6 0QH (hereafter referred to as the 'Site').

The report should be read in conjunction with the Waste Recovery Plan (WRP) for Pode Hole Quarry which accompanies this application (Westbury Environmental Ltd, Version 2, October 2019).

1.2 PROJECT OBJECTIVES AND DESCRIPTION

Aggregate Industries Ltd, the quarry operator of the Site, has engaged PT-CE to deliver restoration of the Site. The proposed DfR operation at the landfill will be a regulated facility which is classified as a Waste Operation under the Environmental Permitting (England and Wales) Regulations (2016). In accordance with Regulation 8 (c), the Site will receive inert waste for disposal by landfill as '*a waste operation not carried on at an installation or by means of mobile plant'*.

DfR uses waste material instead of non-waste material to perform a function, in this case quarry restoration. This allows the non-waste to be available for other uses.

The Site will only accept waste that meets the inert waste acceptance criteria under waste acceptance procedures for inert landfills as prescribed in the Landfill Regulations 2016. The Environmental Permit Application boundary for the Site is shown in **Drawing ESID4 – Site Layout and Waste Deposition.**

1.3 PLANNING PERMISSION

The restoration proposal for the Site is described in Planning Permission Ref. 18/02044/MMFUL dated 12 April 2019 for the "Importation of up to 1,807,000 cubic metres of inert waste to restore Pode Hole Quarry". The Directive on Waste (2008/98/EC), amended in 2018 (2018/851) includes a definition of 'backfilling' as a recovery operation where suitable non-hazardous waste is used for reclamation in excavated areas or for engineering in landscaping (i.e. waste material is used instead of non-waste material to perform a function). To take advantage of this definition, Planning Permission Ref. 19/01373/NONMAT dated 16 October 2019 was subsequently issued to amend the wording of Condition 20 and 22 of Planning Permission Ref. 18/02044/MMFUL to remove reference to the 'waste hierarchy' and refer to the use of 'inert materials' to restore the quarry as opposed to 'waste materials'. This is to enable restoration to be performed as a waste for recovery operation using rather than as landfilling of waste.

1.4 EA PRE-APPLICATION CONSULTATION AND WRP

The Environment Agency (EA) strongly advises that a WRP is prepared in advance of any application for Waste Recovery and is submitted to the EA in the process of obtaining enhanced pre-application advice.

A WRP (Version 2) dated 25 October 2019 (prepared by Westbury Environmental Limited on behalf of PT-CE) has been submitted to the EA in advance of this application, aiming to demonstrate that

restoration of the quarry constitutes a waste recovery activity and not a waste disposal operation. The WRP (Version 2) is appended to this application.

In the EA's letter Ref. EPR/BB3903ZL/A001 dated 26 November 2019, it confirmed that the activity is a recovery operation, although this conclusion will be subject to determination of the application. This response is appended to this application.

Further to approval of the WRP, PT-CE have proposed two minor changes in relation to the waste codes as follows:

- Removal of waste code 17 03 02 Bituminous mixtures other than those mentioned in 17 03 01 from Table 1; and
- Removal of peat from the restrictions under 17 05 04 and 20 02 02 in Table 1.

As these are considered of environmental benefit to the restoration scheme, further EA approval of a revised WRP has not been sought at this stage.

1.5 REPORT CONTENT

This report presents the ESID for the Site as follows:

- Section 2 summarises the source term characteristics including installation engineering and environmental management;
- Section 3 summarises the pathways and receptor characterisation including geology, hydrology and hydrogeology;
- Section 4 summarises the Site Report including the condition of land, permitted activities and monitoring; and
- Section 5 lists the references.

The following drawings are provided in this ESID report:

- Drawing ESID1 – Site Location Plan
- Drawing ESID2 – Environmental Site Setting
- Drawing ESID3 – Cultural and Natural Heritage
- Drawing ESID4 – Site Layout and Waste Deposition
- Drawing ESID5 – Engineering Details
- Drawing ESID6 – Restoration Plan
- Drawing ESID7 – Regional Geology
- Drawing ESID8 – Regional Hydrogeology
- Drawing ESID9 – Local Hydrogeology and Hydrology
- Drawing ESID10 – Monitoring and Extraction Point Plan

1.6 INSTALLATION DETAILS

1.6.1 LOCATION AND ACCESS

The Site is located 1.85 km west of the village of Thorney and 5 km west of Peterborough. The A47 ('The Causeway') runs 460 m to the north of the Site and Willow Hall Lane runs along the western boundary of the Site. The Site extends to approximately 68.5 hectares (Ha). The Grid Reference for the centre of the Site is TF 22515 02604.

Access to the Site is from the A47 to the north of the Site. **Drawing ESID1 – Site Location Plan** shows the location of the Site. The haul road from the A47 to the waste acceptance area will have concrete surfaces.

An identification board will be erected at the Site entrance in a position where it will be visible from the A47. The identification board will display the following information:

- The operators name, address, telephone and contact information;
- The Site name and address;
- Opening hours;
- Environment Agency contact details;
- Environment Agency emergency out of hours contact information; and
- The environmental permit reference number.

1.6.2 CURRENT SURROUNDING AND SITE TOPOGRAPHY

Current ground levels in the surrounding area are fairly flat at about 3 m above Ordnance Datum (AOD).

The Site void covers a surface area of approximately 617,500 m^2 as a result of the mineral extraction of sand and gravel. The quarry void has a undulating landform with semi-restored areas backfilled with overburden materials, areas where the underlying Oxford Clay has been excavated and replaced in engineered layers, and stockpiles of sub-soil and topsoil. The maximum depth of the quarry void is approximately -3.9 m AOD. The site survey from July 2023 is provided within the WRP.

1.6.3 SURROUNDING LAND USE

The land use surrounding the Site is predominantly agricultural fields with associated farmhouses. The historical use of the Site was also agricultural. Bar Pastures Quarry, an extension to Pode Hole Quarry that is also operated by Aggregate Industries, is located immediately west/southwest of the Site. There is another mineral working located immediately west/northwest of the Site (operated by Land Logical Thorney Limited). Both Bar Pastures Quarry and the Land Logical site have abstraction licences to dewater for mineral processing purposes. Eye Quarry (operated by Cemex) and Eye Landfill (operated by Biffa) is located immediately south/southwest of Bar Pastures Quarry

Table ESID1-1 summarises significant features and developments within 500 m of the Site, and these are shown on **Drawing ESID2 – Environmental Site Setting**.

Table ESID1-1 – Land Use within 500 m of the Site

Direction from Site	Name
Northern	▪ Agricultural land ▪ Pode Hole Farm ▪ Pasture House Farm ▪ Middle East Farm Cottage ▪ A47 road running west to east
Eastern	▪ Agricultural land
Southern	▪ Agricultural land
Western	▪ Willow Hall Lane ▪ Willow Hall Farm Quarry and Inert Landfill ▪ Pasture House Farm Quarry ▪ Bar Pastures Scheduled Ancient Monument and Bar Pasture Farm

1.6.4 INSTALLATION BOUNDARY

The installation boundary is shown on **Drawing ESID4 – Site Layout and Waste Deposition**. The boundary includes the quarry area only. The location of the existing site entrance, reception, weighbridge and wheel wash.

The site entrance, reception, weighbridge, wheel wash and access road are also shown on are shown on **Drawing ESID4 – Site Layout and Waste Deposition** and lie outside the installation boundary. Bar Pastures Quarry adjacent to the Site will share the Site entrance and associated facilities.

1.6.5 SITE SECURITY

The Site entrance will have a gate that will be closed and locked during non-operational times.

All other boundaries are bounded screening bunds, dykes, vegetation and/or agricultural fences, which provide a significant degree of security that would be little improved by the addition of further security fences. Thus, the Site is generally secured from unauthorised access.

At least once a week the site manager, or nominated deputy inspects the entire site to check the condition of the perimeter and whether there is any evidence of illegal tipping, break-ins or vandalism. Such inspections and findings will be recorded in the site diary.

Site staff will be inspected that, in the event of finding evidence of unauthorised access and/or vandalism, that the matter must be reported to the police. If the incident involves unauthorised tipping, the Environment Agency will also be informed as soon as reasonably practicable. Perimeter barriers that are found to be in poor condition will be temporarily repaired immediately, and then permanently repaired as soon as practicable.

1.6.6 HAUL ROAD

Temporary haul roads to the tipping face will be constructed using imported inert materials or existing site won stockpiled material.

1.6.7 CONSENTED HOURS OF OPERATION

The consented hours of operation for the Site are as follows:

- 07:00 to 18:00 Monday to Friday;
- 07:00 to 13:00 Saturdays; and
- At no other times or on Sundays and Bank Holidays.

The above are adhered to, except in emergencies, to maintain safe working and environmental protection (and are notified to the Planning Authority in writing as soon as possible afterwards) or where the Planning Authority has agreed otherwise in writing. Periods of servicing and maintenance of plant and equipment outside the hours above are noted in the Site logbook.

1.6.8 WASTE CLASSIFICATION

The Site will accept inert waste only for DfR purposes. The Site will not accept biodegradable waste and will therefore not produce landfill gas and the wastes to be accepted will be classified as inert and therefore by definition the total leachability and pollutant content of the wastes and the ecotoxicity of the leachate should be insignificant and, in particular, not endanger the quality of surface water and/or groundwater. The Site will implement waste acceptance procedures to ensure that only suitable waste materials are imported for use in the restoration works. The waste acceptance criteria, protocols and responsibilities are presented in Appendix 2 of the WRP.

1.6.9 IDENTIFIED POTENTIAL RECEPTORS

The locations of identified potential receptors, including residential areas, Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar Sites, Sites of Special Scientific Interest (SSSIs) and Scheduled Ancient Monuments identified within a 5 km radius of the Site are presented on **Drawing ESID2 – Environmental Site Setting** and **Drawing ESID3 – Cultural and Natural Heritage** and include:

Key statutory receptors are as follows:

- Nene Washes (SPA) – approximately 4 km to the south.
- Nene Washes (SSSI) - approximately 4 km to the south.
- Nene Washes (SAC) – approximately 4.7 km to the south.
- Nene Washes Ramsar – approximately 4.0 km to the south.
- Dogsthorpe Star Pit (SSSI) – approximately 4 km to the west.
- Dogsthorpe Star Pit (LNR) – approximately 4 km to the west.
- Eye Gravel Pit (SSSI) - approximately 2.6 km to the west.

Non-statutory receptors are as follows:

- Eyebury Road Pits (CWS) – approximately 750 m to the west.

Cultural heritage features within 1 km of the site boundary include:

- Scheduled Ancient Monument, Iron Age and Roman settlement at Bar Pastures – adjacent to western boundary.
- Scheduled Ancient Monument, Bowl Barrow 780 m east of Bar Pasture Farm.
- Scheduled Ancient Monument, two Bowl Barrows 940 m south of Bar Pasture Farm.
- Grade II listed building at Willow Hall – approximately 850 m to the south.
- Grade II listed building at Prior's Farmhouse – approximately 1.2 km to the south.

Bar Pastures Scheduled Ancient Monument (SAM) is located to the west of the Site, around Bar Pastures Farm. It is part of a settlement of Iron Age and Roman date, with a drove and associated ditches, rectilinear yards and other enclosures, some of which contain the remains of buildings. It is located on a gravel terrace about 1 km west of what was, formerly, the edge of the peat fen. Archaeological features are visible as low earthworks and as buried features within the underlying gravel below the depth of ploughing.

A second SAM comprises two bowl barrows, approximately 60 m beyond the southern boundary of the Site, situated on gravel islands along the prehistoric fen edge. These comprise earth mounds with encircling ditches associated with burials. The ditches have been infilled, and the deeper remains are protected by Fen deposits.

According to the EA Flood Maps, as shown on **Drawing ESID8 – Regional Hydrogeology** the western half of the Site is within Flood Zone 1 i.e. an area of low probability of flooding (less than 1 in 1,000 years). The eastern part of the Site falls within Flood Zones 2 and 3. A flood risk assessment was completed and approved in 2017 as part of the planning application.

Reference to the EA's website finds that the Site does not lie within a source protection zone (SPZ1, 2 or 3) (MAGIC, 2025), as shown on **Drawing ESID8 – Regional Hydrogeology**.

The Site is not located in a Nitrate Vulnerable Zone for Surface Water.

2 SOURCE TERM CHARACTERISTICS

2.1 THE DEVELOPMENT OF THE INSTALLATION

2.1.1 HISTORICAL DEVELOPMENT

The Site was originally agricultural land until the development of the quarry.

Quarry operations started at the Site in 1998 and ceased in November 2019. The material was extracted dry (i.e. the sands and gravels were temporarily dewatered by groundwater abstraction that took place from a point towards the north of the Site (at grid reference TF 26040,03040)). Dewatering at that location has ceased but continues at the neighbouring Bar Pastures Quarry and the Land Logical sites. There are no longer any quarrying operations taking place at the Site.

A clay batter was installed in 2016/2017 along an approximately 300 m section of the quarry sides in order to provide some protection from deterioration of a nearby scheduled ancient monument (Iron Age and Roman Settlement at Bar Pastures) from the operations at the Site.

2.1.2 PROPOSED DEVELOPMENT

2.1.2.1 Proposed Operational Phasing

The landfilling operations consist of progressive restoration of the void remaining after the sand and gravel extraction. The estimated volume of the void is 1.8 million m^3. The WRP has estimated that 2,700,000 tonnes will be imported to Site, based on an estimated waste density of 1.5 tonnes/m^3. The general sequencing of inert waste filling and restoration is shown on **Drawing ESID4 – Site Layout and Waste Deposition**.It is proposed to fill the quarry void in 10 phases as shown on **Drawing ESID4 – Site Layout and Waste Deposition** over a period of approximately 10 years, a rate of 270,000 tonnes per year.

Material to be utilised in the construction of the perimeter sidewall containment / attenuation layer will be excavated from the *in-situ* Oxford Clay located in the base of the quarry. Using the details provided by PT-CE for the approximate 300 m length of clay bund constructed towards the south of the Site, an estimate has been calculated of the volume of clay required to complete construction of the sidewall containment for the remainder of the Site, at approximately 150,000 m^3 of material. This material is to be won from site by excavating an approximate 0.4 m of clay from across the remaining basal area.

2.1.2.2 Method of Placement of Inert Waste Materials

Dry inert waste will be placed into each phase as the works progress. The inert waste will be deposited in discreet layers, no greater than 300 mm in thickness. Compaction of the inert waste will reduce the amount of settlement and allow restoration to be completed to the approved levels, as shown in **Drawing ESID6 – Restoration Plan**.

2.1.2.3 Permitted Waste Types and Quantities

Only suitable inert restoration materials will be imported for the purpose of the quarry restoration in order to comply with the requirements of DfR. The inert restoration materials in this case will include soils, subsoils and minerals. These materials will not be classified as hazardous waste. Full details of the specific waste codes proposed for the restoration materials, and additional restrictions on these, are included in the WRP, and summarised in **Table ESID2-1**. No waste codes ending in ‘99’

are intended to be accepted. Wastes that consist solely or mainly of dusts, powders or loose fibres, and waste that are in a form which is either sludge or liquid will not be accepted.

Table ESID2-1 – Waste Codes to be Accepted

Waste Code	Waste Description	Additional Restrictions
01 01 02*	Wastes from mineral non-metalliferous excavation	Restricted to waste overburden and interburden only.
01 04 08*	Waste gravel and crushed rocks other than those mentioned in 01 04 06	-
01 04 09*	Waste sand and clays	-
17 01 01*	Concrete	-
17 01 02*	Bricks	-
17 01 03*	Tiles and Ceramics	-
17 01 07*	Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06	Metal from reinforced concrete must have been removed.
17 05 04*	Soils and stones other than those mentioned in 17 05 03	Restricted to topsoil, subsoil and stones only.
19 12 09*	Minerals (for example sand, stones) only	Restricted to wastes from treatment of wastes that are otherwise naturally occurring minerals. Does not include fines from treatment of any non-hazardous waste or gypsum from recovered plasterboard.
19 12 12	Other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11	Restricted to crushed bricks, tiles, concrete and ceramics only. Metal from reinforced concrete must be removed.
20 02 02*	Soils and stones	Restricted to topsoil, subsoil and stones only.

* *Waste producers do not need to test their waste if the waste comes from a single source, is well characterised and described, and carries no risk of contamination.*

Current DfR guidance (EA, 2025a) states that for all but 19 12 12 of the proposed waste codes for the Site waste producers do not need to test their waste if the waste comes from a single source, is well characterised and described, and carries no risk of contamination (i.e. these waste codes will exclude material from contaminated sites). Otherwise, the waste producer must test their waste and provide the results of any analysis to the DfR site.

The Site must also test each waste stream using the same methods and techniques as the waste producer (where known) one to three times per year, depending on the operator's knowledge of the waste and its variability. Any waste which fails to meet the LLVs must be removed from Site. The Site is also required to retain all analysis testing results to be submitted as part of the Site's permit surrender application.

The Landfill Restoration Plan Strategy was submitted as part of planning application 18_02044_MMFUL and covers the general testing procedures associated with the restoration materials. A copy of the Landfill Restoration Plan Strategy is included as Appendix 3 of the WRP.

The Pre-Application response letter from the Environment Agency (dated 26 November 2019) identified some additional work was required in determining the suitability of the proposed waste types. In particular, evidence was requested to prove the suitability of non-typical wastes (covered by waste code 19 12 12) and also provide evidence from a suitably qualified person about the chemical and engineering properties of the waste to show its suitability for the proposed use and that it will not cause pollution. Table 1 of the WRP states that non-typical wastes (covered by waste code 19 12 12) will those other wastes than those covered by waste code 19 12 11 (other wastes from the mechanical treatment of waste containing hazardous substances) and will be restricted to crushed brick, tiles, concrete and ceramics only. Any metal from reinforced concrete must be removed prior to deposition. These wastes should not break down, and as such are not expected to provide a risk of contamination; however, are addressed further within the Hydrogeological Risk Assessment (ref. UK0038843_2142-WSP-RP-GW-0003) and Gas Risk Assessment (ref. UK0038843_2142-WSP-RP-GW-0005) included with this application.

2.1.2.4 Placement of Restoration Soils

Restoration of the Site will be undertaken taken using either site-won topsoil or by selected imported waste soils. The waste soils imported will be placed as subsoils. The topsoil will be stripped from relevant areas of the Site, stored and then placed on top of the imported waste. This will ensure that the imported waste is not used as a growing surface medium.

2.1.2.5 Final Landform and Restoration

On completion of filling to final levels, the majority of the Site will be restored back to farmland and has been designed to create a congruous landform that contains similar profiles and features to the surrounding landscape.

As described in the WRP, the restoration proposals for the Site seek to ensure a net gain in biodiversity value over the previously quarried landscape. The restoration will create a number of habitats including hedgerows, woodland (including copses and woodland edge), conservation grassland, wet grassland and wetland associated with the proposed water body and flood attenuation area and drainage ditches as shown on **Drawing ESID6 – Restoration Plan**.

A wildlife pond is proposed to be created in the southeast corner of the Site, which will have an irregular shape to increase the amount of marginal habitat present.

The restored landform will maintain the existing direction of surface drainage towards the southeast of the Site. Rainfall will therefore be directed towards the nature conservation and pond area.

A broader description of the proposed restoration plan is provided in the WRP, included for submission with this application.

2.2 INSTALLATION ENGINEERING

2.2.1 GROUNDWATER MANAGEMENT

During quarrying the sands and gravels were temporarily dewatered by a groundwater abstraction that took place from a point towards the north of the Site (at grid reference TF 26040,03040)). Dewatering at that location has ceased but continues at the neighbouring Bar Pastures Quarry and the Land Logical sites, which keeps surrounding groundwater levels low.

There are some limited shallow pools currently present on-site as a result of surface water and groundwater seepage accumulating in the base. This water is currently managed by pumping to a silt lagoon for soak away into the ground. This is expected to continue for as long as required during restoration activities.

If further active groundwater management is required during construction of the attenuation layer, and restoration activities, a groundwater management plan will be developed and implemented.

2.2.2 BASAL LINING

2.2.2.1 Geological Barrier

The basal geological barrier will be created by the *in-situ* Oxford Clay. The Oxford Clay is greater than 10 m thick in the vicinity of the Site. This will form the basal geological barrier.

The sides of the quarry (landfill) currently comprise sand and gravel which does not form a natural geological barrier. In line with the Landfill Directive an artificial geological barrier of 1 x 10^{-7} m/s, with a minimum thickness of 1.0 m (or equivalent) will be placed against the exposed gravel at the edges of the excavation. The artificially established geological barrier will use Oxford Clay sourced directly from the base of the Site. A clay batter was installed in 2016/2017 along an approximately 300 m section of the quarry sides in the southwest corner of the Site (see **Drawing ESID4 – Site Layout and Waste Deposition)**, in order to provide some protection from deterioration of the nearby scheduled ancient monument from the operations at the Site. It is understood that the clay batter was constructed in approximate 300 mm layers and compacted with a sheepsfoot roller, but no further details have been made available.

This section will be conformance tested in accordance with the requirements of the CQA Plan and be accepted for inclusion following receipt of conforming test results. Should any of the conformance test results not attain the required values, suitable remediation work, as approved by the CQA Engineer, shall take place initially and res-testing undertaken to confirm acceptance.

Using information provided from the construction of the existing clay batter, it has been estimated that to complete the sidewall liner for the remainder of the Site, approximately 150,000 m^3 of clay will be required, which will be excavated from the base of the Site. As low permeability natural material is to be used to construct the sidewall liner (Oxford Clay, likely around 1 x 10^{-10} m/s), in line with EA Guidance, it is likely that a minimum 0.5 m thick layer will be required (equivalent to a 1 m layer with a permeability of 1 x 10^{-7} m/s). The lining system will conform to a specification contained within a Construction Quality Assurance (CQA) Plan submitted to the EA prior to construction in accordance with the Environmental Permit. Cell design and CQA procedures for engineering the lining system are defined within the CQA Plan. A CQA Validation Report, which presents the final as built construction and engineered details of each cell, is submitted to the EA after construction which will include test results confirming the acceptability of the construction.

2.2.2.2 Artificial Sealing Layer

Due to the inert nature of the fill material, a low permeability sealing liner (i.e. geomembrane) is not required.

2.2.3 FUEL AND OIL STORAGE

The following procedures apply to the storage of fuel and chemicals used on the Site:

- All above-ground container(s) for bulk liquids e.g. gas oil, will be of sound construction and sited within a bund or secondary container. The floor and bund wall, or the secondary containment, will be constructed of a material that is impervious and chemically resistant to the material(s) stored. A bund or secondary container will be capable of containing at least 110% of the volume of the container(s).
- All pipes, gauges and valves will be enclosed within the bund wall or secondary containment so that, should a spillage occur, it is contained. Where applicable, all pipes and valves will be securely locked at the end of each working day.
- Any liquid accumulating within the bund or secondary containment will be removed and disposed of at a suitably authorised facility when the depth of the liquid reaches 0.1 m. A record of any removal is to be made in the site diary.
- Any chemicals that are used on site will be stored in secure compounds or buildings. These compounds or buildings will be locked at the end of each working day.
- Any spillage of materials will be cleaned by means of sand/saw dust spreading procedures.
- All accidental spillages and leaks will be recorded, and steps taken to identify the cause and prevent further occurrence.

An oil ‘soak-up’ kit will be kept at the site comprising absorbent matting and granules and an absorbent boom for the protection of water courses. After use, all contaminated material will be placed in a skip or container prior to disposal at a suitably authorised facility.

All above ground tanks, storage containers and pipework will be inspected at least once per week to identify any evidence of damage or leakages and check the level of liquid accumulating within the bunds. Any leaks identified shall be repaired at least temporarily such that pollution is prevented as soon as possible on the same day that the issue is identified. If a short-term repair is not possible the vessel shall be drained until such time as a permanent repair is completed.

2.3 LEACHATE MANAGEMENT AND MONITORING

Leachate collection, management and monitoring will not be required as the Site will only accept waste that meets the inert waste criteria and will be regulated on entry to the Site.

2.4 GAS MANAGEMENT AND MONITORING SYSTEM

2.4.1 GAS GENERATION

Landfill gas is generated from the breakdown of biological fractions of waste. Given the absence of biological components within the waste streams to be accepted at the Site, landfill gas generation is not expected.

GAS MANAGEMENT AND MONITORING INFRASTRUCTURE

Negligible gas will be generated from the inert waste and therefore no gas management is considered to be required at the Site. It is not possible to undertake gas utilisation or flaring at the Site.

Internal gas monitoring will be undertaken at the Site as detailed in Section 3 of the Gas Risk Assessment (ref. UK0038843_2142-WSP-RP-GW-0005 and summarised below.

To monitor gas conditions with the waste mass, two boreholes per cell will be installed. The proposed Pode Hole restoration will comprise 10 filling phases (sections) and therefore 20 in-waste monitoring boreholes will be installed within 6 months of completion of waste placement in each phase. The in-waste monitoring boreholes in Phase IV(A) will be located as close as possible to the two sensitive receptors to monitor for any gas generation in their vicinity (**Drawing ESID10 – Monitoring and Extraction Point Plan**). All boreholes will be designed, installed and monitored in accordance with the borehole requirements described in LFTGN03.

In-waste monitoring boreholes will be monitored monthly for the first year following installation to demonstrate permit compliance. Data collected will include methane, carbon dioxide, oxygen, atmospheric pressure and flow. In addition, weather conditions will be recorded for each monitoring event including temperature, rainfall and ground conditions, for example if the ground is waterlogged, frozen or covered in snow.

After a review of the annual monitoring data and if it is deemed justifiable, the in-waste gas monitoring will revert to a quarterly.

2.5 SURFACE WATER MANAGEMENT

There are surface waterbodies located on Site that are associated with the quarrying operations. Surface water drainage ditches (dikes) run around much of the perimeter of the Site and across the wider area that provide land drainage. The dikes around the Site drain towards Thorney Dike and Thorney River before discharging into the River Nene at North Side (approximately 3.5 km south of the Site).

Surface water currently accumulates in the quarry void and is pumped and discharged to one of the Sites silt lagoons for infiltration to groundwater. Clean outflow from the lagoon falls to Internal Drainage Board (IDB) drains. This will continue during restoration activities.

The restored landform will maintain the existing direction of surface drainage towards the southeast of the Site. Rainfall will therefore be directed towards the nature conservation and pond area via a series of ditches and drains. The banks around the pond have been designed to facilitate a wide draw-down area for water.

3 PATHWAYS AND RECEPTOR TERM CHARACTERISATION

3.1 CLIMATE

The Site is located within the East Anglian Fenland Region, which is a flat low-lying area on the eastern side of England. The Anglian Region has a low average rainfall when compared with the rest of the UK.

Total long-term rainfall and potential evapotranspiration for the region are reported in the Ministry of Agriculture, Fisheries and Food Technical Bulletin 35 for the period 1941 to 1970 (MAFF, 1976). The site lies within Area 28, for which rainfall is reported as being 574 mm per year.

This is in broad agreement with average annual rainfall for the nearest river gauge station at Wansford, which is 626 mm/yr (for the period 2004 to 2017).

Effective rainfall is the amount of rainfall available for infiltration and run off after evapotranspiration losses have been taken into account and any soil moisture deficit satisfied. A soil moisture deficit evolves as a result of an excess of evapotranspiration over rainfall.

The effective rainfall for active and restored landfill was calculated using ERAIN software incorporating an assumed root constant of 0 mm for bare soil and 56 mm for grassland. The initial soil moisture deficit was set at 0 mm for January as starting month for the calculation.

The average annual effective rainfall calculated was approximately 116 mm and 167 mm for grassland and bare ground, respectively.

Wind rose data has been obtained from Wittering monitoring station located approximately 20 km to the west of the Site. The wind rose data, as shown on **Drawing ESID2 – Environmental Site Setting** indicates that the prevalent wind direction is from the southwest.

3.2 GEOLOGY

3.2.1 SITE INVESTIGATIONS

Six monitoring wells were installed at the Site during April 2024 (Key GeoSolutions, 2024). The works involved drilling six boreholes to depths ranging between 4.0 and 7.4 metres below ground level (m BGL) and installing monitoring wells (BH01 to BH06) to depths ranging between 3.0 m BGL and 6.1 m BGL. **Table ESID3-1** provides details of the installed monitoring wells.

Table ESID3-1 - Groundwater Monitoring Well Installation Details

Borehole	Easting	Northing	Ground Elevation (mAOD)	Drilled Depth (mBGL)	Installed Well Depth (mBGL)	Response Zone (mBGL)	Response Zone (mAOD)
BH01	526077	302587	2.78	4	3	0.8 – 3.0	2.0 – -0.2
BH02	525752	302597	2.98	6.6	5.5	2.5 – 5.5	0.5 – -2.5
BH03	525335	302313	3.07	7.4	5.6	2.6 – 6.4	0.5 – -3.3
BH04	525387	302854	2.59	7.4	6.1	3.1 – 6.4	-0.5 – -3.8
BH05	525711	303259	2.31	6.6	5.6	0.8 – 5.6	1.5 – -3.3
BH06	526145	303108	1.6	6.6	5.6	0.7 - 5.6	0.9 – -4.0

3.2.2 REGIONAL GEOLOGY

The British Geological Survey Sheet 158 for Peterborough and BGS online Geoindex indicates that the Eastern Extension is underlain by Quaternary River Terrace deposits which overlie the Jurassic Oxford Clay Formation and Kellaways Sand. The regional geological setting is presented on **Drawing ESID7 – Regional Geology** and the geological succession is summarised in **Table ESID3-2** below.

Table ESID3-2 - Summary of Regional Geology

Age	Formation	Description	Approximate Thickness (m)
Quaternary	River Terrace Deposits	Sand and gravel with some silt	Variable
Jurassic	Oxford Clay	Olive grey fossiliferous, bituminous shale and blocky mudstone	63 – 76 m
	Kellaways Sand	Grey clayey silt and mud	1.9 – 6.4 m
	Kellaways Clay	Grey fissile mudstone	1.4 – 5.8 m
	Cornbrash	Fine grained shell-detrital limestone	1.2 – 4.3 m
	Blisworth Clay	Grey/Green mudstone with thin limestone	3.0 – 6.0 m
	Blisworth Limestone	Shell-detrital to micritic limestone with marl and mudstone	1.9 – 5.1 m

3.2.3 LOCAL GEOLOGY

The British Geological Survey (BGS) has mapped the geology at the Site at the 1:50,000 scale as River Terrace Deposits overlying the Oxford Clay Formation (BGS, 2025). The River Terrace Deposits are described as comprising sand and gravel, locally with lenses of silt, clay or peat. The Oxford Clay Formation is a slightly silty mudstone with sporadic beds of argillaceous limestone nodules. The Oxford Clay is typically 50 m to 70 m thick over much of the East Midlands Shelf.

There is a small area of Tidal Flat deposits mapped in the southern part of the Site and no superficial deposits are mapped along the eastern part of the Site. The River Terrace Deposits are also mapped to the west and south of the Site but are not laterally extensive; other superficial deposits such as Tidal Flat Deposits, which normal comprise a soft silty clay, and Peat dominate the mapped superficial geology east of the Site and further to the south. No faults are mapped at the Site.

There are four BGS borehole records located within the Site (BGS, 2025 – BGS borehole references TF20SE4, TF20SE5, TF20SE50 and TF20SE51). These describe the local geology as comprising topsoil over silty sands, and sand and gravel to between about 4 m and 6 m below ground level, underlain by a grey, blue-grey or bluish-green clay. This geology correlates well with additional logs from boreholes and trial pits completed in 1989, 1991 and 2017 on nearby parcels of land also targeted for sand and gravel reserves (Aggregate Industries, 2017 and 2018). These show topsoil

underlain by around 3 m to 8 m (but typically to about 6 m) of alternating layers of sand and gravel, and silty clay, that are underlain by a grey clay (Oxford Clay).

A deeper BGS borehole (TF20SW53) located approximately 850 m to the south-west of the site reports 0.61 m of topsoil with underlying River Terrace Deposits to a depth of 8.23 m BGL (thickness of 7.62 m), and then Oxford Clay to a depth of 18.59 m BGL (thickness of 10.36 m), beneath which lies the "Kellaways Beds" comprising 0.31 m of "stone" to 18.9 mBGL (likely to be the Kellaways Sands) over 5.18 m "blue clay" to 24.08 mBGL (likely to be the Kellaways Clay). Another BGS borehole in the vicinity of the Site (TF20SW55) recorded a thickness of Oxford Clay of 15.24 m and Kellaways Sand of 1.53 m.

Six monitoring wells were installed at Site during April 2024 (Key GeoSolutions, 2024). The works involved drilling six boreholes to depths ranging between 4.0 and 7.4 metres below ground level (m BGL) and installing monitoring wells (BH01 to BH06) to depths ranging between 3.0 m BGL and 6.1 m BGL. The geology encountered is summarised in **Table ESID3-3** and broadly correlates with that found in BGS boreholes and during earlier ground investigations.

Table ESID3-3 – Summary of Geology Encountered by 2024 Ground Investigation

Depth (m BGL)	Thickness (m)	Geology
0.5 – 0.7	0.5 – 0.7	Soft dark brown sandy clay topsoil
0.5 – 1.1	0.2 – 0.4	Soft brown mottled orange brown slightly sandy gravelly clay – River Terrace Deposits
07 – 0.8	0.1	BH05 only: Mottled brown slightly clayey gravelly sand – River Terrace Deposits
0.7 – 6.4	2.2 – 5.5	Orange brown slightly clayey very sandy gravel (flint and sst) – River Terrace Deposits A layer of soft grey slightly gravelly silt was encountered in BH02 from 5.0-5.1 mBGL (0.1 m thick), in BH05 from 2.8-4.1 mBGL (1.3 m thick) and in BH06 from 2.9-4.0 mBGL (1.1 m thick).
3.0 – 7.4 (Base not proven)	1-1.1 (Thickness not proven)	Stiff to very stiff bluish grey clay - Oxford Clay

3.3 MAN-MADE SUBSURFACE PATHWAYS

With the exception of the boreholes that are around the perimeter of the Site, there are no known man-made sub-surface pathways that cross the Site.

3.4 HYDROLOGY

3.4.1 LOCAL HYDROLOGICAL SETTING

Surface water drainage ditches (dikes) run around much of the perimeter of the Site and across the wider surrounding area that provide land drainage. The dikes around the Site drain towards Thorney Dike and Thorney River before discharging into the River Nene at North Side (approximately 3.5 km south of the Site).

Cat's Water Drain is located 600 m to the west of the Site, which flows in a southerly direction, also towards the River Nene.

3.4.2 FLOOD RISK AND CLIMATE CHANGE

Part of the eastern half of the Site is mapped by the EA as being located in Flood Zones 2 and 3 (EA, 2025b). This means it is located on land that has a high probability of flooding from rivers and/or the sea. Flood defences have been built to protect against flooding. Flood risk from rivers or the seas is given as medium (i.e. there is a between 1% and 3.3% chance of flooding each year taking account of the effect of flood defences) (EA, 2025c).

There are also localised areas mapped as being at up to high risk from surface water flooding (i.e. there is a more than a 3.3% chance of flooding each year) (EA, 2025c). Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding. The Site is not at risk from flooding from reservoirs.

3.4.3 SURFACE WATER QUALITY

No surface water quality data is available at the time of writing.

For the purposes of risk screening, the most appropriate water quality standards that apply to surface water are Environmental Quality Standards for freshwater (FW EQS). These are considered to be the most stringent standards to ensure that no deterioration in surface water quality or harm to ecosystem will occur.

The proposed monitoring regime for surface water quality is presented in the Hydrogeological Risk Assessment (ref. UK0038843_2142-WSP-RP-GW-0003) and will be carried out in accordance with the Permit.

3.4.4 SURFACE WATER ABSTRACTIONS

Publicly available information regarding current licensed and private surface water abstractions has been obtained from the Environment Agency and Peterborough City Council in August 2023. There are numerous EA licenses for the abstraction of surface water, largely for agricultural spray irrigation, positioned on watercourses both on Site and in the immediate surrounding area. No surface water abstractions are listed as being for human consumption. The EA licensed abstractions from surface water positioned within 2 km of the Site are presented in

Table ESID3-4.

Table ESID3-4 – Environment Agency Licensed Surface Water Abstractions within 2 km

Licence No.	Orig. Effective Date	Name	Use	Point Name	Max Annual Quantity	Max Daily Quantity
5/32/11/*S/0061	01/04/1977	J R Fisher & Son	General Agriculture/Spray Irrigation - Direct	Gores Drain A - B – C Counter Drain D – E	27277	1527
5/32/11/*S/0081	01/08/1973	P J Lee and Sons Limited	General Agriculture/Spray Irrigation - Direct	Levitts Drove Drain At Thorney	62000	5000
5/32/11/*S/0098	01/10/1983	James Sutton Farming Co Ltd	General Agriculture/Spray Irrigation - Direct	New Ten Foot Drain, Thorney River	18000	1100
5/32/11/*S/0120/A	08/03/2014	Northlands Farm (Thorney) Limited	General Agriculture/Spray Irrigation - Direct	Gores Drain "28-29-30", Thorney River “1-2”, Un-named Drain 3-8.	27000	1718
5/32/11/*S/0144/R01	01/11/2017	N Woodroffe & Sons	General Agriculture/Spray Irrigation - Direct	Highland Drain At Thorney, Hundreds Drain At Thorney, Newborough Main Drain, Highland Drain At Thorney, Newborough Main Drain	55000	3000
AN/032/0011/034	29/05/2018	C Horrell Ltd	General Agriculture/Sp	Reaches 2-11 Un-Named Drain, North	50000	4020

Licence No.	Orig. Effective Date	Name	Use	Point Name	Max Annual Quantity	Max Daily Quantity
			ray Irrigation - Direct	Level Main Drain, Inland Water Unnamed Drain Thorney 'Reach 1', Drains in the Drysides IDB		
AN/032/0011/043	30/09/2022	Aggregate Industries UK Ltd	Extractive - Dewatering	Settling Lagoon at Pode Hall Quarry	195108	750

** Licences are for the same polygon for the same purposes, but registered to different holders. It is assumed these are variations of the same licence.*

3.5 HYDROGEOLOGY

The regional and local hydrogeology are shown on **Drawing ESID8 - Regional Hydrogeology** and **Drawing ESID9 - Local Hydrogeology**.

3.5.1 LOCAL HYDROGEOLOGICAL SETTING

Although not apparent at the scale available online[1], in their pre-application response the EA state that the superficial deposits (River Terrace Deposits) at the Site are classified 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. The hydrogeological map of England and Wales (DEFRA, 2025) indicates that such superficial deposits, which mainly comprise silty clays, could provide limited supplies of uncertain quality from the sand and gravel components. The bedrock aquifer (Oxford Clay) designation is 'unproductive'. The Oxford Clay Formation comprises largely clays that confine underlying aquifers and is described as rocks with essentially no groundwater (BGS, 2025). Underlying the Site at depth are the Kellaways Sand, also classified as a Secondary A aquifer.

Groundwater vulnerability is classified as medium-low over most of the Site. The eastern-most part of the Site is located on an area classified as being unproductive, so has no groundwater vulnerability classification.

3.5.2 GROUNDWATER ABSTRACTIONS

The Site is not located in a source protection zone (SPZ). The nearest SPZ is located over 10 km west of the Site and is associated with an abstraction located between Peterborough and Markey Deeping (DEFRA, 2025).

Publicly available information regarding current licensed and private surface water abstractions has been obtained from the Environment Agency and Peterborough City Council in August 2023. The

[1] https://magic.defra.gov.uk/MagicMap.html

EA licensed abstractions from groundwater positioned within 2 km of the Site are presented in **Table ESID3-5**. These are all for agricultural or industrial purposes, and not for human consumption.

Table ESID3-5 – Environment Agency Licensed Groundwater Abstractions within 2 km

Licence Number	Orig. Effective Date	Name	Use	Max Annual Quantity	Max Daily Quantity
AN/032/0011/035	29/05/2018	NENE SANDS AND GRAVELS AT THORNEY	Agriculture / General Agriculture / Spray Irrigation - Storage	50000	4020
AN/032/0011/037/L*	01/04/2023	PASTURE HOUSE FARM	Industrial, Commercial and Public Services / Mineral Products / Dewatering	1892160	5184
AN/032/0011/037/R01*	06/04/2023	PASTURE HOUSE FARM	Industrial, Commercial and Public Services / Mineral Products / Dewatering	1892160	5184
AN/032/0011/053	10/10/2022	LAGOON AT EYE LANDFILL	Industrial, Commercial and Public Services / Refuse And Recycling / Dewatering	63072	168
AN/032/0011/048	07/10/2022	LAGOON AT WILLOW HALL QUARRY	Industrial, Commercial and Public Services / Extractive / Dewatering	218732	1350

** Licences are for the same polygon for the same purposes, but registered to different holders. It is assumed these are variations of the same licence.*

There are no private water supplies recorded by Peterborough City Council located within 2 km of the Site. The nearest private water supply is positioned approximately 6 km northwest of Site at Chase Farm.

3.5.3 GROUNDWATER LEVELS AND FLOW

Water strikes recorded on the BGS borehole records located within the Site boundary (BGS, 2025 – BGS borehole references TF20SE4, TF20SE5, TF20SE50 and TF20SE51) indicate groundwater was encountered near, or within about 2 m of, the surface.

Additional information supplied for five monitoring boreholes on site (referred to as Locations A-E) provides groundwater level data between 2017 and 2023. Groundwater level in these boreholes ranged between 1.1 m and 3.8 m from the surface.

Six groundwater monitoring boreholes were installed during April 2024, the response zones for which are located within the River Terrace Deposits. Fourteen groundwater monitoring rounds were carried out between April 2024 and April 2025, inclusive, and the results are summarised in

Table ESID3-6. The groundwater levels encountered during 2024 and 2025 appear to be lower than those encountered between 2017 and 2023 in Locations A-E however it is difficult to compare without elevation information.

Table ESID3-6 – Summary of Groundwater Statistics (April 2024 to April 2025)

Loc.	Depth Range (mBGL)	Range (m)	Minimum (mAOD)	Median (mAOD)	95th %ile (mAOD)	Maximum (mAOD)	St Dev (mAOD)
BH01^	3.44 – 3.84	0.40	-1.22	-0.98	-0.86	-0.82	0.10
BH02^	3.65 – 6.65	3.00	-3.85	-1.02	-0.86	-0.85	1.16
BH03	3.34 – 4.24	0.90	-1.62	-1.45	-0.87	-0.72	0.28
BH04^	6.25 – 6.86	0.61	-4.66	-4.58	-4.24	-4.05	0.16
BH05	3.79 – 4.22	0.43	-2.37	-2.08	-1.97	-1.94	0.12
BH06	3.62 – 4.6	0.98	-3.40	-2.92	-2.49	-2.42	0.26

All measured groundwater levels in BH01 and BH04 are below the base of the installed well and the last three measurements recorded for BH02 are also below the base of the installed well. These boreholes are therefore assumed to be dry.

Groundwater flow in the near-surface superficial deposits is likely to be heavily influenced by dewatering activities at nearby quarries, the surface network of drainage dikes, and the River Nene. It will also be influenced by groundwater abstractions that are dewatering the sands and gravels for mineral extraction. Therefore, natural groundwater flow in the area is likely to be towards major drainage ditches and the River Nene to the south but may be locally and temporarily influenced by dewatering to the west.

3.5.4 GROUNDWATER QUALITY

There has been no monitoring of groundwater quality parameters at the time of writing.

Groundwater quality monitoring is proposed for the six monitoring boreholes installed in 2024. The proposed monitoring regime for groundwater quality is presented in the Hydrogeological Risk Assessment (ref. UK0038843_2142-WSP-RP-GW-0003) and will be carried out in accordance with the Permit.

3.5.5 OFF-SITE GAS MONITORING

Eight external combined gas monitoring boreholes will be monitored (six of which have been installed to date) with two of them located at the border to the sensitive residential receptors (**Drawing ESID10 – Monitoring and Extraction Point Plan**). The boreholes will be monitored to characterise background ground gas levels prior to the start of operations, and throughout the operational and closure phases to record any evidence of LFG migration from the Site. The monitoring records would also be used to indicate the suitability of the geological barrier to prevent LFG migration and provide data to be used in the eventual permit surrender process.

Gathering monitoring data prior to and during the site preparation phase will allow the natural gas background conditions to be established and provide a reference for any changes once DfR infilling commences. Monitoring will be undertaken on a monthly basis prior to the restoration works, quarterly during the works, and six-monthly in the post restoration phase (also in line with the groundwater monitoring). This frequency of monitoring will be sufficient to enable the characterisation of seasonal variation and other environmental influences. Data collected will include methane, carbon dioxide, oxygen, atmospheric pressure and flow. In addition, weather conditions will be recorded for each monitoring event including temperature, rainfall and ground conditions, for example if the ground is waterlogged, frozen or covered in snow.

Monitoring of these boreholes will also be used to demonstrate that there are no additional risks introduced by the increase in TOC content of the inert wastes.

All boreholes will be designed, installed and monitored for bulk gases in accordance with the borehole requirements for monitoring lateral emissions described in LFTGN03.

3.6 RECEPTORS AND COMPLIANCE POINTS

The sources, pathways, and receptors that have been identified within this report are shown on **Drawing ESID2 – Environmental Site Setting**.

3.6.1 GROUNDWATER AND SURFACE WATER

The specific receptors that are considered in the Hydrogeological Risk Assessment (ref. UK0038843_2142-WSP-RP-GW-0003) are:

- The groundwater beneath and adjacent to the Site (including groundwater abstractions); and
- Surface water drains (including surface water abstractions).

As described in sections 3.4 and 3.5 above, there are a number of groundwater and surface water abstractions within 2 km of the Site boundary. The abstractions located off-site have not been considered further specifically as by assessment of the risk to groundwater immediately beneath and adjacent to the Site, this is naturally protective of off-Site sources also.

The compliance limits are as follows:

- For Hazardous Substances, the receptor point will be the edge of the sidewall liner just within groundwater in the River Terrace Deposits above the Oxford Clay, and the point within groundwater just at the base of the Oxford Clay above the Kellaways Sands; and
- For Non-Hazardous Substances, the primary receptor point will be the downstream boundary of the Site within the River Terrace Deposits and Kellaways Sands. Surface water drainage ditches (dikes) will form secondary receptors.

3.6.2 GAS

The specific receptors that are considered in the Gas Risk Assessment (ref. UK0038843_2142-WSP-RP-GW-0005) are:

- Properties immediately adjacent to the western boundary of the Site; and
- Bar Pasture Farm.

3.6.3 AMENITY (NUISANCE AND HEALTH)

The specific receptors that are considered in the Dust Management Plan (Quarry Restoration Partnerships Ltd, 2025) and Noise Mitigation and Monitoring Plan (PT-CE Ltd, 2019) appended to this application are:

- Pode Hole Farm, 500m north-northeast of the Site;
- 58 The Causeway, 500 m north of the Site;
- 38 &39 Willow Hall Lane, 40m west of the Site; and
- Bar Pasture Farm, 20 m west of the Site.

3.6.4 HABITATS

There are no European or nationally designated sites located within 0.5 km of the Site (DEFRA, 2025). The nearest European designated site is the Nene Washes Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar site, which is located approximately 3.3 km south of the Site. The SAC is defined as an inland water body; bog, marshes, water fringed vegetation, fens; and improved grassland. It is designated for the presence of spined loach in Moreton's Leam (a drainage channel running along the eastern flank of the Nene Washes). The SPA qualifies under Article 4.1 of the EC Birds Directive by regularly supporting, in winter, an internationally important wintering population of Bewick's swan. It also qualifies also under Article 4.2 by:

- Supporting, in summer, in recent years, nationally important breeding populations of regularly occurring migratory species (gadwall, garganey, shoveler and 16 black-tailed godwits, as well as several other rare birds.
- Supporting, in winter, nationally important wintering populations of five migratory species (wigeon, teal, gadwall, Pintail and shoveler).

The Ramsar is described as an extensive area of seasonally flooded wet grassland along the canalized lower River Nene.

The Nene Washes is also nationally designated as a Site of Special Scientific Interest (SSSI) of biological interest. It is designated for its washland habitat, which is notable for the diversity of plant and associated animal life within its network of dykes.

The following additional European or nationally designated sites are also located within 10 km of the Site (DEFRA, 2025):

- Eye Gravel Pit SSSI, Geological Conservation Review site and Local Nature Reserve is located 2.5 km northwest of the Site. It is designated for its geological interest and will not be affected by the restoration of the Site.
- Dogsthorpe Star Pit SSSI and Local Nature Reserve is located approximately 3.6 km west of the Site. It is designated for the biologically interesting features that have developed in the former clay pit. Given the regional groundwater flow direction and surface water flow direction is generally towards the River Nene in the south, the SSSI is a former clay pit, and the SSSI is located west of the Site, it is unlikely to be hydrologically connected to the Site.
- Bassenhally Pit SSSI is located approximately 4.6 km southeast of the Site and on the opposite side of the River Nene. It is designated for its biological interest; namely grassland and aquatic habitats that have developed in the old gravel workings. This site is unlikely to be hydrologically connected to the Site.

There is no ancient woodland within 5 km of the Site (DEFRA, 2025). There are three scheduled ancient monuments (SAM) located within 0.5 km to the Site (see Drawing ESID2 –Environmental Setting, which are:

- An Iron Age and Roman settlement at Bar Pastures, which is located less than 20 m west of the Site on the opposite side of Willow Hall Lane. This area of land is also identified as a priority habitat inventory floodplain grazing marsh.
- A bowl barrow (Bowl Barrow 780 m east of Bar Pasture Farm) is located 60 m south of the southern boundary of the Site.
- A Roman field system and drove at Pode Hole Farm, which is located within 400 m of the northern Site boundary. This area of land is also identified as a priority habitat inventory floodplain grazing marsh.

An additional screening assessment provided by DEFRA on Nature and Heritage Conservation confirmed the above but also identified one protected species (European Water Vole) and two protected habitats (coastal and floodplain grazing marsh and deciduous woodland) within the specified screening area that were not publicly available. These areas have been included on **Drawing ESID 2 – Environmental Setting**.

The effect of the landfilling operation on these Habitat Sites is detailed in the Habitats Risk Assessment (ref. UK0038843_2142-WSP-RP-GW-0007).

4 SITE REPORT

4.1 SITE DETAILS

Name of Applicant:

- Quarry Restoration Partnerships Limited

Activity Address:

- Pode Hole Quarry, The Causeway, Thorney, Peterborough PE6 0QH

Nation Grid Reference:

- TF 25663 02876

Document References for site plans (including location and boundaries)

- Environmental Setting and Installation Design Report including drawings (ref. UK0038843_2142-WSP-RP-GW-0002-C01)

4.2 CONDITION OF THE LAND AT PERMIT ISSUE

A Site Condition Report is provided with this application.

Environmental Setting including:

- Geology – see Section 3.2 above;
- Surface Waters – see Section 3.4 above; and
- Hydrogeology - see Section 3.5 above.

Pollution history including:

- Pollution incidents that may have affected land - None;
- Historical land uses and associated contaminants - see Section 2.1 above;
- Any visual/olfactory evidence for existing contamination - None; and
- Evidence of damage to pollution prevention measures – not applicable.

Evidence of historical contamination, for example historical site investigation assessment, remediation and verification reports:

- None.

Baseline soil and groundwater reference data:

- Section 3.5.3, plus proposed baseline environmental monitoring prior to permit issue/commencement of restoration activities.

4.3 PERMITTED ACTIVITIES

4.3.1 PERMITTED ACTIVITIES

- To be determined at Permit issue.

4.3.2 NON-PERMITTED ACTIVITIES

- To be determined at Permit issue.

4.3.3 DOCUMENTS

The activity layout at Pode Hole Quarry is described in the Environmental Setting and Installation Design Report including drawings (ref: UK0038843_2142-WSP-RP-GW-0002-C01).

As part of the current application, quantitative risk assessments are presented for hydrogeology, stability and gas, and qualitative risk assessments have been carried out for nuisance and health.

4.4 POLLUTION INCIDENTS

No pollution incidents that may have had an impact on land have been identified to date.

4.5 SOIL, GAS AND WATER QUALITY MONITORING

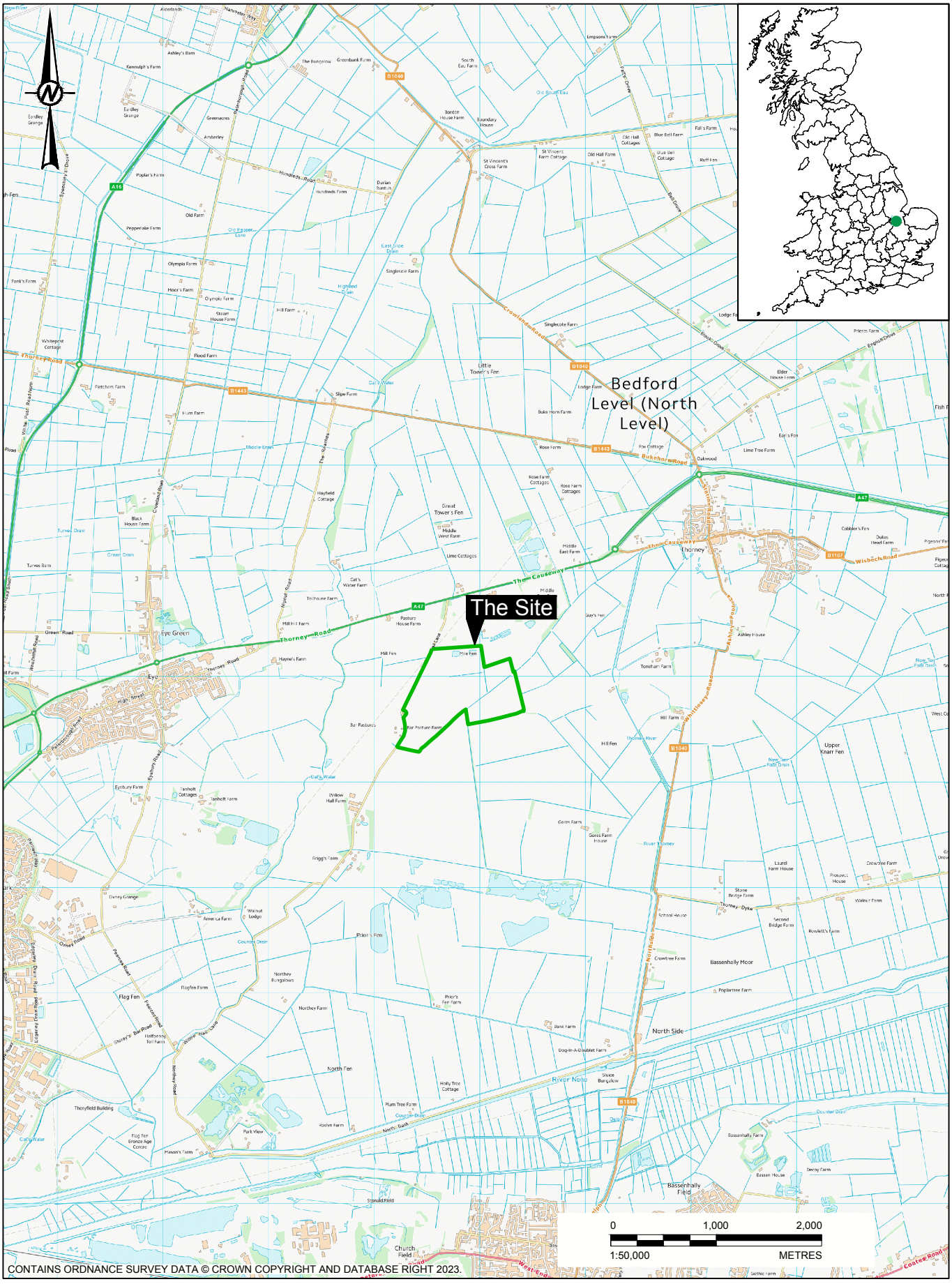
No soil, gas or water quality monitoring has been undertaken to date. A programme of baseline groundwater monitoring is proposed prior to permit issue/commencement of restoration activities. Subsequent baseline monitoring and monitoring in accordance with the requirements of the permit will be undertaken.

5 REFERENCES

- British Geological Survey (BGS) (2025) https://www.bgs.ac.uk/map-viewers/geology-of-britain-viewer/ [accessed June 2025]
- Environment Agency (EA) (2025a) Guidance – Deposit for recovery operators: environmental permits. Available at https://www.gov.uk/government/publications/deposit-for-recovery-operators-environmental-permits [accessed June 2025]
- Environment Agency (2025b) Flood Map For Planning. Available at https://flood-map-for-planning.service.gov.uk/ [accessed June 2025]
- Environment Agency (2025c) Check your long-term flood risk. Available at https://check-long-term-flood-risk.service.gov.uk/ [accessed June 2025]
- Ministry of Agriculture, Fisheries and Food (MAFF) (1976). Technical Bulletin 35, s.l.
- Department for Environment, Food and Rural Affairs (DEFRA) (2025). Magic Map Application. [Online] Available at: magic.defra.gov.uk [Accessed June 2025].

Appendix A

DRAWINGS



CLIENT
PT-CE LTD

PROJECT
PODE HOLE QUARRY PERMIT APPLICATION

CONSULTANT

YYYY-MM-DD	2025-07-02
DESIGNED	PH
PREPARED	TS
REVIEWED	PH
APPROVED	NW

TITLE
SITE LOCATION PLAN

PROJECT NO.	CONTROL	REV.	DRAWING
UK0038843.2142	1001_ES_0001	-	ESID1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ISO A4

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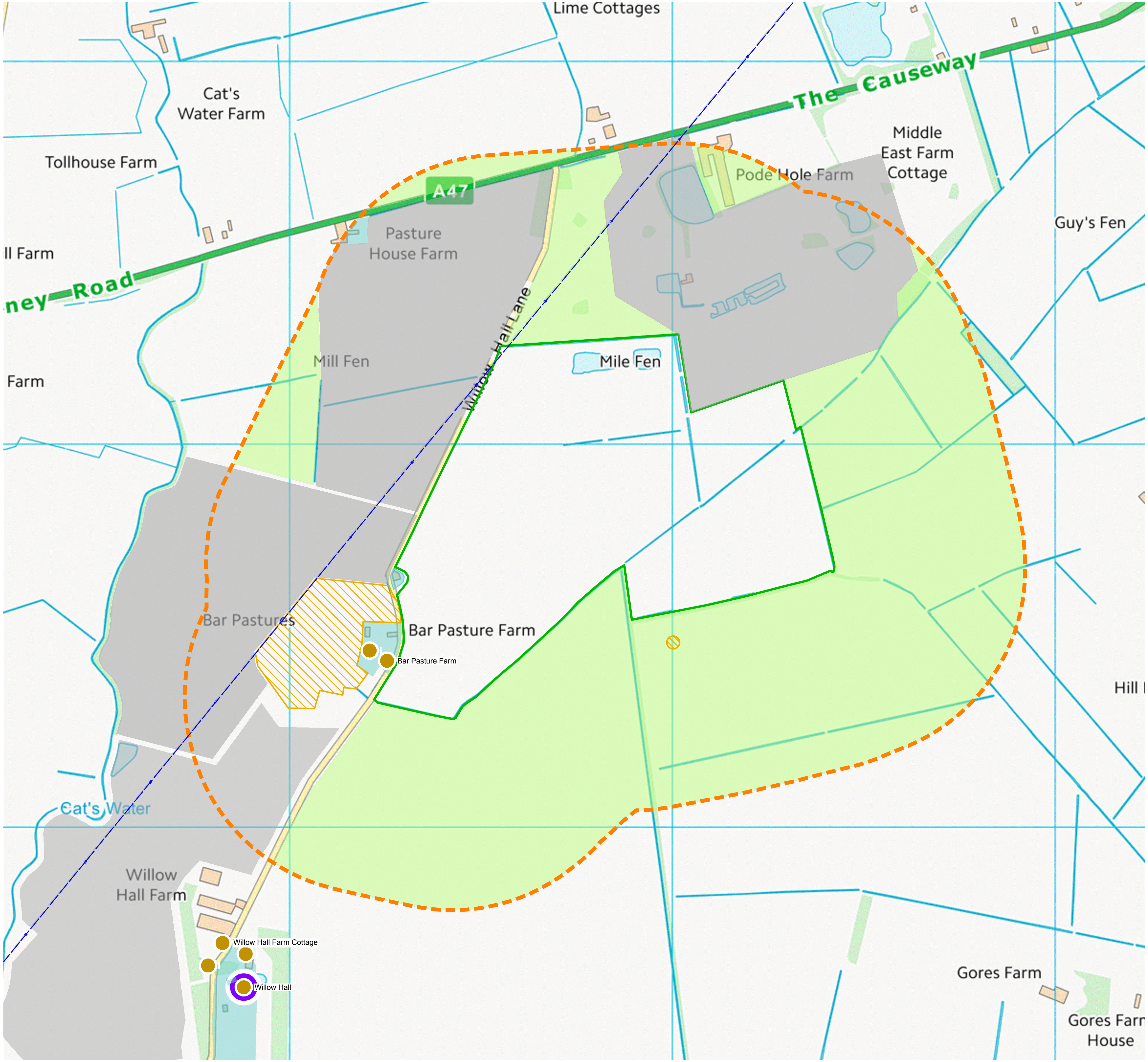

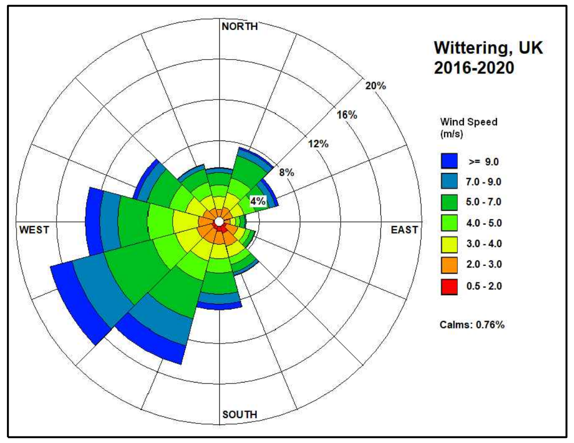

WIND ROSE

LEGEND

- PROPOSED ENVIRONMENTAL PERMIT BOUNDARY
- PYLONS AND OVERHEAD ELECTRICITY TRANSMISSION WIRES
- 500 m OFFSET FROM PROPOSED PERMIT BOUNDARY

Receptors:

- RESIDENTIAL PROPERTY
- COMMERCIAL/INDUSTRIAL PROPERTY
- FARMLAND (ARABLE OR LIVESTOCK)
- QUARRY
- SCHEDULED ANCIENT MONUMENT

Pathways:

- WATERCOURSES AND DRAINS

CLIENT
PT-CE LTD

PROJECT
PODE HOLE QUARRY PERMIT APPLICATION

TITLE
ENVIRONMENTAL SETTING

CONSULTANT
wsp

YYYY-MM-DD	2025-07-02
DESIGNED	PH
PREPARED	TS
REVIEWED	PH
APPROVED	NW

PROJECT NO.	CONTROL	REV.	DRAWING
UK0038843.2142	1001_ES_0002	-	ESID2

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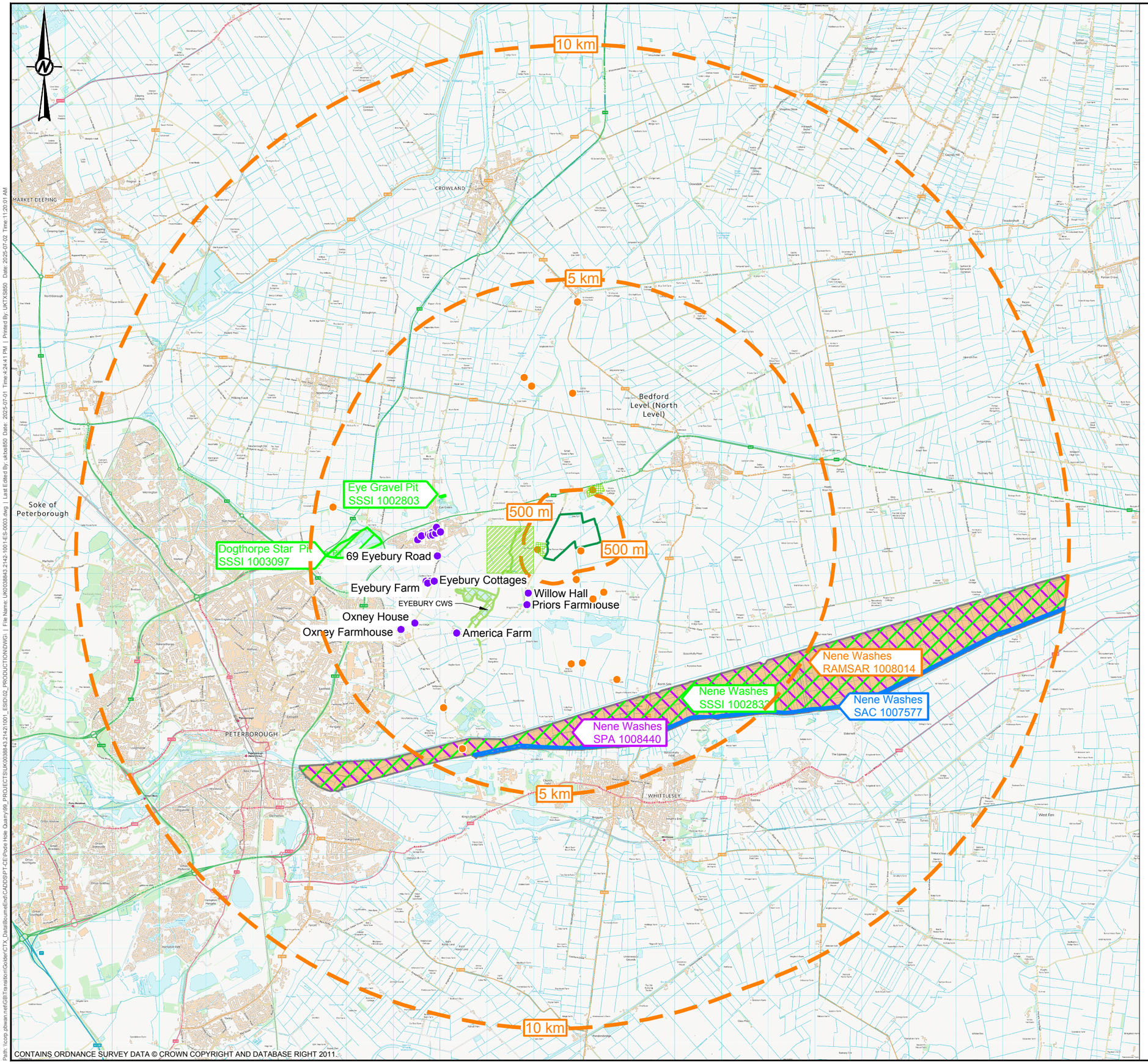

Key:

- PROPOSED BIFFA ENVIRONMENTAL PERMIT BOUNDARY EPR/BP3537PP/V011
- 500 m, 5 km AND 10 km OFFSET FROM BIFFA EPR/BP3537PP/V011
- CULTURAL HERITAGE: LISTED BUILDINGS (0.5 km)
- CULTURAL HERITAGE: BOUNDARY OF SSSI, SPA AND RAMSAR
- CULTURAL HERITAGE : SCHEDULED MONUMENTS (5 km)
- Nene Washes SSSI 1002833 — SSSI
- SSSI
- Nene Washes SPA 1008440 — SPA
- SPA
- Nene Washes SAC 1007577 — SAC
- SAC
- Nene Washes RAMSAR 100 — RAMSAR
- RAMSAR
- COUNTY WILDLIFE SITES (5 km)
- PROTECTED SPECIES (EUROPEAN WATER VOLE) (5 km)
- PROTECTED HABITATS (COASTAL AND FLOODPLAIN GRAZING MARSH AND DECIDUOUS WOODLAND) (5 km)

0 2,000 4,000
1:80,000 METRES

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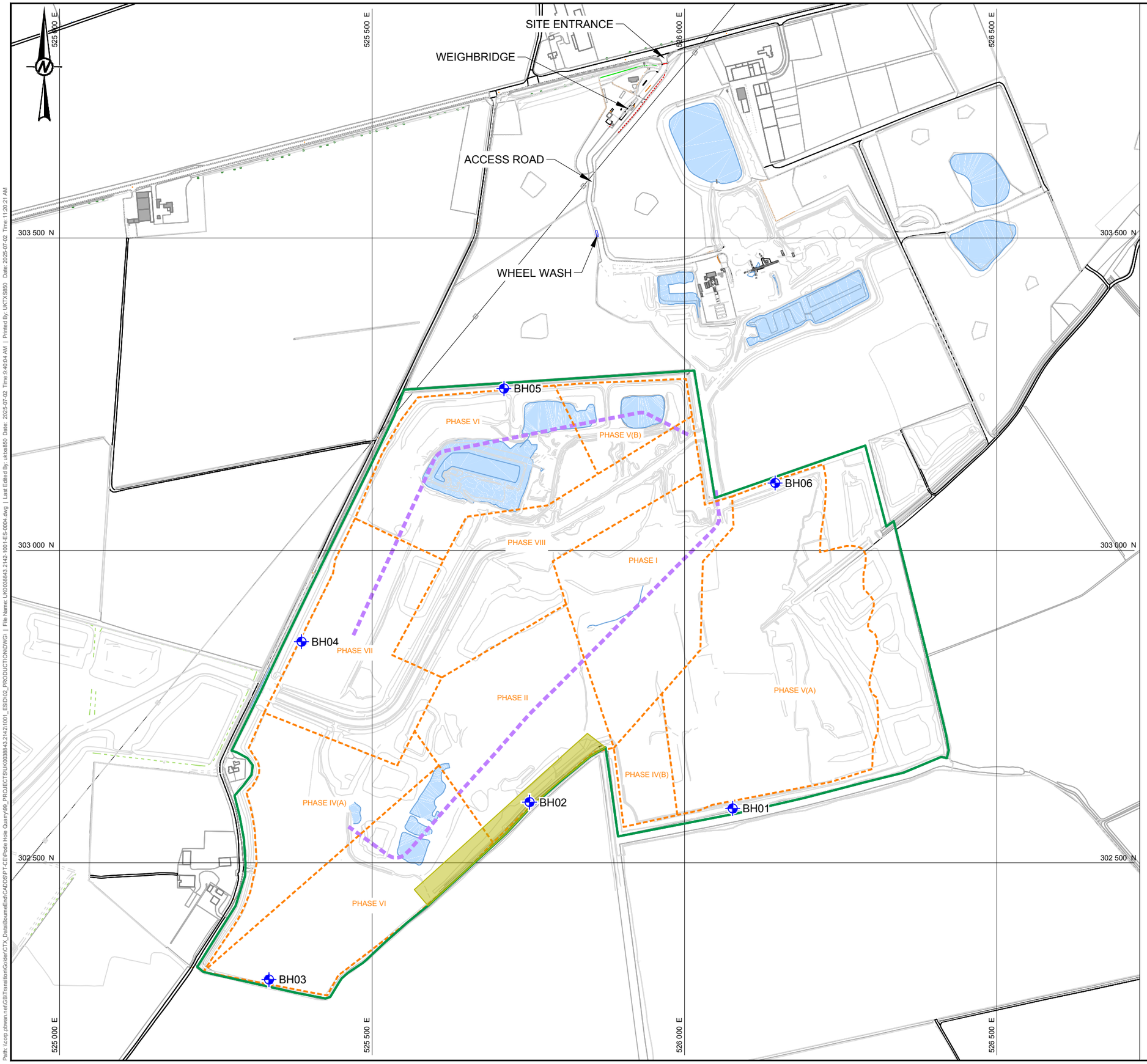
PROJECT
PODE HOLE QUARRY PERMIT APPLICATION

TITLE
CULTURAL AND NATURAL HERITAGE

CONSULTANT
wsp

YYYY-MM-DD	2025-07-02
DESIGNED	PH
PREPARED	TS
REVIEWED	PH
APPROVED	NW

PROJECT NO. UK0038843.2142 | CONTROL 1001_ES_0003 | REV. - | DRAWING ESID3



LEGEND

- ENVIRONMENTAL PERMIT APPLICATION BOUNDARY
- EXISTING GROUNDWATER MONITORING BOREHOLE
- PHASE BOUNDARY
- TEMPORARY HAUL ROAD
- EXISTING PERIMETER CLAY BUND

BOREHOLE COORDINATES		
ID	EASTING (m)	NORTHING (m)
BH01	526077	302587
BH02	525752	302597
BH03	525335	302313
BH04	525387	302854
BH05	525711	303259
BH06	526145	303108

0 100 200
1:6,000 METRES

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PROJECT
PODE HOLE QUARRY PERMIT APPLICATION

TITLE
SITE LAYOUT AND WASTE DEPOSITION

CONSULTANT
wsp

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UK0038843.2142	1001_ES_0004	-	ESID4

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25 mm

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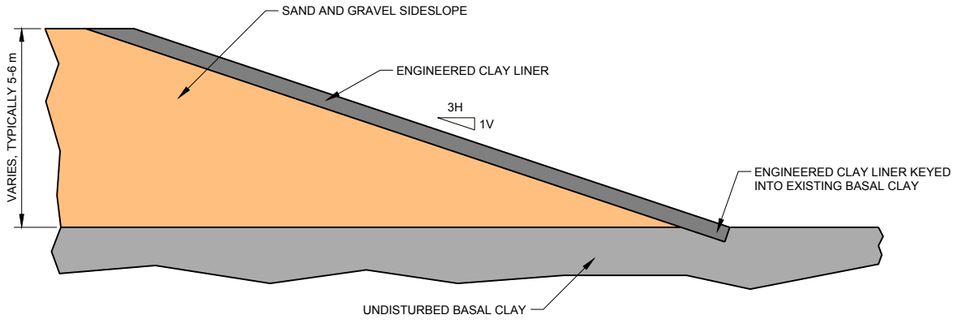
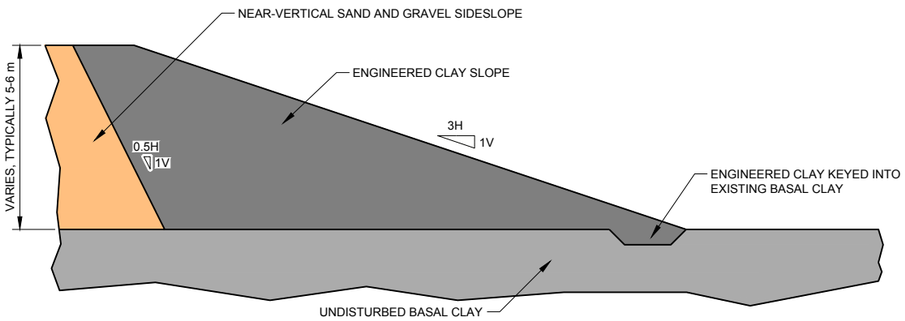
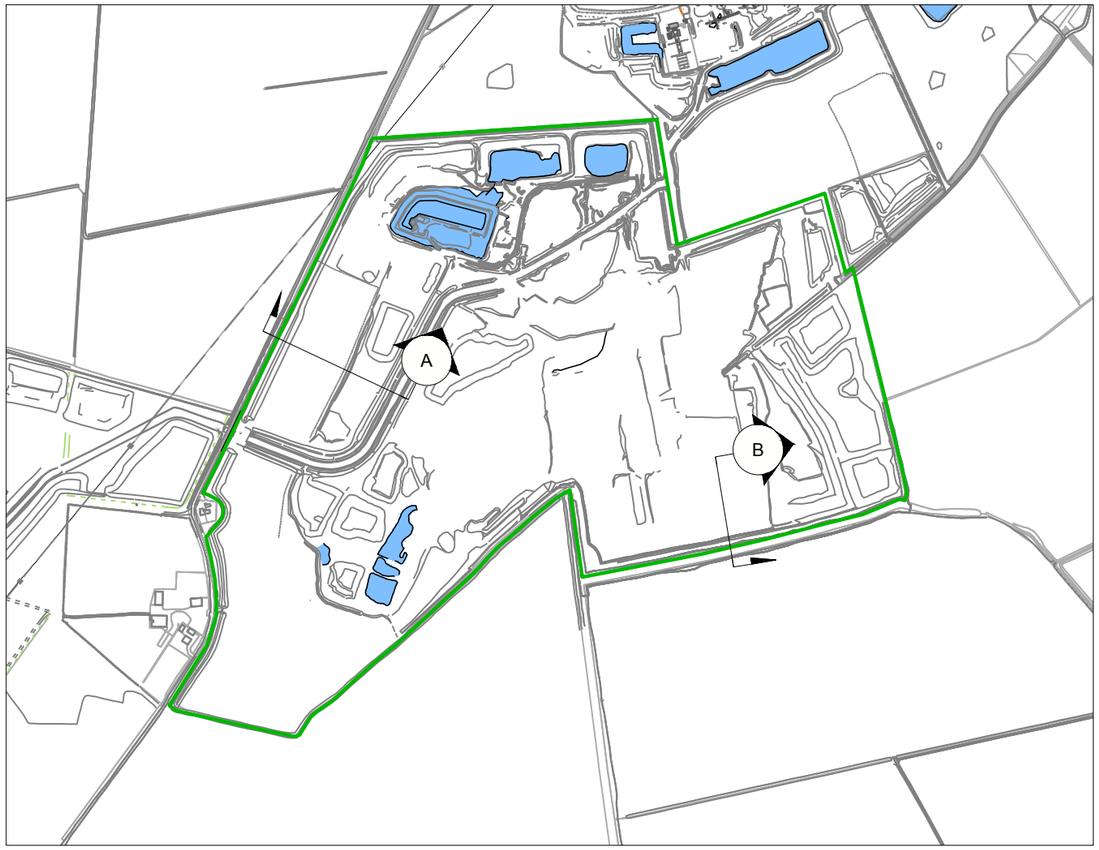


SECTION A - TYPICAL WESTERN SIDEWALL DETAIL



SECTION B - TYPICAL SOUTHERN SIDEWALL DETAIL



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PROJECT
PODE HOLE QUARRY PERMIT APPLICATION

TITLE
ENGINEERING DETAILS

CONSULTANT

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UK0038843.2142	1001_ES_0005	-	ESID5

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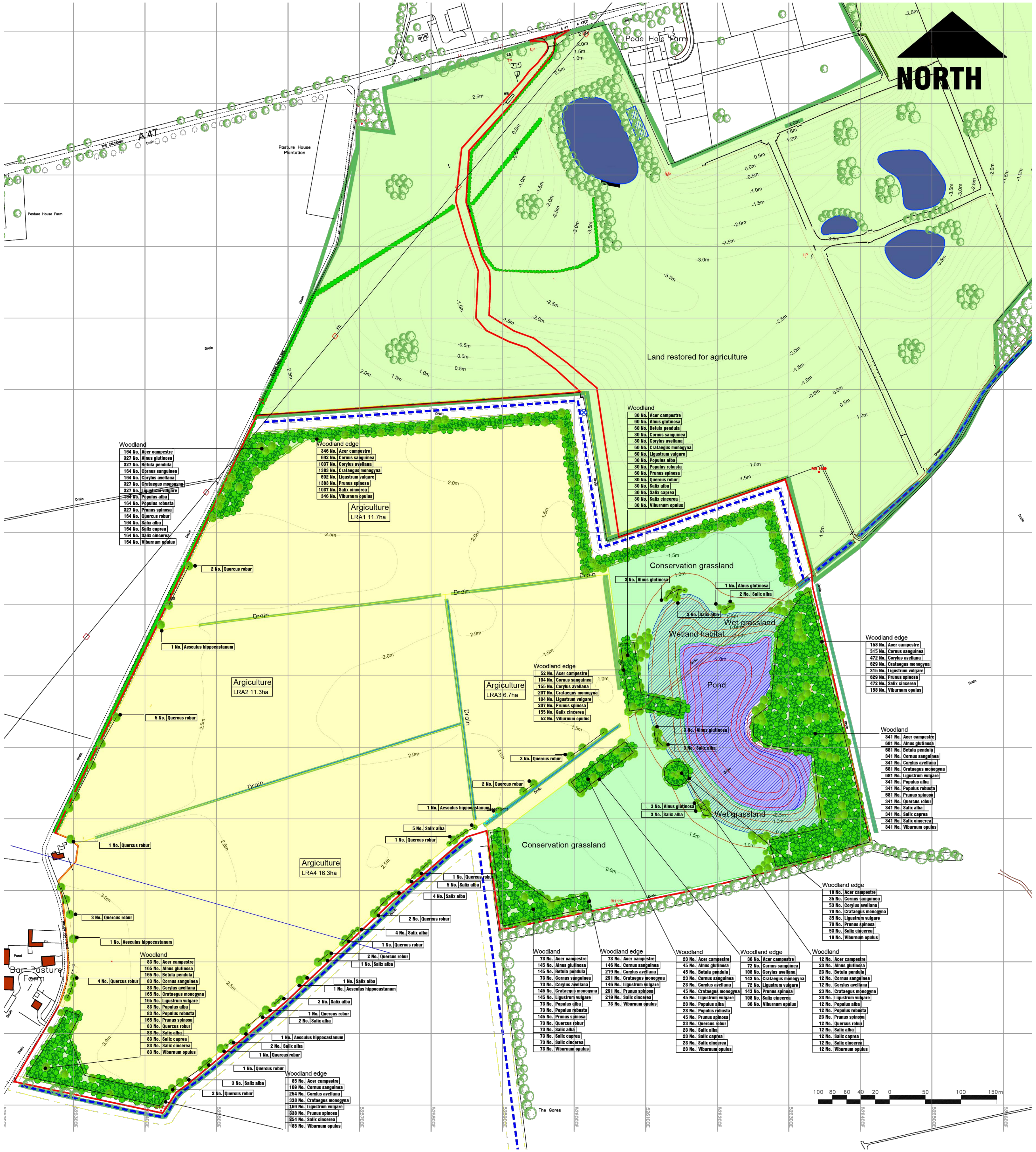

NORTH

Key

- Restored to agriculture
- Conservation grassland
- Woodland belt planting
- Water body
- Attenuation zone with grassland
- Existing trees
- Land previously restored

Woodland Planting

Trees

Number	Species	Girth	Height	Density
41 No.	Salix alba	6-8cm	2.5-3.0m	Counted
10 No.	Alnus glutinosa	6-8cm	2.5-3.0m	Counted
32 No.	Quercus robur	10-12cm	3.0-3.5m	Counted
5 No.	Aesculus hippocastanum	6-8cm	2.5-3.0m	Counted

Pode Hole Woodland

Number	Species	Specification	Density
726 No.	Acer campestre	1+1 :transplant - seed raised :BR	0.25/m²
1446 No.	Alnus glutinosa	1+1: transplant - seed raised :BR	0.25/m²
1446 No.	Betula pendula	1+1: transplant - seed raised :BR	0.25/m²
726 No.	Cornus sanguinea	1+1 :Branched :2/3 brks :BR	0.25/m²
726 No.	Corylus avellana	1+1: transplant - seed raised :BR	0.25/m²
1446 No.	Crataegus monogyna	1+1 :transplant - seed raised :BR	0.25/m²
1446 No.	Ligustrum vulgare	0/1 :Branched :2 brks :BR	0.25/m²
726 No.	Populus alba	1+1: transplant - seed raised :BR	0.25/m²
726 No.	Populus robusta	1+1: transplant - seed raised :BR	0.25/m²
1446 No.	Prunus spinosa	1+1: transplant - seed raised :Branched :2 brks :BR	0.25/m²
726 No.	Quercus robur	1+1: transplant - seed raised :BR	0.25/m²
726 No.	Salix alba	1+1: transplant - seed raised :BR	0.25/m²
726 No.	Salix caprea	1+1: transplant - seed raised :BR	0.25/m²
726 No.	Salix cincerea	1+1: transplant - seed raised :BR	0.25/m²
726 No.	Viburnum opulus	1+1 :Branched :2/3 brks :BR	0.25/m²
Total :14490 No.			

Pode Hole Woodland Edge

Number	Abbreviation	Species	Specification	Density
768 No.	Ac	Acer campestre	1+1 :transplant - seed raised :BR	1/m²
1533 No.	CORSA	Cornus sanguinea	1+1 :Branched :2/3 brks :BR	1/m²
2298 No.	Cav	Corylus avellana	1+1: transplant - seed raised :BR	1/m²
3061 No.	Cmo	Crataegus monogyna	1+1 :transplant - seed raised :BR	1/m²
1533 No.	LIGVU	Ligustrum vulgare	0/1 :Branched :2 brks :BR	1/m²
3061 No.	PRUSP	Prunus spinosa	1+1: transplant - seed raised :Branched :2 brks :BR	1/m²
2298 No.	SLCI	Salix cincerea	1+1: transplant - seed raised :BR	1/m²
768 No.	VIBOP	Viburnum opulus	1+1 :Branched :2/3 brks :BR	1/m²
Total :15320 No.				

Restoration Land Budget

Land use	Area ha
Pond > -0.7m	2.5
Wet grassland/attenuation > 0.7m	5.5
Conservation grassland	10.0
Woodland planting	7.1
Restored to Agriculture, margins and ditches	45.8
Total planning application area	70.9

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PROJECT
PODE HOLE QUARRY PERMIT APPLICATION

TITLE
RESTORATION PLAN

CONSULTANT

wsp

YYYY-MM-DD	2025-07-02
DESIGNED	PH
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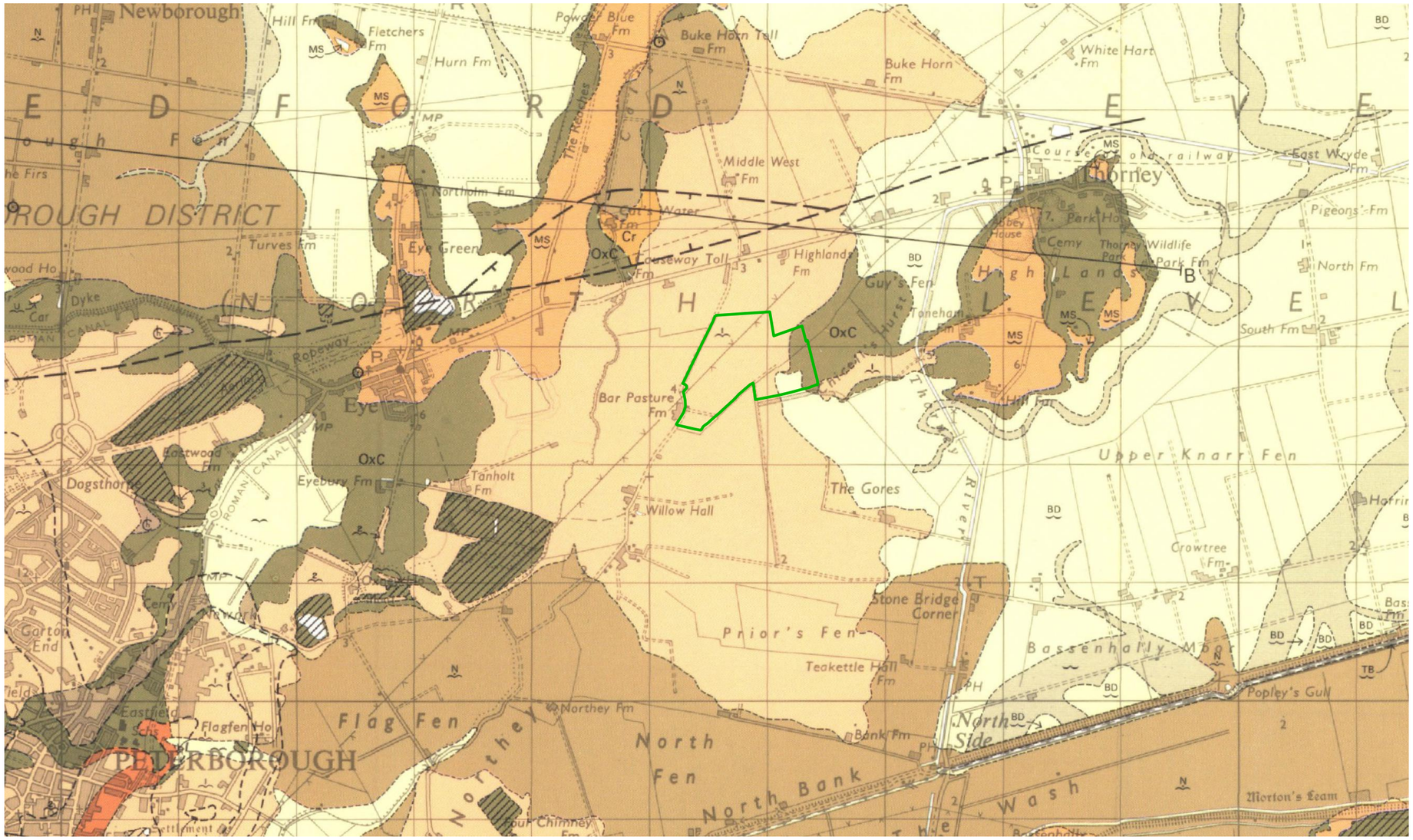
REVIEWED	PH
APPROVED	NW

PROJECT NO.	CONTROL	REV.	DRAWING
UK0038843.2142	1001_ES_0007	-	ESID6



LEGEND

ENVIRONMENTAL PERMIT APPLICATION BOUNDARY

INDEX AND EXPLANATION OF GEOLOGICAL SYMBOLS AND COLOURS

DRIFT

QUATERNARY

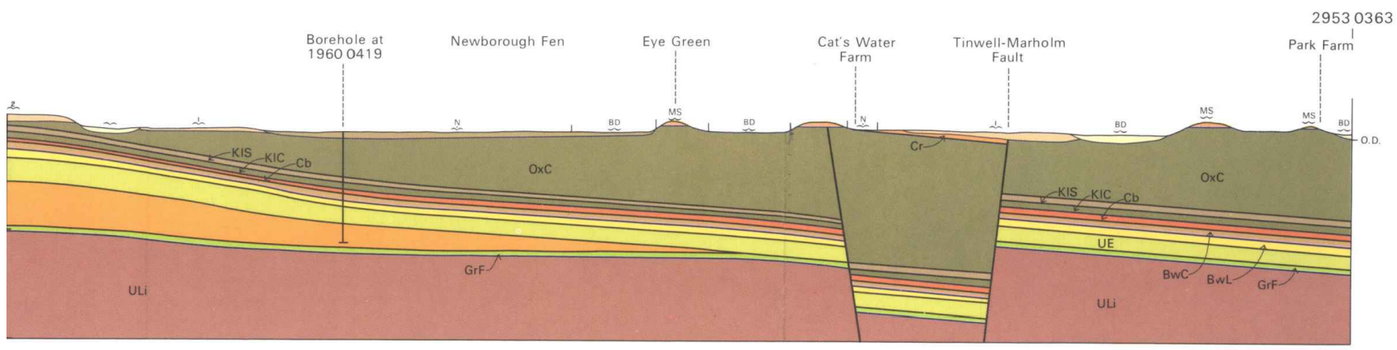
Flandrian

- Alluvium
- Marine Alluvium (Terrington Beds)
- Nordelph Peat
- Older Marine Alluvium (Barroway Drove Beds)
- Silt-filled creeks in Marine Alluvium, undifferentiated
- First, Second and Third River Terrace deposits, as numbered
- River Terrace deposits, undifferentiated
- Marine/Estuarine Sand and Gravel (Abbey Gravels)
- Older Marine/Estuarine Sand and Gravel (March Gravels)
- Head
- Glacial Sand and Gravel
- Till
- Glacial lake deposits

- Geological boundary, Drift
- Geological boundary, Solid
- Fault at surface; crossmark indicates downthrow side

Broken lines denote uncertainty.

- Selected waterwell or borehole
- Made ground (other than artificial excavations)
- Opencast mineral workings (some wholly or partially backfilled)



(Note: Flandrian deposits have not been subdivided on the sections)

Horizontal Scale 1:50 000 Vertical Exaggeration ×20

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PODE HOLE QUARRY PERMIT APPLICATION

TITLE
REGIONAL GEOLOGY

CONSULTANT
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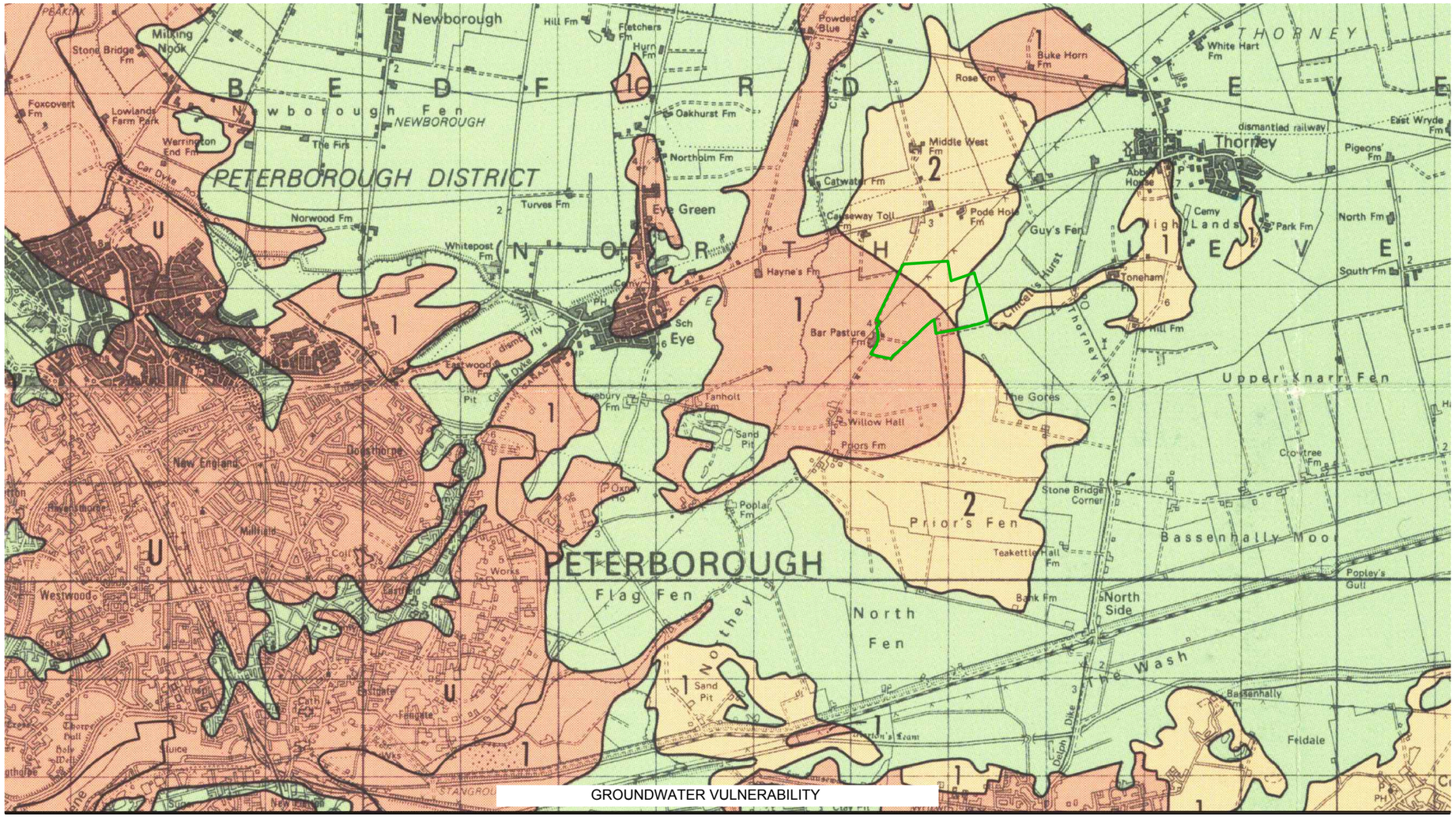
PROJECT NO.	CONTROL	REV.	DRAWING
UK0038843.2142	1001_ES_0006	-	ESID7



GROUNDWATER VULNERABILITY

LEGEND

PROPOSED ENVIRONMENTAL PERMIT BOUNDARY

VULNERABILITY CLASSES

Geological Classes	Soil Classes
Major Aquifer (Highly Permeable)	High (H) 1, 2, 3, U*
	Intermediate (I) 1, 2
	Low
Minor Aquifer (Variably Permeable)	High (H) 1, 2, 3, U*
	Intermediate (I) 1, 2
	Low
Non-Aquifer (Negligibly Permeable)	

Low permeability, non-water bearing drift deposits occurring at the surface and overlying major and minor aquifers are head, brickearth, peat, lacustrine and glaciolacustrine silts and clays and till.

* – Because soil information for urban areas is less reliable and based on fewer observations than in rural areas, the worst case is assumed and such land is classified as high leaching potential (HU) until proved otherwise.

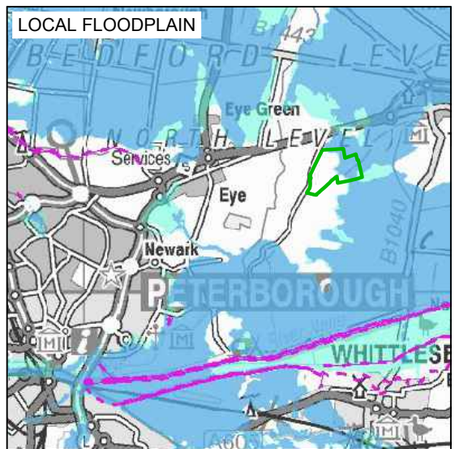
All maps involve a compromise between the representation of natural complexity and ease of interpretation of the map. Such compromises place limitations on the resolution and precision of map information. In this case, the variety of soils, geological strata and potential contaminants that have to be covered is wide, and the classification used is, of necessity, generalised. Individual sites and circumstances will always require further and more detailed assessments to determine the specific impact on groundwater resources. The maps only represent conditions at the surface and therefore where the soil and/or underlying formations have been disturbed or removed, for example during mineral extraction, the vulnerability class may have been changed. Hence, where there is evidence of disturbance there will be a need to determine groundwater vulnerability using site-specific data.

Map prepared by Cartographic Department, Soil Survey and Land Research Centre, Cranfield University, Silsoe, Bedford, MK45 4DT

GROUNDWATER SOURCE PROTECTION

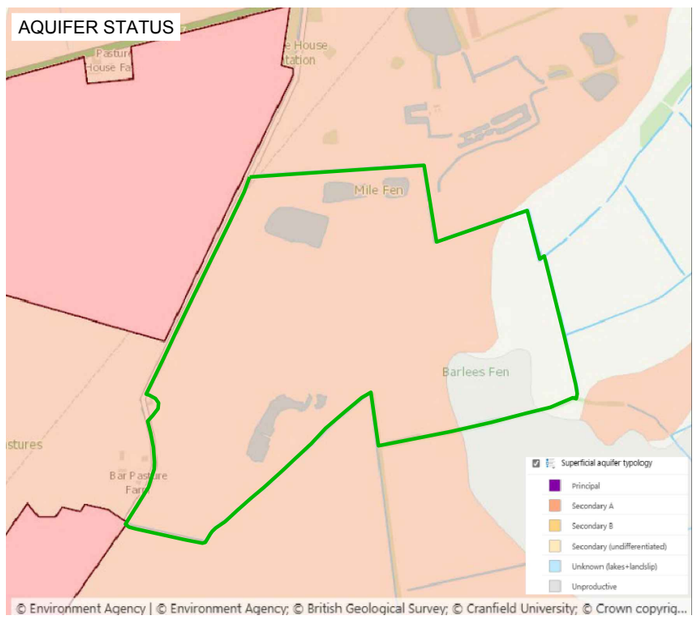
Source Protection
- Inner Zone
- Outer Zone
- Total Catchment
- Special Interest

LOCAL FLOODPLAIN



Indicative Floodplain
- River
- Sea

AQUIFER STATUS



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PODE HOLE QUARRY PERMIT APPLICATION

TITLE
REGIONAL HYDROGEOLOGY

CONSULTANT
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UK0038843.2142	1001_ES_0008	-	ESID8

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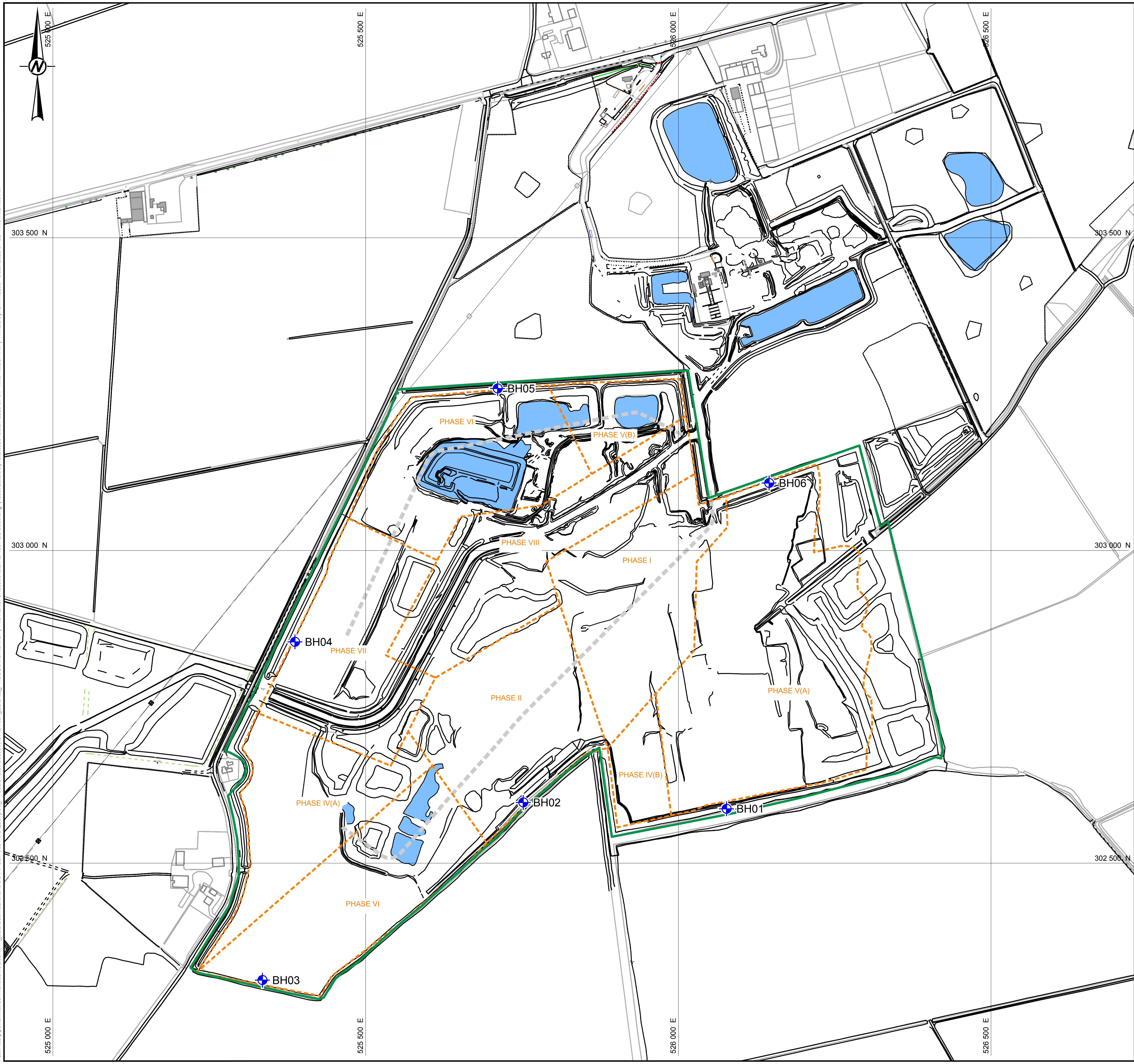

LEGEND

- ENVIRONMENTAL PERMIT APPLICATION BOUNDARY
- EXISTING GROUNDWATER MONITORING BOREHOLE
- PHASE BOUNDARY
- TEMPORARY HAUL ROAD

0 100 200
1:6,000 METRES

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PODE HOLE QUARRY PERMIT APPLICATION

TITLE
LOCAL HYDROGEOLOGY AND HYDROLOGY

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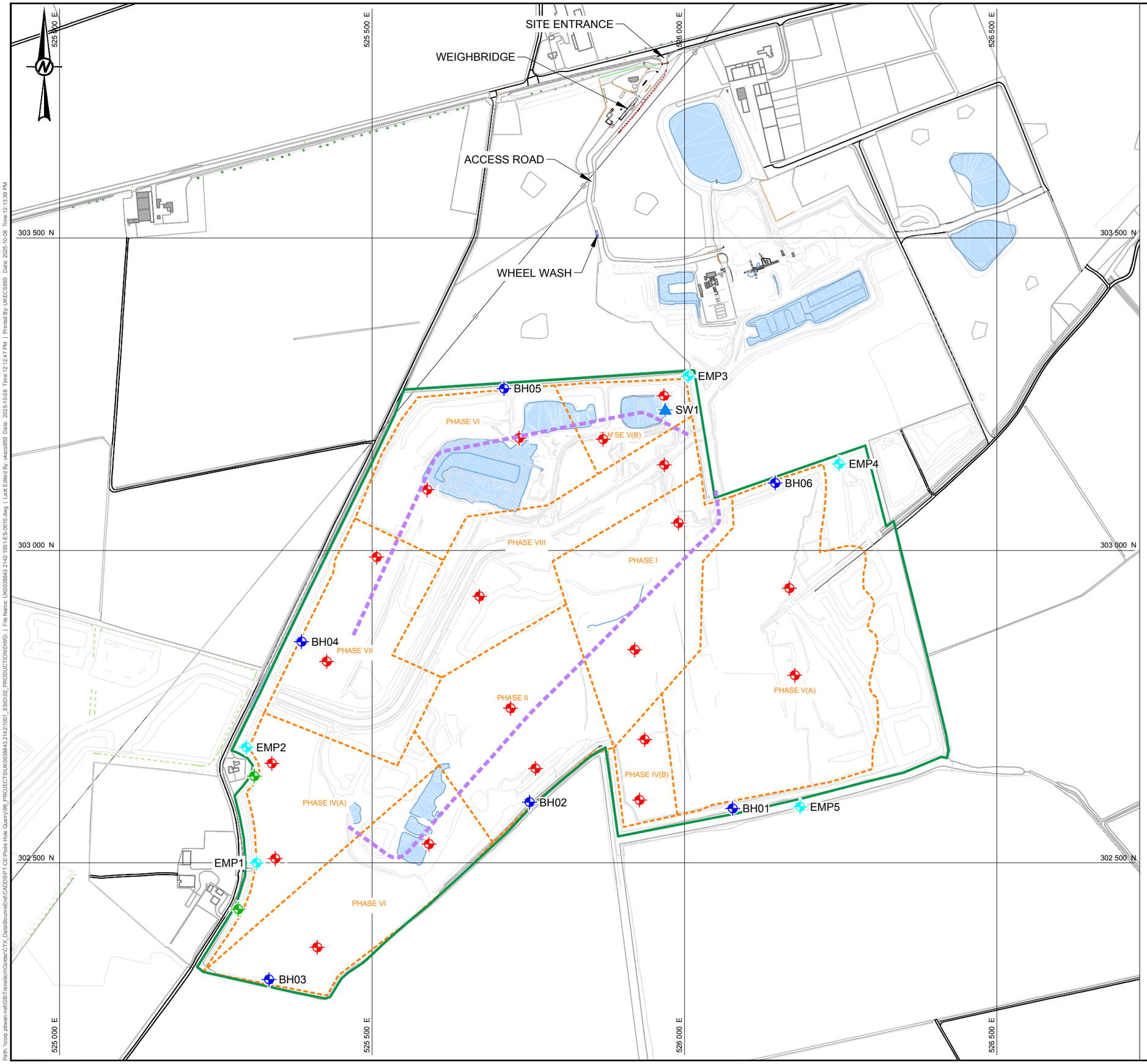

LEGEND

- ENVIRONMENTAL PERMIT APPLICATION BOUNDARY
- EXISTING GROUNDWATER MONITORING BOREHOLE
- INDICATIVE IN-WASTE LANDFILL GAS MONITORING BOREHOLE
- PROPOSED EXTERNAL GAS MONITORING BOREHOLE
- PROPOSED SURFACE WATER MONITORING POINT
- ENVIRONMENTAL MONITORING POINT
- PHASE BOUNDARY
- TEMPORARY HAUL ROAD

0 100 200
1:6,000 METRES

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PROJECT
PODE HOLE QUARRY PERMIT APPLICATION

TITLE
MONITORING AND EXTRACTION POINT PLAN

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YYYY-MM-DD	2025-07-24
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APPROVED	NW

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UK0038843.2142	1001_ES_0010	A	ESID10

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WSP House
70 Chancery Lane
London
WC2A 1AF

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